General Catalogue

PART I
Circular of Information

PART II
Announcement of Courses

DEPARTMENTS AT BERKELEY

Fall and Spring Semesters
1959–1960

AUGUST 10, 1959
General Catalogue

Consisting of

PART I—CIRCULAR OF INFORMATION
(published as a separate bulletin on May 20, 1959)

PART II—ANNOUNCEMENT OF COURSES
(to be published as a separate bulletin on August 15, 1959)

Fall and Spring Semesters
1959–1960

AUGUST 10, 1959

UNIVERSITY OF CALIFORNIA, BERKELEY

NONRESIDENT TUITION FEE
$250 per semester, effective September, 1959
PART I
Circular of Information
Circular of Information

BERKELEY
Circular of Information

BERKELEY

Fall and Spring Semesters
1959–1960

MAY 20, 1959

UNIVERSITY OF CALIFORNIA, BERKELEY
## CALENDAR*

Referring Primarily to the Departments of the University at Berkeley

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<th>1959</th>
<th>FALL SEMESTER, 1959–1960</th>
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| July 15, Wednesday | Last day for filing credentials and applications for admission to graduate standing with the Dean of the Graduate Division.  
Last day for filing applications for readmission to graduate standing with the Dean of the Graduate Division. |
| Aug. 17, Monday | Final date for applications for admission to undergraduate status for the fall semester and credentials to be filed with the Director of Admissions. Credentials received as late as this may not be evaluated in time for the enrollment of the student during the regular registration period. |
| Sept. 1, Tuesday | Last day for filing applications for readmission to undergraduate status with the Registrar. |
| Sept. 7, Monday | Labor Day—an academic and administrative holiday. |
| Sept. 11, Friday, or Sept. 14, Monday | Examination in English for foreign students, 1 to 4 p.m., 101 California Hall. |
| Sept. 12, Saturday | Subject A Examination, 9 a.m. to 12 m. |
| Sept. 14, Monday | Fall semester begins. |
| Sept. 15, Tuesday | Mathematics 3, 3A, and 3G qualifying examination, 4:15 to 5:45 p.m. |
| Sept. 15, Tuesday | Chemistry 1A Aptitude Test, 4:15 to 5:45 p.m. |
| Sept. 16, Wednesday | Registration of students, graduate and undergraduate, in the departments at Berkeley for courses of the fall semester. |
| Sept. 17, Thursday | Advanced enrollment. Assignment to sections. |
| Sept. 18, Friday | Instruction begins. |
| Sept. 21, Monday | Last day for filing applications in candidacy for all master's degrees to be conferred in January, 1960; office of the Dean of the Graduate Division, 102 Sproul Hall. All signatures required upon these applications must be obtained in advance. |
| Oct. 2, Friday | Last day for filing applications and programs in candidacy for the certificates of completion of teacher-training curricula to be received in January, 1960; office of the Faculty Counseling Committee of the School of Education, 103 Haviland Hall. |
| Oct. 5, Monday | Last day for filing announcement of candidacy for a bachelor's degree to be conferred in January, 1960; before 4:30 p.m. at the office of the Registrar, Sproul Hall. |
| Oct. 9, Friday | Last day for filing applications in candidacy for the degrees of Doctor of Philosophy, Doctor of Public Health, Doctor of Engineering, Doctor of Education, and Doctor of Library Science, to be conferred in June, 1960; office of the Dean of the Graduate Division, 102 Sproul Hall. All signatures required upon these applications must be obtained in advance. |
| Oct. 28, Wednesday | Last day to file petitions to add or drop courses. After this date, upon written petition duly approved by the dean of the college or school, an undergraduate student may discontinue attendance in a course, though without permission to drop the course from the study list. Normally, "F" will be assigned as the final grade in such discontinued courses. Graduate students may drop courses after this date with the permission of the Dean of Graduate Division. |
| Nov. 6, Friday | Last day to file application to take an engineering examination for admission in the spring semester, 1960. |

*Importance of early application: In order to give time for necessary correspondence and for due notice to applicants who may be required to take examinations for admission, applications and credentials should be forwarded to the Director of Admissions at the earliest possible date.*
Calendar

Nov. 7, Saturday  Engineering Examinations: Lower Division, 8 a.m. to 12:30 p.m.; Upper Division, 8 a.m. to 4:30 p.m.
Nov. 17, Tuesday  Last day to file application for admission or readmission to the University for students wishing to enroll in the College of Engineering in the spring semester, 1960.
Nov. 26, Thursday  Thanksgiving holiday—academic and administrative.
Nov. 26, Friday  Fall recess—an academic holiday.
Nov. 26, Thursday, to Nov. 28, Saturday  Last day for filing credentials and applications with the Dean of the Graduate Division for admission to graduate standing in the spring semester.
Dec. 15, Tuesday  Last day for filing applications with the Dean of the Graduate Division for readmission to graduate standing in the spring semester.
Dec. 21, Monday, to Jan. 2, Saturday  Last day for filing in final form with the committees in charge ofses for master's degrees to be conferred in January, 1960.
Dec. 24, Thursday  Christmas recess—an academic holiday.
Dec. 25, Friday  Christmas holiday—academic and administrative.
Dec. 31, Thursday  New Year's holiday—academic and administrative.
Jan. 1, Friday  1960
Jan. 4, Monday  Instruction resumes.
Jan. 11, Monday  Last day for students enrolled in the current session to file applications for undergraduate scholarships for 1960-1961.
Jan. 16, Saturday  Instruction ends.
Jan. 18, Monday, to Jan. 27, Wednesday  Final examinations in the departments at Berkeley.
Jan. 28, Thursday  Fall semester ends.
Jan. 15, Friday  Last day for filing theses with the Dean of the Graduate Division for master's degrees to be conferred in January, 1960.

1959

Dec. 15, Tuesday  Last day for filing credentials and applications with the Dean of the Graduate Division for admission to graduate standing.

1960

Jan. 15, Friday  Last day for filing credentials and applications with the Dean of the Graduate Division for graduate standing.

Applications for admission to undergraduate status for the spring semester and credentials to be filed with the Director of Admissions.

Jan. 29, Friday, or Feb. 1, Monday  Examination in English for foreign students, 1 to 4 p.m., 101 California Hall.
Jan. 30, Saturday  Subject A Examination, 9 a.m. to 12 m.
Feb. 1, Monday  Spring semester begins.
Feb. 3, Wednesday  Registration of students, graduate and undergraduate, in the departments at Berkeley for courses of the spring semester.
Feb. 4, Thursday  Advance enrollment. Assignment to sections.
Feb. 5, Friday  Last day for filing applications for fellowships and graduate scholarships for 1960-1961.*
Feb. 8, Monday  Instruction begins.

* Established date of February 7 being Sunday, the deadline is changed to February 8.
Feb. 19, Friday  
Last day for filing applications in candidacy for all master's degrees to be conferred in June, 1960; office of the Dean of the Graduate Division, 102 Sproul Hall. All signatures required upon these applications must be obtained in advance.

Feb. 22, Monday  
Washington's Birthday—an academic and administrative holiday.

Feb. 23, Tuesday  
Last day for filing announcement of candidacy for a bachelor's degree to be conferred in June, 1960; before 4:30 p.m. at the office of the Registrar, Sproul Hall.

Feb. 26, Friday  
Last day for filing applications in candidacy for the degrees of Doctor of Philosophy, Doctor of Public Health, Doctor of Engineering, Doctor of Education, Doctor of Library Science, and Doctor of Social Welfare, to be conferred in January, 1961; office of the Dean of the Graduate Division, 102 Sproul Hall. All signatures required upon these applications must be obtained in advance.

Feb. 29, Monday  
Last day to file petitions to add or drop courses. After this date, upon written petition duly approved by the dean of the college or school, an undergraduate student may discontinue attendance in a course though without permission to drop the course from the study list. Normally, "F" will be assigned as the final grade in such discontinued courses. Graduate students may drop courses after this date with the permission of the Dean of the Graduate Division.

March 1, Tuesday  
Last day for filing applications and programs in candidacy for the certificates of completion of teacher-training curricula to be received in June, 1960; office of the Faculty Counseling Committee of the School of Education, 103 Haviland Hall.

March 21, Monday  
Last day for entering students to file applications for undergraduate scholarships for 1960-1961.

March 23, Wednesday  
Last day to file application to take an engineering examination for admission in the fall semester, 1960.

April 2, Saturday  
Engineering Examinations: Lower Division, 8 a.m. to 12:30 p.m.; Upper Division, 8 a.m. to 4:30 p.m.

April 11, Monday, to April 16, Saturday  
Spring recess—an academic holiday.

April 12, Tuesday  
Last day to file application for admission or readmission to the University for students wishing to enroll in the College of Engineering in the fall semester, 1960.

May 9, Monday  
Last day for filing in final form with the committees in charge of theses for master's degrees to be conferred in June, 1960.

May 19, Thursday  

May 28, Saturday  
Instruction ends.

May 30, Monday  
Memorial Day—an academic and administrative holiday.

May 31, Tuesday, to June 9, Thursday  
Final examinations in the departments at Berkeley.

June 9, Thursday  
Last day for filing theses with the Dean of the Graduate Division for master's degrees to be conferred in June, 1960.

Spring semester ends.
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THE REGENTS OF THE UNIVERSITY

REGENTS EX OFFICIO

His Excellency, EDMUND G. BROWN, LL.B.
Governor of California and President of the Regents
State Capitol, Sacramento 14

GLENN M. ANDERSON
Lieutenant-Governor of California
State Capitol, Sacramento 14

RALPH M. BROWN, A.B., LL.B.
Speaker of the Assembly
State Capitol, Sacramento 14

ROY E. SIMPSON, M.A., Litt.D.
State Superintendent of Public Instruction
721 Capitol av, Sacramento 14

APPOINTED REGENTS

John S. Watson, B.S.
President of the State Board of Agriculture
496 Pepper rd, Petaluma

WILLIAM G. MERCHANT
President of the Mechanics' Institute
804 Mechanics' Institute bldg,
San Francisco 4

J ohn V. Vaughn, A.B.
President of the Alumni Association of the University of California
1199 Sherwood rd, San Marino

Clark Kerr, Ph.D., LL.D.
President of the University
714 State-wide Administration bldg.
Berkeley 4

GED MONTE
President of the Board.

APPOINTED REGENTS

The term of the appointed Regents is sixteen years, and terms expire March 1 of the years indicated in parentheses. The names are arranged in the order of original accession to the Board.

EDWIN W. PAULEY, B.S. (1970)
717 N Highland av, Los Angeles 38

VICTOR R. HANSEN, LL.B. (1962)
Apt. 605, 2000 Connecticut av,
NW Washington, D.C.

CORNELIUS J. HAGEN (1966)
Room 810, 995 Market st,
San Francisco 3

JESSIE H. STEINHART, A.B., LL.B. (1962)
111 Sutter st, San Francisco 4

DONALD H. MCLAUGHLIN, B.S., M.A.,
Ph.D., D.Eng. (1966)
100 Bush st, San Francisco 4

GUS OLSON, B.S. (1960)
Clarksburg

GERALD H. HAGAR, A.B., J.D. (1964)
1421 Central bldg, 14th and Broadway,
Oakland 12

HOWARD C. NAFFEGER, B.S., M.S., M.D.
(1963)
Room 417, 58 Sutter st, San Francisco 4

OFFICERS OF THE REGENTS

His Excellency, Edmund G. Brown, LL.B.
Governor of California
President
State Capitol, Sacramento 14

Donald H. McLaughlin, B.S., M.A.,
Ph.D., D.Eng., Chairman
100 Bush st, San Francisco 4

Robert M. Underhill, B.S.
Secretary and Treasurer
615 State-wide Administration bldg,
Berkeley 4

Stanley J. Thomson, A.B., Assistant Secretary and Assistant Treasurer
615 State-wide Administration bldg,
Berkeley 4

Miss Marjorie J. Woolman
Associate Secretary
615 State-wide Administration bldg,
Berkeley 4

Thomas J. Cunningham, A.B., LL.B.
General Counsel of the Regents
590 State-wide Administration bldg,
Berkeley 4
UNIVERSITY OF CALIFORNIA

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Harry R. Wellman, Ph.D., Vice-President of the University.
Claude B. Hutchison, M.S., L.L.D., D.Agr. (hon.c.), Vice-President of the University and Dean of the College of Agriculture, Emeritus.
Stanley E. McCaffrey, A.B., Vice-President—Executive Assistant.
James H. Corley, B.S., Vice-President—Government Relations and Projects, and Vice-President—Business Affairs.
Richard J. Stull, A.B., Vice-President—Medical and Health Sciences.
Robert M. Underhill, B.S., Vice-President, and Secretary and Treasurer of the Regents.
Thomas J. Cunningham, A.B., LL.B., Vice-President, and General Counsel of the Regents.
Glenn T. Seaborg, Ph.D., Sc.D., Chancellor at Berkeley.
Stanley B. Freeborn, Ph.D., Sc.D. (hon.c.), Chancellor at Davis.
Raymond B. Allen, M.D., Ph.D., LL.D., D.Sc., Chancellor at Los Angeles.
Herman T. Spieth, Ph.D., Chancellor at Riverside.
Elmer R. Noble, Ph.D., Vice-Chancellor at Santa Barbara.
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Herman A. Spindt, Ph.D., Director of Admissions and Director of Relations with Schools.

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Alex C. Sherriffs, Ph.D., Vice-Chancellor—Student Affairs.
Edward W. Strong, Ph.D., Vice-Chancellor at Berkeley.
Clinton C. Gilliam, A.B., Registrar.
James C. Stone, M.A., Ed.D., Acting Associate Director of Admissions.
Morris A. Stewart, Ph.D., LL.D., Dean of the Graduate Division, Northern Section.
James M. Cline, Ph.D., Associate Dean of the Graduate Division, Northern Section.
Robert A. Cockrell, Ph.D., Associate Dean of the Graduate Division, Northern Section.
Sanford A. Mosk, Ph.D., Associate Dean of the Graduate Division, Northern Section.
Hurford E. Stone, Ph.D., LL.D., Dean of Students (to June 30, 1959).
William F. Shepard, Ph.D., Dean of Men and Associate Dean of Students (to June 30, 1959), Dean of Students (from July 1, 1959).
Katherine A. Towle, M.A., LL.D., Dean of Women and Associate Dean of Students.
Catharine Devoto Quire, Ph.D., Associate Dean of Women.
Eric C. Bellquist, Ph.D., Assistant Dean of Students.
George D. Changaris, M.A., Assistant Dean of Students.
Helen E. Clarke, M.A., Assistant Dean of Students.
Thomas B. Dutton, M.A., Assistant Dean of Men.
Gordon Hearn, Ph.D., Assistant Dean of Students.
Administrative Officers

Betty H. Neely M.Ed., Assistant Dean of Students.
Maryanne Reid, M.A., Assistant Dean of Students.
Donald Coney, M.A., University Librarian.
Allen C. Blaisdell, M.A., Foreign Student Adviser.
James G. Siler, M.S., Supervisor of Special Services.
Ruth N. Donnelly, A.B., Housing Supervisor.
Robert F. Kerley, B.S., Acting Business Manager.
Edwin C. Linsley, B.S., Accounting Officer.
Lloyd D. Bernard, Ph.D., Manager of the Bureau of School and College Placement.
Robert Calvert, Jr., Ed.D., Manager of the Student and Alumni Placement Center.
Barbara A. Kirk, M.A., Manager of the Counseling Center.
Margaret G. Zeff, M.D., Acting Director of the Student Health Service.

ADMINISTRATIVE OFFICERS OF THE COLLEGES AND SCHOOLS

BERKELEY CAMPUS

Roy Bainer, M.S., Assistant Dean of the College of Engineering (Resident at Davis).
Clinton E. Ballou, Ph.D., Assistant Dean of the College of Letters and Science.
William J. Bouwsma, Ph.D., Assistant Dean of the College of Letters and Science.
Boris Bresler, M.S., Assistant Dean of the College of Engineering.
William A. Brownell, Ph.D., LL.D., Dean of the School of Education.
Eugene W. Burgess, Ph.D., Assistant Dean of the Graduate School of Business Administration.
Milton Chernin, Ph.D., Dean of the School of Social Welfare.
Lincoln Constance, Ph.D., Dean of the College of Letters and Science.
J. Periam Danton, Ph.D., Dean of the School of Librarianship.
Arnold Elston, Ph.D., Assistant Dean of the College of Letters and Science.
Clyne F. Garland, M.S., Associate Dean of the College of Engineering.
Ewald T. Grether, Ph.D., LL.D., Dean of the Graduate School of Business Administration and Dean of the School of Business Administration.
Mary T. Harms, Ed.D., Assistant Dean of the School of Nursing.
Ralph R. Hultgren, Ph.D., Assistant Dean of the College of Engineering.
William N. Keeler, A.B., J.D., Assistant Dean of the School of Law.
George C. Kyte, Ed.D., Acting Dean of the School of Education (from January 1, 1959, to June 30, 1959).
Theodore D. McCown, Ph.D., Associate Dean of the College of Letters and Science.
Maurine McKeany, Ph.D., Associate Dean of the School of Social Welfare.
F. Theodore Malm, Ph.D., Assistant Dean of the School of Business Administration.
Gerald E. Marsh, M.A., Associate Dean of the College of Letters and Science and Director of the Summer Sessions.
Maurice Moonitz, Ph.D., Associate Dean of the Graduate School of Business Administration.
Charles Muscatine, Ph.D., Assistant Dean of the College of Letters and Science.
Helen Nahm, Ph.D., Dean of the School of Nursing.
Donald S. Noyce, Ph.D., Assistant Dean of the College of Chemistry.
Morrough P. O'Brien, B.S., Dean of the College of Engineering (to June 30, 1959).
Kenneth S. Pitzer, Ph.D., Dean of the College of Chemistry.
William L. Prosser, A.B., LL.B., LL.D., Dean of the School of Law.
John A. Putnam, Ph.D., Assistant Dean of the College of Engineering.
Administrative Officers

Warren Ramsey, Ph.D., Assistant Dean of the College of Letters and Science.
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Erhard Rostlund, Ph.D., Assistant Dean of the College of Letters and Science.
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Lysle E. Shaffer, E.M., Assistant Dean of the College of Engineering.
Charles E. Smith, M.D., D.P.H., Dean of the School of Public Health.
Kathryn M. Smith, M.A., Assistant Dean of the School of Nursing.
Kenneth B. Stoddard, Ph.D., Dean of the School of Optometry.
Frederick T. Tyler, Ph.D., Associate Dean of the School of Education.
Henry J. Vaux, Ph.D., Dean of the School of Forestry.
Dow Votaw, M.B.A., LL.B., Associate Dean of the School of Business Administration.
Orlando W. Wilson, A.B., Dean of the School of Criminology.

SAN FRANCISCO CAMPUS

Robert H. Crede, M.D., Assistant Dean of the School of Medicine.
Troy C. Daniels, Ph.D., Dean of the School of Pharmacy.
John J. Eiler, Ph.D., Associate Dean of the School of Pharmacy.
Willard C. Fleming, D.D.S., D.Sc., Dean of the School of Dentistry.
Leon Goldman, M.D., Associate Dean of the School of Medicine.
Mary T. Harms, Ed.D., Assistant Dean of the School of Nursing.
Helen Nahm, Ph.D., Dean of the School of Nursing.
John B. deC. M. Saunders, M.B., Ch.B., F.R.C.S., Dean of the School of Medicine.
Kathryn M. Smith, M.A., Assistant Dean of the School of Nursing.
David E. Snodgrass, A.B., LL.B., Dean of Hastings College of the Law.
Malcolm S. Watts, M.D., Assistant Dean of the School of Medicine.
Gurdon G. Woods, Director of the California School of Fine Arts.
Wendell L. Wylie, D.D.S., M.S., Assistant Dean of the School of Dentistry.
THE UNIVERSITY OF CALIFORNIA

FOUNDED 1868

The University of California is composed of academic colleges, professional schools, divisions, departments of instruction, museums, libraries, research institutes, bureaus and foundations, and the University of California Press, situated on eight different campuses throughout the State, namely: Berkeley, Davis, La Jolla, Los Angeles, Mount Hamilton, Riverside, San Francisco, and Santa Barbara. A list of the divisions on each campus follows:

I. AT BERKELEY

The colleges of Letters and Science, Agriculture, Architecture, Chemistry, Engineering; The schools of Business Administration, Criminology, Education, Forestry, Law, Librarianship, Medicine (first year), Nursing (in part), Optometry, Public Health (in part), Social Welfare.

The Graduate Division (Northern Section); The University Extension (offering instruction wherever classes can be formed, or anywhere in California by correspondence, and providing lectures, recitals, moving pictures, and other material for visual instruction); The Agricultural Extension Service; The Agricultural Experiment Station (in part); The Giannini Foundation of Agricultural Economics; M. Theodore Kearney Foundation of Soil Science; The Museum of Vertebrate Zoology; The Museum of Paleontology; The Museum of Anthropology; The Heller Committee for Research in Social Economics; The institutes of Engineering Research, of Experimental Biology, of Geophysics (in part), of Human Development, of Industrial Relations (in part), International Studies, Personality Assessment and Research, of Transportation and Traffic Engineering (in part); The bureaus of Business and Economic Research (in part), of International Relations, of Public Administration; The William H. Crocker Radiation Laboratory; The Virus Laboratory; The University Art Gallery; The University of California Press; The University Library.

Departments of Instruction in the Colleges at Berkeley

II. AT LOS ANGELES*

The colleges of Letters and Science, Engineering, Applied Arts, Agriculture, Pharmacy (in part); The schools of Business Administration, Business Administration—Graduate, Education, Law, Medicine, Nursing, Public Health (in part), Social Welfare; The Graduate Division (Southern Section); Agricultural Experiment Station (in part); The bureaus of Business and Economic Research (in part), of Governmental Research; The institutes of Geophysics (in part), of Industrial Relations (in part), of Slavic Studies (in part), of Transportation and Traffic Engineering (in part); The University Library; The Senator William Andrews Clark Memorial Library.

III. AT SAN FRANCISCO

Schools of Dentistry, of Medicine (including the University Hospital and Langley Porter Neuropsychiatric Institute), of Nursing (in part), of Pharmacy, of Public Health (in part); The George Williams Hooper Foundation (for medical research); College of Pharmacy; California School of Fine Arts; Hastings College of the Law.

IV. AT DAVIS

The College of Agriculture, the College of Letters and Science, and the School of Veterinary Medicine.

V. AT RIVERSIDE

The College of Letters and Science and the Citrus Experiment Station.

VI. AT MOUNT HAMILTON

The Lick Observatory.

VII. AT LA JOLLA

The Scripps Institution of Oceanography.

VIII. AT SANTA BARBARA

The Division of Applied Arts and the Division of Letters and Science.

DIVISION OF AGRICULTURAL SCIENCES

There is established a Division of Agricultural Sciences which shall consist of the College of Agriculture, the School of Forestry, the School of Veterinary Medicine, the Agricultural Extension Service, the Agricultural Experiment Station, the Citrus Experiment Station, the Giannini Foundation of Agricultural Economics, and the M. Theodore Kearney Foundation of Soil Science.

ADMINISTRATION

The Regents of the University of California, by authority vested in them by the State constitution, created an academic administrative body called the Academic Senate. The Senate, subject to the approval of the Regents, determines the conditions for admission, for certificates, and for degrees. It authorizes and supervises all courses of instruction in the academic and professional colleges and schools, except in professional schools offering courses at the graduate level only. The dean or director of a school, college, or other division

* A more detailed description of instruction offered at Los Angeles will be found on page 17.
of the University is entrusted with the duty of assisting the President in the administration of the University, with special reference to the welfare of the particular school, college, or other division concerned, and of the students therein.†

SURVEY OF CURRICULA

In order that the student may gain some idea of the scope of the curricula offered—undergraduate, professional, and graduate—and of the academic and professional opportunities that are open to him, there is presented in the following paragraph a cursory but fairly comprehensive outline of the programs of instruction offered in the different schools and colleges.

THE FOUR ACADEMIC UNDERGRADUATE COLLEGES

Four academic colleges at Berkeley offer undergraduate curricula of four years, leading, in the College of Letters and Science, to the bachelor's degree in arts (A.B.), and in the three colleges of applied sciences to the bachelor's degree in science (B.S.); additionally, students who enter the Armed Services before completing all requirements for the Bachelor of Science degree in engineering may be granted the degree of Bachelor of Applied Science. The undergraduate colleges are:

College of Letters and Science

Colleges of applied sciences—

College of Agriculture. In this College, curricula are open in the fields of plant science, animal science, agricultural economics, entomology and parasitology, food science, home economics, irrigation science, nutrition, soil science, landscape architecture, or agricultural education.

College of Chemistry. In this College, the student may choose a program in chemistry or a program in chemical engineering.

College of Engineering. The student in this College may elect programs of study in agricultural engineering, ceramic engineering, civil engineering, electrical engineering, engineering science (engineering physics), geological engineering, industrial engineering, mechanical engineering, metallurgy, mining engineering, petroleum engineering, or process engineering.

PROFESSIONAL CURRICULA

The professional curricula offered by the University are based on two or more years of undergraduate work. Some of the curricula may be carried to completion at Berkeley; others must be pursued in part at Berkeley and completed in San Francisco or at Davis; others may be pursued in full in San Francisco. These curricula lead to the higher degrees, or to degrees and/or certificates, in the respective fields of architecture, bioradiology, business administration, city planning, criminology, dentistry, education, engineering, forestry, journalism, law, librarianship, medicine, pharmacy, public health, nursing, optometry, and social welfare. Full details of the respective curricula will be found in later pages of this bulletin.

The Professional Schools—

The School of Business Administration offers a program beginning with junior standing in the University, normally requiring two years and leading to the degree of Bachelor of Science.

The Graduate School of Business Administration offers curricula leading to the degree of Master of Business Administration. The master's degree nor-

† For a list of the administrative officers of the University at Berkeley and San Francisco, see pages 8–10.
Survey of Curricula

nally requires from one to two years, depending upon the undergraduate preparation. Students who have completed the work for the degree of Bachelor of Science in the School of Business Administration, University of California, or an equivalent institution, should be able to complete the requirements for the degree of Master of Business Administration in one year.

The School of Criminology offers curricula on both the undergraduate and graduate levels. Students may be admitted to the undergraduate curricula leading to the Bachelor of Arts or the Bachelor of Science degree upon attaining upper division standing and at least a grade C average in the College of Letters and Science or the equivalent elsewhere. The graduate curricula lead to the degree of Master of Criminology.

The School of Dentistry offers three curricula: a six-year curriculum leading to the degrees of Bachelor of Science and Doctor of Dental Surgery; a curriculum, limited to women students, in the training of dental hygienists; and a graduate curriculum leading to the degree of Master of Dental Surgery, and Master of Science in Dentistry.

The degree of Bachelor of Science is awarded for completion of the work of the first five years—two years in the College of Letters and Science at Berkeley or Los Angeles, followed by three years of the four-year professional curriculum in the School of Dentistry at San Francisco—and the degree of Doctor of Dental Surgery is awarded after one additional year (the fourth year of the professional curriculum) in San Francisco. The degree of Master of Dental Surgery is awarded upon completion of a graduate curriculum of three years, following receipt of the degree of Doctor of Dental Surgery.

For the training of dental hygienists a four-year curriculum is offered, including two years of academic instruction similar in scope and content to that required for admission to the curricula in dentistry, followed by two years of professional training in dental hygiene. On completion of the curriculum for dental hygienists, the degree of Bachelor of Science is awarded.

The School of Education offers two programs. The first (a three-year curriculum) covers, with the required preliminary work, a total of five years—the usual four undergraduate years leading to the bachelor's degree, and an additional graduate year leading to the Certificate of Completion of teacher-training curricula. The second program (a two-year curriculum following the bachelor's degree) requires six years—the four undergraduate years leading to the bachelor's degree, and two graduate years, leading either to the degree of Master of Education or to the degree of Doctor of Education.

The School of Forestry offers undergraduate and graduate curricula leading to the degrees of Bachelor of Science, Master of Forestry, and Master of Science. For further details, consult the Announcement of the School of Forestry.

The School of Law offers the following curricula:

1. A three-year curriculum leading to the degree of Bachelor of Laws. Applicants for admission to the professional curriculum must have received the degree of Bachelor of Arts or Bachelor of Science from the University of California, or an equivalent degree from a college or university of approved standing. (For admission requirements, see under School of Law in later pages of this bulletin and consult the Announcement of the School of Law, a copy of which may be obtained from the Dean of the School.)

2. A graduate curriculum of one year, based on the degree of Bachelor of Laws and leading to the degree of Master of Laws (LL.M.) or Doctor of the Science of Law (J.S.D.).

The School of Librarianship offers a curriculum of two years based on the bachelor's degree, leading to the degree of Master of Library Science; and a curriculum of two years following completion of the basic professional curriculum of a graduate library school of approved standing, leading to the degree of Doctor of Library Science.
The School of Medicine prescribes a curriculum of four years based on three years of undergraduate work. The three years of undergraduate work may be taken in the College of Letters and Science, Berkeley. The student who completes the courses specified by the School of Medicine and attains the equivalent of senior standing in the College of Letters and Science may apply for admission to the School of Medicine for the senior year. If he completes the junior year in the College of Letters and Science, Berkeley, he must elect a regular major for the A.B. degree and enroll in that major program. A student who enters the School of Medicine in his senior year may be a candidate for the bachelor's degree upon completion of his first year in the School of Medicine. The four-year curriculum in the School of Medicine leads to the degree of Doctor of Medicine.

In addition, the School of Medicine offers practical training in clinical techniques for a limited number of qualified students.

The School of Nursing, in connection with the University Hospital, offers a curriculum of five years, leading to the degree of Bachelor of Science, and to a Certificate in Nursing. Matriculation and the completion of the lower division requirements in the College of Letters and Science or in the College of Applied Arts are required. The program includes two years in the College of Letters and Science at Berkeley or Los Angeles or in the College of Applied Arts at Los Angeles, and three years in the School of Nursing. A graduate curriculum is also offered, leading to the Master of Science degree.

The School of Optometry offers a curriculum of three years based on the completion of two years of study in the College of Letters and Science, or its equivalent, leading to the degree of Bachelor of Science at the end of two years, and the Certificate of Completion in optometry and to the Master of Optometry degree at the end of an additional graduate year.

The School of Pharmacy (at San Francisco) offers a four-year curriculum leading to the degree of Doctor of Pharmacy. The requirements for admission are completion with an average grade of "C" or better of 60 units of college work in the University of California or another institution of approved standing.

The School of Public Health offers curricula on both the undergraduate and the graduate levels. Students may be admitted to the undergraduate curriculum leading to the degree of Bachelor of Science upon attaining upper division standing and at least a grade C average in the College of Letters and Science or the equivalent elsewhere. The graduate curricula lead to the degrees of Master of Public Health and Doctor of Public Health.

The School of Social Welfare offers a curriculum of two years, based upon the bachelor's degree, leading to the degree of Master of Social Welfare.

The School of Veterinary Medicine (at Davis) offers a curriculum of four years based upon two or more years of undergraduate work, leading to the degree of Doctor of Veterinary Medicine.

The Professional Colleges—

The College of Architecture offers a five-year curriculum leading to the degree of Bachelor of Architecture. Students admitted (through September, 1955) to the College of Architecture under regulations in effect for admission to the School of Architecture prior to the establishment of the College may be granted the Bachelor of Arts degree.

Hastings College of the Law offers a three-year curriculum and a four-year curriculum, both leading to the degree of Bachelor of Laws:

Every applicant for admission to the three-year curriculum of the College must have received the degree of Bachelor of Arts or Bachelor of Science from the University of California, or an equivalent degree from a college or university of approved standing.

Every applicant for admission to the four-year curriculum must have com-
completed at least 60 units of undergraduate work, acceptable toward a bachelor's
degree in the College of Letters and Science of the University of California.

The College of Pharmacy offers, to those students who began work in Sep-
tember, 1956, a four-year curriculum, which leads to the degree of Bachelor
of Science in pharmacy, and a fifth year of study which, for properly qualified
students, leads to the degree of Master of Pharmacy. The requirements for
admission are the same as those for academic departments of the University
and in addition 30 units of college work in the University of California or in
another institution of approved standing. The first year of this curriculum is
given at Berkeley and Los Angeles; the final three years comprise specialized
training in the College of Pharmacy in San Francisco.

The College of Pharmacy also issues a Certificate of Completion to students
who, having already received the Bachelor of Science degree in that College,
complete an additional year of residence in order to become eligible for the
State Board of Pharmacy examinations for the licentiate in pharmacy.

Graduate Curricula in Engineering—

Curricula in engineering lead to the advanced professional degrees: Master
of Engineering and Doctor of Engineering.

Special Professional Curricula—

The professional curriculum in public health nursing leads to the Certificate
of Completion in public health nursing, awarded by the School of Nursing to
students who (a) have completed the requirements of the B.S. degree in the
curriculum for undergraduate students in nursing, provided they hold the
Certificate of Completion in nursing and have completed an additional pro-
gram of prescribed study, including four months of supervised field practice;
or (b) have completed the requirements of the B.S. degree in the curriculum
for graduate nurses, and in addition have completed four months of super-
vised field practice in public health nursing.

The professional curriculum in nursing education leads to the Certificate of
Completion in nursing education, awarded by the School of Nursing to stu-
dents who (a) have completed the requirements of the B.S. degree in the cur-
riculum for undergraduate students in nursing, provided they hold the Cer-
tificate of Completion in nursing and have completed an additional program
of study prescribed by the School of Nursing, including four months of super-
vised field practice in nursing education; or (b) have completed the require-
ments of the B.S. degree in the curriculum for graduate nurses and in addi-
tion four months of supervised field practice in nursing education.

The professional curriculum in hospital dietetics requires one year of work
following the bachelor's degree (including one semester's residence at the
University Hospital in San Francisco and one semester in the Graduate Divi-
sion at Berkeley) and leads to a Certificate of Completion of the curriculum
in hospital dietetics.

The course in physical therapy is given at the School of Medicine in San
Francisco. It requires a period of one year divided into two semesters and
two summer sessions of six weeks each and leads to a certificate or to a B.S.
degree in the School of Medicine with a major in physical therapy.

The course for orthoptic technicians is given at the School of Medicine in
San Francisco. The requirements for admission to the course are a bachelor's
degree or equivalent training. The total training period is twelve months and
leads to a Certificate of Completion of the course for orthoptic technicians.

The course for medical technicians is given at the School of Medicine in
San Francisco. It consists of twelve months of full-time work and leads to a
Certificate of Completion of the curriculum in medical technology.

Two courses in medical illustration are given at the School of Medicine in
San Francisco. The first extends through a full year and leads to a Certificate
of Completion in elementary medical illustration. The second course extends
through a second year and leads to a Certificate of Completion of the course in advanced medical illustration.

The course for X-ray technicians is offered at the University of California Medical Center, San Francisco. It extends through a full year and leads to a Certificate of Completion of the course for X-ray technicians.

The course for technicians in exfoliative cytology is given at the School of Medicine in San Francisco. The requirements for admission to the course are a bachelor's degree in medical sciences and a certificate in medical laboratory techniques. It requires a period of four months and leads to a Certificate of Completion of the course for technicians in exfoliative cytology.

A field of study in city planning leads to the degree of Master of City Planning after at least two years of prescribed graduate work. Candidates must have received the degree of Bachelor of Arts or Bachelor of Science, must have completed an approved program of study, and must either present an acceptable thesis or pass a comprehensive examination.

A field of study in journalism leads to the degree of Master of Journalism after at least one year of prescribed graduate work. Candidates must have received the bachelor's degree, must have completed an approved program of study, and must have passed a comprehensive final examination.

A field of study in bioradiology leads to the degree of Master of Biomedical Engineering after at least two years of prescribed work. Candidates must have received a bachelor's degree and must have completed an approved program of study.

**UNIVERSITY OF CALIFORNIA, LOS ANGELES**

Instruction at the University of California, Los Angeles, is offered in (a) the College of Letters and Science, with curricula leading to the degree of Bachelor of Arts, and Bachelor of Science; also, the following preprofessional curricula: prebusiness, precriminology, predental, predental hygiene, premedical, and prepharmacy; (b) the College of Applied Arts, with curricula leading to the degree of Bachelor of Arts, and Bachelor of Science; also, the following preprofessional curricula: prenursing, preoccupational therapy, preoptometry, and prepublic health; (c) the College of Engineering, with curricula leading to the degree of Bachelor of Science; (d) the College of Agriculture, with curricula leading to the degree of Bachelor of Science; (e) the College of Pharmacy, offering the first year of the B.S. curriculum; (f) the School of Business Administration, with curricula leading to the degree of Bachelor of Science; (g) the School of Public Health, with curricula leading to the degree of Bachelor of Science; (h) the School of Nursing, with curricula leading to the degree of Bachelor of Science; (i) the School of Law, with a curriculum leading to the degree of Bachelor of Laws; and (j) the School of Medicine with a curriculum leading to the degree of Doctor of Medicine. Students electing certain curricula in the College of Agriculture may register at Los Angeles for the first two years and then transfer to Berkeley or Davis to complete the requirements for the degree. The School of Education at Los Angeles supervises curricula leading to the Certificate of Completion for the various elementary and secondary teaching credentials, and for the administrative credential. Graduate study, leading to the degrees of Master of Science, Master of Arts, Master of Business Administration, Master of Education, and Master of Social Welfare, and to the degrees of Doctor of Philosophy and Doctor of Education, also is available at the University of California, Los Angeles.

**SUMMER SESSIONS**

During the summer the University conducts at Berkeley one or more sessions of six weeks' duration each. In 1959 two such summer sessions of six weeks
each will be conducted, the first session beginning June 18, and the second beginning July 30. Information concerning the Summer Sessions of 1959 is in the SUMMER SESSIONS bulletin, obtainable on or about April 2, 1959, upon request from the Office of the Summer Sessions, 1 Sproul Hall, University of California, Berkeley 4, California.

In addition to the sessions at the University on the Berkeley campus, Summer Sessions are conducted annually by the University of California on the campuses of Davis, Los Angeles, San Francisco, and Santa Barbara.

**UNIVERSITY EXTENSION**

University Extension makes available the resources of the University to those, especially adults, who cannot take up residence at one of the campuses or who prefer a part-time special program. The program includes classes, correspondence courses, discussion groups, conferences, and special activities in a wide variety of subject fields and interests. During the past few years, an increasingly large and significant service has been made available to those in the professions and others with advanced training. Study at the professional level is offered in such fields as engineering and sciences, law, medicine, nursing, public health, dentistry, accounting, public administration, and the like. However, the majority of University Extension offerings are in the more general fields and are open to all adults who can profit by the instruction.

The educational services of University Extension are organized around three primary aims: to help men and women advance professionally; to aid them in meeting their responsibilities as citizens; to assist in their pursuit of intellectual and cultural interests.

Five principal methods of instruction are used:

1. Classes and discussion groups are organized in areas wherever there is a sufficient number of persons who wish to study a subject.
2. Correspondence courses offer lessons, study materials, and University faculty guidance by mail.
3. Conferences and special activities, for periods ranging from two days to several weeks, provide intensive instruction for groups interested in specialized knowledge.
4. Lectures, singly or in series, are provided for any committee, club, organization, or community in the State that will make the necessary arrangements for their delivery.
5. The Department of Visual Communications administers the University's programming in the field of educational television; produces educational motion pictures as needed by campus departments; makes certain educational films available for purchase; and maintains film libraries on a rental basis for the campus and the general public.

For schedules and literature describing these services in detail, write to University Extension at one of the following addresses: University Extension, University of California, Berkeley 4; University Extension, 55 Laguna Street, San Francisco 2; University Extension, Room 164, Home Economics Building, University of California, Davis; University Extension, University of California, Los Angeles 24; University Extension, University of California, Riverside; University Extension, University of California, 129 East Carrillo Street, Santa Barbara; University Extension, 1221 Fourth Avenue, San Diego 1.

**THE UNIVERSITY LIBRARY**

The Library on the Berkeley campus of the University of California consists of the General Library with its twenty-one branch libraries and about thirty-five departmental and special libraries. These groups, collectively known as the University Library, contain more than 2,500,000 volumes. Approximately 28,000 periodicals and serials are received currently.

The Bancroft Library of Californian, western American, and colonial Latin-American history, and the Alexander F. Morrison Library, a recreational reading room open only to students, members of the faculty, and officers of the University, are also located in the Main Library.

The twenty-one branch libraries are located near the departments which use them most: Anthropology Library, Building T-2; Architecture Library, Architecture Building; Astronomy Library, Leuschner Observatory; Biochemistry Library, Biochemistry and Virus Laboratory Building; Biology Library, Life Sciences Building; Chemistry Library, Gilman Hall; City and Regional Planning Library, City and Regional Planning Building; East Asiatic Library, Durant Hall; Engineering Library, Hesse Hall Annex; Forestry Library, Mulford Hall; Geology Library, Bacon Hall; Howison Memorial Library of Philosophy, Dwinelle Hall; Landscape Architecture Library, Agriculture Hall; Lange Library of Education, Haviland Hall; Library School Library, Main Library Building; Mathematics-Statistics Library, Dwinelle Hall; Matthew Memorial Library of Paleontology, Hearst Mining Building; Music Library, May T. Morrison Hall; Optometry Library, Optometry Building; Physics Library, LeConte Hall; Public Health Library, Earl Warren Hall.

Departmental and special libraries include the libraries of the Bureau of International Relations and the Bureau of Public Administration on the third floor of the Main Library; the Entomology Library, Agriculture Hall; Giannini Library of agricultural economics in Giannini Hall; the Institute of Industrial Relations Library, Old California Hall; the Institute of Transportation and Traffic Engineering Library, Richmond Field Station; and the Law Library in the School of Law Building.

Registered students may draw books and periodicals from the University Library, according to the regulations of the various units, by presentation of their registration cards as identification. A series of orientation leaflets describing the location of library units and collections and explaining their use are available at the General Reference Service desk in the Main Library.
ADMISSION TO THE UNIVERSITY

ADMISSION IN UNDERGRADUATE STATUS

The University of California bases its entrance requirements on two principles: first, that the best guarantee of success in the University is high quality of scholarship in previous work, and second, that the study of certain specified subjects will give to the student both good preparation for the work of the University and reasonable freedom of choice of a major field of study after his entrance. These principles apply to admission in either freshman or advanced standing, and the applicant who wishes to enter the University must fulfill the general requirements for admission as set forth below.

Every new student must also present at the time of medical examination by the University Medical Examiners a certificate establishing the fact that he has been successfully vaccinated against smallpox within the last seven years. A form for this purpose will be furnished by the University. Vaccination should be completed prior to registration.

ADMISSION PROCEDURE

1. Formal application should be filed with the Director of Admissions, 127 Sproul Hall, University of California, Berkeley 4. Application blanks will be supplied by the Office of Admissions upon request. The application should be filed during the semester preceding that for which the applicant wishes to register and must be filed not later than August 15 for the fall semester or January 15 for the spring semester. Applicants for the College of Engineering have earlier filing dates, see “Special Requirements for Engineering,” page 90. Every applicant for admission is required to pay a fee of $5 when the first application is filed. Remittance by bank draft or money order should be made payable to The Regents of the University of California.

2. Official transcripts of record should be sent directly to the Office of Admissions from the graduating high school and from each college attended. College transcripts should be endorsed by the proper authority and include a statement of good standing or honorable dismissal from the last college attended.

3. Report of College Board Examination should be presented. Effective with the fall semester of 1960, all undergraduate applicants must present a satisfactory score in the College Entrance Examination Board Scholastic Aptitude Test. Arrangements to take the test, and to have the scores transmitted to the University, should be made with the Educational Testing Service, P.O. Box 27896, Los Angeles 27, California, or P.O. Box 592, Princeton, New Jersey. Scores will be regarded as official only if received directly from the Educational Testing Service. The fee for the Aptitude Test is to be paid to the Educational Testing Service.

Aptitude Test Dates for 1960

<table>
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<th>Test Dates</th>
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<tbody>
<tr>
<td>Saturday, December 5, 1959</td>
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<td>Saturday, January 9, 1960</td>
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<td>Saturday, March 12, 1960</td>
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<td>Saturday, May 21, 1960</td>
<td>April 23, 1960</td>
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<tr>
<td>Wednesday, August 10, 1960</td>
<td>July 13, 1960</td>
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ADMISSION IN FRESHMAN STANDING

An applicant who has attended a junior college, four-year college, university, extension classes of college level, or any comparable institution since graduating from high school is subject to regulations governing admission in advanced standing (see page 24). Such college attendance may not be disregarded, whether or not any courses were completed.

Requirements

1. College Entrance Examination Board Scholastic Aptitude Test (see above).

2. Graduation from an Accredited High School.

An accredited high school in California is one that has been officially designated by the Board of Regents of the University as a school from which students will be admitted to the University on the basis of the record of subjects completed and scholarship attained. The list of accredited schools is published by the University annually in the month of September. Accreditation by the University refers to the college preparatory function of the high school and implies no judgment regarding the other educational functions of the school. For information concerning the accrediting of schools, principals may communicate with the Office of Relations with Schools, Berkeley or Los Angeles. For schools outside California, regional or other accrediting agencies are consulted; the University makes the final decision regarding acceptability. If the high school from which the applicant graduated is not accredited, the Office of Admissions will, upon request, instruct the student regarding the procedure he should follow.

3. Subject Requirements.

Upon the high school authorities rests the responsibility for determining the scope and content of courses preparatory to admission to the University and for certifying such courses to the University. Students naturally will be guided by their respective high school principals in making their preparation for entrance to the University.

(a) History .................. 1 unit. — This requirement must be satisfied by 1 unit of United States history or 1 unit of United States history and civics.

(b) English .................. 3 units.— These may consist of any six semesters that give preparation in written and oral expression and in the reading and study of literature. Reading and study of contemporary literature may be included. The requirement in English must be satisfied by credit designated "English."

(c) Mathematics ............ 2 units.— These must consist of two semesters of elementary or advanced algebra, and two semesters of plane geometry, or an integrated two-year course covering the same material. Advanced algebra and trigonometry may be substituted for algebra, and trigonometry and solid geometry for plane geometry.

(d) Laboratory science ....... 1 unit. — This may consist of a year course in one field of science, namely, biology, botany, chemistry, physics, physical science, physiology, or zoology. The science selected must be an advanced (third- or fourth-year) laboratory science, and the two semesters must be in the same subject field.

(e) Foreign language ......... 2 units.— These must be in one language.
Advanced course 1 (or 2) units
chosen from one of the following:
1. Mathematics, a total of 1 unit (second-year algebra, \(\frac{1}{2}\) or 1 unit; solid geometry, \(\frac{1}{2}\) unit; trigonometry, \(\frac{1}{2}\) unit or other course for which trigonometry is a prerequisite).
2. Foreign language, either 1 additional unit in the same foreign language offered under (e), or 2 units of a different foreign language.
3. Science, 1 unit of either chemistry or physics in addition to the science offered under (d) above.

Additional elective units to complete the minimum of 15 standard entrance units.

4. Scholarship Requirements.

For California Residents
An average of grade B (3.0 based on a marking system of four passing grades) is required in the (a) to (f) subjects listed above, which are taken in each of the tenth, eleventh, and twelfth years. Courses taken in the ninth year or used as additional elective units need show passing grades only.

In determining the B average, a grade of A in one course may be used to balance a C in another; only courses used to meet the (a) to (f) subject requirements and completed in the tenth, eleventh, and twelfth years are used in computing the grade average. Grades are considered on a semester basis, except from schools that give only year grades.

Courses in the required list completed after the ninth year in which a grade of D is received may not be counted in satisfaction of a subject requirement; an A grade may not be used to compensate for D, E, or F grades. Courses taken in the tenth, eleventh, and twelfth years in which a grade of C or lower is received may be repeated to raise grades, when approved by the principal of an accredited high school, in an amount not to exceed 2 units of the (a) to (f) pattern. Only the first repetition of a subject will be used to satisfy scholarship requirements, although additional repetitions are allowed for the purpose of satisfying a subject requirement.

For Out-of-State Applicants
A scholarship average of 3.4 is required plus an average score of 500 or above in the College Entrance Examination Board Scholastic Aptitude Test (see also section on “Limitation of Enrollment of Out-of-State Applicants,” page 26).

5. Alternate Methods of Admission (if not qualified under the General Method described above—usually referred to as Method I).

METHOD II
Achieve a scholarship rank in the highest tenth of his graduating class with a substantial academic preparation (not less than 10 units in courses designated by the high school principal as college preparatory in nature and chosen from the fields of English, mathematics, science, foreign language, and social science), although he need not complete the exact pattern of subjects (a) to (f) listed above.

METHOD III
Complete not less than 12 high school units of grade A or B in the work of the tenth, eleventh, and twelfth years with not more than 2 units of subject deficiencies in the required list (a) to (f) and in addition must receive in the (a) to (f) subjects attempted no grades lower than C and an average of at least B. (Grades earned in courses such as physical education, study period, work experience, military science, R.O.T.C., and religion are not to be counted under this method.)
METHOD IV

1. In the (a) to (/) subjects completed in the tenth, eleventh, and twelfth years, achieve a scholarship standing:
   (a) with no grade lower than C
   (b) with no more than \( \frac{1}{2} \) unit of scholarship deficiency, i.e., not more than \( \frac{1}{2} \) unit below B average, and

2. Complete not less than 6 high school units of grade A or B selected from the following 10 units of academic subjects:
   - Third- and fourth-year English
   - Third- and fourth-year mathematics
   - Third- and fourth-year laboratory science
   - Third- and fourth-year foreign language
   - Third- and fourth-year history or social science, limited to 2 units, of which one must be United States history

University authorities believe that high school students who follow the regular (a) to (/) pattern of subjects outlined above, together with the additional subjects recommended for particular majors, will be well prepared for work in the University. However, the University does not wish to exclude a student who has followed a program of university preparatory studies recommended to him by his high school and will therefore admit an applicant on a grade B average scholarship in a different program of University preparatory studies provided such a program has been previously filed with, and approved by, the Board of Admissions and Relations with Schools.


In addition to the foregoing methods, the Board of Admissions and Relations with Schools authorizes from time to time experimental programs to test the validity of suggested procedures. Information about these programs is communicated promptly to school authorities in California by the Office of Relations with Schools. Also the Director of Admissions is charged by the Board with the authority and responsibility for waiving minor deficiencies when justification is evident in the form of unusual academic transcripts of record or recommendations.

Agricultural Experimental Plan. (Applicable only to high school students starting program prior to 1960.) Applicants for admission to freshman standing in the College of Agriculture may meet the minimum subject requirements prescribed in Method I by substituting for the (e) foreign language requirement either (1) two years of agriculture or home economics or (2) one year of mathematics or laboratory science in addition to that required under (/). Such substitute courses must be passed with grades not lower than C. Under this plan the grades received in the additional mathematics or science will be used in meeting the B average minimum scholarship requirement, but grades received in agriculture or home economics will not be so used.

A student admitted under this plan must realize that if, after registration in the College of Agriculture, he wishes to transfer to another college of the University, he must meet one of the regular methods of admission.

ADMISSION BY EXAMINATION

Applicable to High School Graduates Who Are Residents of California and Ineligible on Their School Records

The University of California does not itself offer entrance examinations, but accepts on all campuses the results of examinations given by the Educational Testing Service for the College Entrance Examination Board. Information
about dates and places of examination may be secured from the Educational Testing Service, P.O. Box 27896, Los Angeles 27, California, or P.O. Box 592, Princeton, New Jersey. Definite arrangements to take the tests must be made with the Board at least four weeks prior to the date of the tests. If the applicant has completed all of the subjects in the (a) to (f) list with grades of C or better, but is deficient in the scholarship average, he may clear his admission requirements by an average score of 500 or above on the Scholastic Aptitude Test and scores of 500 or above on each of three achievement tests in subject fields. If the (a) to (f) list of subjects has not been completed with grades of C or better, the applicant should consult the Office of Admissions in regard to the tests he must take. If the applicant graduated from an unaccredited high school he should consult with the Office of Admissions regarding the tests he must take.

**Preparation for University Curricula**

In addition to those subjects required for admission to the University, outlined beginning on page 21, certain preparatory subjects are recommended for each University curriculum which, if included in the high school program, will give the student a more adequate background for his chosen field of study. In some cases, lack of a recommended high school course will delay graduation from the University. Details of these recommendations will be found in the circular, *Prerequisites and Recommended Subjects*, which may be obtained from the Director of Admissions and Relations with Schools, Berkeley or Los Angeles.

A statement of the requirements for the bachelor's degree is contained in this circular and in the announcement of each school or college of the University. A copy of the desired announcement may be obtained from the Office of the Registrar on the campus on which the school or college is located.

**HONORS AT ENTRANCE**

All entering freshmen are considered for Honors at Entrance on the basis of their high school records. Honors recognition at the time of admission is given to entering freshmen students with outstanding high school scholastic records. Certificates are presented to the Honors recipients shortly after registration in the University.

**ADMISSION IN ADVANCED STANDING**

**Requirements for California Residents**

1. An applicant who was eligible for admission in freshman standing or whose only deficiency arose from not having studied one or more required high school subjects must present evidence that:

   (a) He has satisfied, either through high school or college courses, the subjects required for admission of high school graduates in freshman standing (see page 21).

   (b) His advanced work, in institutions of college level, has met the minimum scholarship standard required of transferring students, in no case lower than a C average in the last college attended, and an over-all C average in all college work attempted. "Scholarship standard" is expressed by a system of grade points and grade-point averages in courses acceptable for transfer to the University of California. One unit of A counts four grade points; one unit of B counts three grade points; one unit of C counts two grade points; one unit of D counts one grade point; E and F yield no grade points.
Admission in Advanced Standing

The grade-point average is determined by dividing the total number of grade points by the total number of units undertaken. Courses completed with a grade lower than C may be repeated but the units and grade points count each time the course is taken.

(c) He is entitled to return as a student in good standing to the last college attended.

2. If an applicant for admission to the University in advanced standing was ineligible at the time of high school graduation because of low scholarship or a combination of low scholarship and incomplete subject preparation, he may remove his deficiencies by completing college courses of appropriate content and amount. These courses completed with satisfactory grades may be taken in any approved college.

(a) The applicant must include in his program courses acceptable for removing high school subject shortages caused by omission or by grades of D or lower and present either:

(1) A minimum of 30 units of transfer courses with a grade-point average of 2.4, plus a satisfactory score on the College Entrance Examination Board Scholastic Aptitude Test. (Please see page 20 for further information.)

or

(2) Sixty units or more of transfer courses with a grade-point average of 2.4.*

(b) As an alternative to making up high school subject deficiencies, an applicant may be admitted on the basis of a record showing completion of at least 60 units of transfer courses with a grade-point average of 2.4* or higher in which must be included all of the subjects required for junior standing in a school or college of the University.

Ordinarily, it is recommended that graduates of California high schools who are not eligible for admission to the University, attend one of the California junior colleges and complete the lower division requirements of the college in which they wish to register.

Special Requirements for Out-of-State Applicants

(See also page 26)

In addition to the regular admission requirements described above, out-of-state applicants with advanced standing must meet the following regulations:

1. A grade-point average of 2.8* must be maintained in college subjects acceptable for transfer credit, plus an average score above 500 on the College Entrance Examination Board Scholastic Aptitude Test.

2. An advanced standing applicant who presents less than 30 units of acceptable transfer courses must also meet the high school requirements listed on page 21.

Applications with 60 or more units of acceptable college courses will still be admitted in the 1959 fall semester under the regulations for California students (see page 24).

Credit for Work Taken in Other Colleges

As an integral part of the system of public education of California, the University of California accepts at full value approved transfer courses com-

* All undergraduate applicants will be required to submit a report of their scores on the College Entrance Examination Board Scholastic Aptitude Test beginning with the fall of 1960.
Admission to the University

Students who intend to complete their advanced studies at the University will frequently find it to their advantage to complete the first two years of their college course in one of the many excellent California public junior colleges. An applicant may not disregard his college record and apply for admission in freshman standing; he is subject without exception to the regulations governing admission in advanced standing. He should ask the registrars of all preparatory schools and colleges he has attended to forward complete official transcripts directly to the Office of Admissions where he has filed his application. Transcripts not sent directly by the issuing school to the Office of Admissions will be considered unofficial. A statement of good standing from the last college attended must also be sent.

No applicant may receive transfer credit in excess of an average of 18 units per semester. After a student has earned 70 units acceptable toward a degree (except credit allowed on the basis of military service and training), no further unit credit will be granted for courses completed at a junior college.

Extension courses taken at some institution other than the University of California may not be acceptable. The decision as to their acceptability rests with the Office of Admissions. If such a program is planned with the intention of applying it toward a degree at the University of California, it is wise to have the approval of the Office of Admissions in advance.

Removal of Scholarship Deficiencies by Applicants from Other Colleges

Applicants otherwise eligible who seek to transfer from other institutions of collegiate rank but whose college records fail to show a satisfactory scholarship average may be admitted only when the deficiency has been removed by additional work completed with grades sufficiently high to offset the shortage of grade points. This may be accomplished by work in other approved higher institutions, in summer sessions, or by correspondence courses in University Extension.

SPECIAL REQUIREMENTS FOR ENGINEERING

An engineering qualifying examination must be taken by all applicants for admission to the College of Engineering at either the lower division or the upper division level. The examination is to be taken the previous semester to that in which the applicant desires to register. The dates for the examinations and the dates for filing applications for admission are included in the Calendar on page 2. Students not taking the test on the date scheduled will not be considered for admission to the College of Engineering in the semester immediately following. For details regarding the qualifying examinations and selective admission requirements, see page 90.

Out-of-state applicants may use the engineering examination both for the engineering requirement and for the nonresident examination requirement.

LIMITATION OF ENROLLMENT OF OUT-OF-STATE APPLICANTS

It has been necessary to place some limitation on enrollment of applicants who are not residents of California and only those of exceptional promise will be eligible for admission. Children of alumni of the University of California are not subject to the special nonresident requirements for admission nor are applicants who at the time of application have become bona fide residents of California. The regulations below are designed to admit approximately the upper half of candidates eligible for admission under regular rules as measured by scholastic record and aptitude tests.
Admission to Freshman Standing—
An applicant must present evidence that he has maintained a grade-point average of 3.4* or higher on the required high school subjects and an average score above 500 on the College Entrance Examination Board Scholastic Aptitude Test (see “Admission in Freshman Standing,” page 21).

Admission with Advanced Standing—
A grade-point average of 2.8* must be maintained in college subjects acceptable for transfer credit plus an average score above 500 on the College Entrance Examination Board Scholastic Aptitude Test. If less than 30 semester units of acceptable transfer courses are presented, the requirements for admission to freshman standing listed above must also be satisfied. (Applicants with 60 units or more of college transfer credit will still be admitted under the regulations for California students through the fall semester of 1959.) See also page 24 for detailed description of admission with advanced standing.

INTERCAMPUS TRANSFER
An undergraduate student, who has attended a regular session of the University of California and has not since that time been registered in a regular session in another institution, may apply for transfer to another campus of the University by obtaining the proper forms from the campus on which he was 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 January 15 for the spring semester and August 15 for the fall semester.

ADMISSION OF SPECIAL STUDENTS
Special students are students of mature years who have not had the opportunity to complete a satisfactory high school program or who have not completed a substantial amount of college work, and who, by reason of special attainments, may be prepared to undertake certain courses in the University toward a definite and limited objective.

The conditions for the admission of each applicant under this classification are assigned by the Director of Admissions and are subject to the approval of the dean of the college. Ordinarily, a personal interview is required before final action can be taken and, in general, special students are required to confine their attention to some special study and its related branches. Admission as a special student is for a limited time only, as fixed by the Director, and is subject at all times to satisfactory scholastic achievement.

No person under 21 years of age will be admitted as a special student, but mere attainment of any given age is not in itself a qualification for admission.

An applicant will not be admitted directly from high school to the status of special student. Graduates of high schools are expected to qualify for admission in accordance with the usual rules; students admitted to regular status, if not candidates for degrees, may, with the approval of the proper study-list officer, pursue elective or limited programs.

Transcripts of record from all schools attended beyond the eighth grade must ordinarily be submitted by an applicant for special status. He may also be required to take the examination in Subject A.

* One unit of A counts four points, one unit of B counts three points, one unit of C counts two points, one unit of D counts one point, E and F yield 0 points.
Admission to the University

The University has no "special courses." All courses are organized for regular students. A special student may be admitted to those regular courses for which, in the judgment of the instructor, he has satisfactory preparation. A special student will seldom be able to undertake the work of the engineering and professional colleges or schools until he has completed the prerequisite subjects.

A special student may at any time attain the status of regular student by satisfying all the matriculation requirements for admission to the University but an applicant will not be admitted to special status for the purpose of making up requirements.

ADMISSION OF LIMITED STUDENTS

Limited students are those with a bachelor's degree but ineligible for admission to graduate standing, or without a bachelor's degree who have completed a substantial amount of college work in the University of California or in another institution of approved standing with a satisfactory scholarship average and who, by reason of special attainments, may be prepared to undertake certain courses in the University toward a definite and limited objective.

The conditions for the undergraduate admission of each applicant under this classification are assigned by the Director of Admissions and are subject to the approval of the dean of the professional school to which he seeks eventual admission or by the dean of the college or school in which the applicant desires to satisfy a definite need or interest.

Transcripts of record from all schools attended beyond the eighth grade must ordinarily be submitted by an applicant for limited status. He may also be required to take the examination in Subject A.

The applicant will not be admitted to limited status for the sole purpose of raising a low scholarship average. Limited students for whom no grades have been specified are subject to the minimum scholarship requirements of the college or school in which they are enrolled. Any deviation from the program as planned, or any scholarship deficiency incurred while pursuing it, will result in the cancellation of a student's limited status and will render him subject to dismissal from the University.

ADMISSION OF APPLICANTS WITH BACHELORS' DEGREES

Ordinarily an applicant with a bachelor's degree substantially equivalent to the bachelor's degree granted by the University of California should apply for admission to graduate status. Occasionally, such an applicant with a superior record may qualify as a limited student or, as a result of complete change of objective, as an undergraduate seeking a second baccalaureate. In either case, the previous scholarship record must be such as to indicate very strong probability of academic success. Admission is also subject to the approval of the Dean of the school or college in which the applicant plans to enroll.

ADMISSION FROM SCHOOLS AND COLLEGES IN FOREIGN COUNTRIES

The credentials of an applicant for admission from a foreign country, either in undergraduate or graduate standing, are evaluated in accordance with the general regulations governing admission. An application, official certificates and detailed transcripts of record should be submitted to the Director of Admissions several months in advance of the opening of the semester in which the applicant hopes to gain admittance. This will allow time for exchange of necessary correspondence relative to entrance and, if the applicant is admitted, will assist him in obtaining the necessary passport visa.
An applicant from a foreign country whose education has been conducted in a language other than English may be admitted only after demonstrating that his command of English is sufficient to permit him to profit by instruction in this University. An applicant's knowledge of English is tested by an oral and written examination given by the University of California. This regulation applies to both graduate and undergraduate foreign students. Admission of an applicant who fails to pass this examination will be deferred until he has acquired the required proficiency in the use of English.

*Language Credit for a Foreign Student.*—College credit for the mother tongue of a foreigner and for its literature is given only for courses taken in native institutions of college level, or for upper division or graduate courses actually taken in the University of California, or in another English-speaking institution of approved standing.

*College of Engineering.*—An applicant for admission to the College of Engineering must pass with satisfactory scores the Scholastic Aptitude Test (verbal and mathematics sections) and achievement examinations in English composition, physics, and advanced mathematics of the College Entrance Examination Board before a letter of admission to the College of Engineering may be issued. Arrangements to take the tests in another country may be made directly with the College Entrance Examination Board, P.O. Box 592, Princeton, New Jersey. A fee of $16 is charged for these examinations and should be forwarded to the College Entrance Examination Board, not to the University of California. An applicant should also request that his scores in the tests be forwarded to the College of Engineering.

*Foreign Student Adviser.*—Advisers are appointed by the President of the University to assist foreign students in all matters pertaining to their attendance at the University. Every student from another country is urged, upon his arrival at the University, to consult Mr. Allen C. Blaisdell, Foreign Student Adviser, International House, University of California, Berkeley 4.

**LATE ADMISSION AND REGISTRATION**

The student or prospective student should consult the Registration Circular for the semester he plans to attend, and acquaint himself with the dates upon which students are required to register and file their study lists. Failure to register on the scheduled date will make it necessary for the student to seek special approval for late registration from the dean of his college, school, or the Graduate Division; such approval will be granted only when the student's reasons for lateness are acceptable to the dean.

*In no event will a student be permitted to register or file his study list after Friday of the third week of instruction.* If a prospective entrant or re-entrant seeks to register late, it will be necessary for him to qualify for admission or readmission ten days before the proposed date of registration.

A student will not be permitted to enroll in or attend classes unless he is currently registered or holds a temporary permit to visit classes. New graduates seeking permits to attend classes apply to the Dean of the Graduate Division; new undergraduates to the Director of Admissions; reentrants graduate and undergraduate, to the Registrar.

Every student who registers late is charged a fee of $10 for lateness. Moreover, the late registrant is subject to unusual difficulty in arranging a suitable program of studies and may not plead lateness as an excuse if, subsequent to late registration, he is found to be deficient in his work.

**ADMISSION IN GRADUATE STANDING**

Holders of the bachelor's degree from institutions of acceptable standing, representing the usual college course of four years, may, provided their scholarship is satisfactory, be admitted to the Graduate Division (Northern See-
Admission to the University of California. Application for admission should be accompanied with official transcripts of record covering all college or university work completed, together with official evidence of the degrees conferred. The University of California may deny admission to graduate standing, however, if the scholarship record has not been satisfactory or if the undergraduate program has not been of such character as to furnish an adequate preparation for advanced work leading to the academic or professional degree or certificate desired. This proviso applies to colleges and schools within the University of California as well as to those outside. Registration will not in any case be permitted until all official records and official evidence of degrees conferred have been received.

Transcripts of students’ records and all other official credentials are retained permanently in the files of the office of the Dean of the Graduate Division. The student must have an official transcript of his record (in addition to the record sent to the Dean of the Graduate Division) in his possession for conference with departmental advisers and for his own reference in planning a program of study. The Graduate Division office copy may not be borrowed for this, or for any other purpose. Admission to the Graduate Division does not necessarily carry with it the privilege of proceeding to candidacy for a higher degree on the basis of minimum residence and subject requirements.

A formal application is required of all persons seeking admission to the Graduate Division (Northern Section) of the University of California. The application blank may be obtained by addressing the Dean of the Graduate Division, 102 Sproul Hall, University of California, Berkeley 4, and must be filed at the office of the Dean of the Graduate Division, preferably twelve weeks prior to the date of registration and in no case later than July 15 for the fall semester and December 15 for the spring semester; it should be accompanied by a money order or bank draft for $5 in payment of the application fee.* Please note that the application fee is chargeable to every person who files an application, and is not returnable under any circumstances. (For readmission of former graduate students, see below.) In cases where applications and complete records are filed later than twelve weeks before the date of registration, registration may be delayed, and the applicant made liable for the late registration fee of $10.

Every new student must present at the time of his medical examination by the University medical examiners, a certificate establishing the fact that he has been successfully vaccinated against smallpox within the last seven years. Vaccination should be completed prior to registration. A form for this purpose will be furnished by the University.

Applicants for admission to the graduate years in the School of Medicine should file their credentials with the Dean of the School of Medicine, University of California Medical Center, San Francisco 22, and should accompany them with a money order or bank draft for $5 in payment of the application fee.*

Applicants for admission to graduate work at Davis, the Lick Observatory on Mount Hamilton, the Hooper Foundation in San Francisco, the academic departments of the School of Medicine in San Francisco, and the School of Dentistry in San Francisco must first secure admission to the Graduate Division and authorization to pursue work in these branches of the University from the Dean of the Graduate Division, Northern Section.

The level of work to which graduate students are assigned, and their standing as candidates for degrees, depends upon the extent and character of their undergraduate courses. If, in the opinion of any department, the preliminary training of an applicant has not been sufficient to qualify him for graduate work, he may be admitted to undergraduate courses suited to his needs.

* Veterans who expect to enroll under the provisions of Public Law 16 or Public Law 894 are not required to remit this fee with their applications. Persons governed by Public Law 550 (“Korean” G.I. Bill) must pay this fee from their allotment.
Admission in Graduate Standing

Foreign Students.—Applicants for admission to the Graduate Division on credentials from universities and colleges in foreign countries are required to appear for the Examination in English for Foreign Students described in the preceding section, to demonstrate whether or not their command of English is sufficient to enable them to profit by instruction in this University.

Readmission.—An application for readmission is required of persons formerly registered as graduate students in a regular session who wish to return after an absence. The form for this purpose is obtainable from the Registrar, and no fee is charged. It must be filed with the Graduate Division at least two months before the opening of the semester in which the student wishes to be readmitted. Applicants for readmission must present at the time of the medical examination by the University Medical Examiners, a certificate establishing the fact that they have been successfully vaccinated against smallpox within the last seven years. Vaccinations should be completed prior to registration. A form for this purpose will be furnished by the University.

Study Lists.—After admission to the Graduate Division, every graduate student is required to file with the Registrar on a specified date a study list containing his program of courses (or statement of other graduate work, including thesis and research), approved by the graduate adviser in the department of his major subject. Study-list changes for graduate students are subject to the regulations applying to undergraduates.

For further information on all matters pertaining to the Graduate Division at Berkeley, see the Announcement of the Graduate Division, Northern Section, which is obtainable from the Dean of the Graduate Division, University of California, Berkeley 4.

For regulations concerning graduate study at Los Angeles, consult the Announcement of the Graduate Division, Southern Section, which may be obtained upon request from the Dean of the Graduate Division, University of California, Los Angeles 24.
GENERAL REGULATIONS

Certain general regulations govern residence and study in the academic departments. These regulations, unless otherwise stated, concern both graduate and undergraduate students.

ROUTINE OF REGISTRATION

No student in the departments of the University at Berkeley may undertake any work or examination with a view to credit toward a University degree without registration for the work or examination with the Registrar; such registration must be accepted by the proper faculty before the work proposed is undertaken.

Students of good standing carrying a limited amount of regular classwork may be permitted, on the basis of private study outside of University classes, to take certain University examinations for the purpose of gaining advanced standing, but the authorization of the proper faculty must be obtained by written petition before preparation for the examination is begun.

All students must register with the Registrar their choice of courses to be pursued in any semester, on blanks provided for the purpose, at the times and place designated. Continuing students in good standing may now register by mail. For full particulars see placards posted on University bulletin boards. Registration at a later date requires special permission. For further information, see under Late Admission and Registration, page 29.

Students in year courses must register with the Registrar for these courses at the beginning of each semester. They are sometimes permitted to register for year courses in the second semester without having been registered in the first semester. When this is done, credit is given for the work of the second semester only.

No person will be admitted as a student to any course, except as authorized by the official certificate of registration and the student's duplicate of the official study card supplied to each student by the Registrar, subject to the approval of the appropriate study-list officer.

Concurrent enrollment in resident courses and in extension courses is permitted only when the entire program of the student has received the approval of the proper dean or study-list officer and has been registered with the Registrar before the work is undertaken.

After the study cards are filed, students may make changes in their programs by formal petition, which must be approved by the instructors concerned and by the deans or other proper officers of the students' colleges.

Every regular student must include in his study list all required work appropriate to the college and year of his course. (The rules governing the choice of studies of regular students are stated in the description of the curricula of the several colleges.)

The names of students who fail to comply with the regulations governing registration will not appear on the official class rolls.

MEDICAL AND PHYSICAL EXAMINATION

All new students (graduate and undergraduate) must pass a medical and physical examination at the Student Health Service, to the end that the health of the University community, as well as the individual student, may be safeguarded. An appointment for this examination will be given to each student at the time of the registration. Every new student (graduate and undergraduate) entering the University must present at the time of medical examination by the University medical examiner a certificate establishing
the fact that the student has been successfully vaccinated against smallpox within seven years. Vaccination should be completed prior to registration. A form for this purpose is furnished by the University. Tests for tuberculosis are a part of the examination of all new students. Applicants for admission who have contagious diseases will be excluded. Those having physical conditions which grossly disturb the classwork of other students, should not apply for admission.

Before coming to the University, every student is urged to have his own physician examine him for fitness to carry on University work, and to have all defects capable of remedial treatment, such as diseased tonsils or imperfect eyesight, corrected. This will prevent possible loss of time from studies.

Students returning after an absence must comply with the University requirements regarding smallpox vaccination and evidence of freedom from active tuberculosis as well as have a health evaluation at the Student Health Service.

STUDENT HEALTH SERVICE

The purpose of the Student Health Service is to conserve the time of students for their classwork and studies, by preventing and treating acute illnesses. This service is made possible by the general funds of the University and in part by the staff physicians, and is not a total health insurance plan; therefore, the services are limited by the staff and facilities available.

Any physically handicapped student is invited to communicate with the Director of the Student Health Service, Cowell Hospital, before registration, for the purpose of facilitating orientation to the campus.

Each student registering in the fall and continuing through the spring semester, and each student registering in the spring semester may, at need, have such medical care as the campus health service is staffed and equipped to provide from the first day of the semester in which the student first registers during the academic year to the last day of the spring semester of the same academic year, or to the date of official withdrawal from the University. Additional service may be provided for seven days after the last day of the semester at the discretion of the Director of the Student Health Service. Any prospective registrant who receives health service and who does not register for the next following semester shall be required to pay toward the cost of the service rendered him up to the amount of the incidental fee.

During any semester, hospital care for a period up to thirty days may be given in the event of serious illness, on the recommendation of the Director of the Health Service. Surgical treatment within certain limitations is also included in the services offered when, in the opinion of the Director of the Health Service, this service is necessary. If at the end of the semester the patient is still ill he will be released from the hospital to the care of his home or community as soon as the Director considers it safe. Also, if injuries or illnesses are of a nature requiring long continued care which will obviously prevent the continuance in college in the current semester, the patient will be returned to his community or home for definitive treatment. No surgical diagnostic procedures will be done (for example, tumors of the bone) where the procedure will prevent the student from returning to college the same semester or which may of necessity have to be followed by immediate definitive treatment where the student may not be returned to college. Charges will be made for unusual appliances or remedies not ordinarily available or for hospitalization in excess of thirty days.

The Health Service does not assume responsibility for chronic physical defects or illnesses present at the time of entrance to the University (for example, hernias, chronic bone and joint diseases or deformities, chronic gastrointestinal disorders, fibroids of the uterus, chronically infected tonsils,
tuberculosis, syphilis, malignant diseases, allergic and endocrine disorders, etc.). Furthermore, it does not take responsibility for any injury or illness wherein treatment has been initiated elsewhere, with the exception of first aid and emergency care. It does not take responsibility for remedial defects where medical or surgical treatment is elective and not of an emergency nature, and where the best interests of the student will be served by treatment during vacation. It does not take care of industrial injuries covered by compensation insurance, except first aid.

_Dental Service._ The hours of 8–10:30 a.m. and 1–3:30 p.m. are reserved for emergency dental examinations and treatments, x-rays, and consultation. Emergency treatment of fractured jaws is also included in the service. After dental examination, some appointments for general dentistry and cleaning may be scheduled for the remaining time in accordance with a schedule of rates approved by the President of the University.

**PHYSICAL EDUCATION**

_Required Meeting of New Undergraduates._—All men and women students are required, at the time of first registration in the University, to attend a group meeting regarding participation in physical education activities and athletic sports. At this meeting, students will be informed concerning the opportunities available to them and the values of participation in organized courses of the department, in intramural athletics, in intercollegiate athletics, and in nonorganized recreational activities.

_Use of Facilities._—The physical education facilities are available to students who wish an opportunity for exercise and recreation, either with or without instruction.

Harmon Gymnasium, including the swimming pool, courts and sports fields, is available to all men students of the University. Further information may be obtained from the Secretary, Room 103, Harmon Gymnasium.

The Hearst Gymnasium rooms, courts, swimming pools and sports fields are available to all women students of the University. The Women's Athletic Association, A.S.U.C., and the Department of Physical Education cooperate in furthering opportunities for participation in a wide variety of activities.

The Lucie Stern pool, the Elise and Walter Haas Clubhouse, courts, and fields located in Strawberry Canyon, are available to men and women students, their spouses and families. Further information may be obtained from the Coordinator of Recreation, Room 143, Harmon Gymnasium.

**SUBJECT A: ENGLISH COMPOSITION**

With the exceptions noted below, every undergraduate entrant must, at the time of his first registration in the University, take an examination known as the _Examination in Subject A_, designed to test his ability to write English without gross errors in spelling, grammar, sentence structure, and punctuation.

The examination in Subject A is given at the opening of the fall and spring semesters (see the _Registration Circular_, to be obtained from the Registrar) and at the opening of each of the summer sessions. A second examination for late entrants is given not later than two weeks after the first examination in each semester; for this examination, a fee of $1 is charged.

The results of the first examination will be made known not later than the day preceding the date set for the filing of study cards for the current semester. Papers submitted in the examination are rated as either passed or not passed. A student who is not present at the examination in Subject A which he is required to take will be treated as one who has failed. Every student who does not pass in the examination in Subject A must, immediately after
his failure, enroll in a course of instruction, three hours weekly for one semester, known as the Course in Subject A, without unit credit toward graduation. Should any student fail in the course in Subject A he will be required to repeat the course in the next succeeding semester of his residence in the University.

A student who maintains in the course in Subject A a grade of A is permitted, on recommendation of the Committee on Subject A, to withdraw from the course at a date determined by that committee and is given credit for Subject A.

Every student who is required to take the course in Subject A is charged a fee of $35, and the charge will be repeated each time he takes the course. This fee must be paid before the study list is filed.

No student will be granted the bachelor's degree until he has satisfied the Subject A requirement.

In respect to grading, conditions, and failure, the course in Subject A is governed by the same rules as other University courses.

A student who has received a satisfactory rating in the College Entrance Examination Board examination in English composition will receive credit for Subject A. A student who has passed an examination in Subject A given by the University at Los Angeles or given under the jurisdiction of the University at various centers in the State annually in May or June will receive credit for Subject A.

A student who, at any time, has failed in the University examination in Subject A does not have the privilege of taking a second examination until he has completed the course in Subject A.

A student who enters the University of California with credentials showing the completion elsewhere with a grade not lower than C of one or more college courses in English composition (totaling at least 3 semester units, or the equivalent, of transferable college credit) is exempt from the requirement in Subject A.

AMERICAN HISTORY AND AMERICAN INSTITUTIONS

All students who are candidates for the bachelor's degree must demonstrate a knowledge of (1) American History, and (2) the principles of American Institutions under the Federal and State constitutions. Beginning with the academic year, 1958-1959, satisfaction of this requirement on the Berkeley campus is to be met by examination only. A transfer student who presents a transcript from a California institution carrying the certification, "State requirement in American History and American Institutions satisfied" will be exempted from the requirement.

All foreign students in attendance at the University of California on student visas, who are candidates for the bachelor's degree, are advised to see the Supervisor of the American History and American Institutions Requirements early in their academic work at the University.

Further information regarding these requirements, and the examination necessary to meet them, may be obtained from the Supervisor, Room 204, Building T-9. For office hours, see official announcements on campus bulletin boards.

THE RESERVE OFFICERS' TRAINING CORPS

Under the Act of Congress establishing land-grant colleges, it is required that military training be included in the curricula. The Board of Regents of the University of California has therefore directed that every lower division male student, unless excused, must pursue a course of military training during his first two years of residence. This is in accordance with instructions con-
tained in the Circular for New Undergraduates or announcements which may be posted on the University bulletin boards. Enrollment in the basic course of the Reserve Officers' Training Corps satisfies this requirement of the Board of Regents for first- and second-year undergraduate male students. At the University of California this military requirement is fulfilled by enrollment in the Department of Air Science, the Department of Military Science and Tactics, or in the Department of Naval Science.

First-year students will be permitted to elect either Air Science or Military Science in accordance with their personal preferences. First-year students interested in Naval Science should consult the section on Naval Science.

Students must list the prescribed courses in military training on their study cards with other University courses. A petition for excuse from, or deferment of, military training must be filed within two weeks of the date of registration. Exception will be made where illness or physical disability occurs after that date. Further information about the requirement of military training, including a statement of grounds upon which students may be excused from this work, may be obtained from the Registrar.

If a student subject to this requirement lists the prescribed course on his study card, and thereafter without authority fails to appear for work in the course, his neglect will be reported to the Registrar, who, with the approval of the Chancellor, will notify the student that he is dismissed from the University. The Registrar will then inform the dean of the student's college or other officer in charge of the student's program of his dismissal. Reinstatement will be made only upon approval of the Chancellor with the concurrence of the chairman of the appropriate department.

The United States Government furnishes arms, equipment, uniforms, and textbooks for the use of all students formally enrolled in military training courses. Certain monetary advantages accrue to advanced course (third- and fourth-year) students. As described in the following sections, with the exceptions noted for the separate services, students who successfully complete the advanced course are eligible for a reserve commission in one of the armed forces of the United States. They are also eligible to be commissioned by the Governor of the State of California in the University Cadets.

Air Science

The Air Force Reserve Officers' Training Corps provides a two-year course of instruction to meet the University requirements for lower division military training. An additional two-year course in the upper division provides training for future officers of the Air Force Reserve. The primary objectives of the A.F.R.O.T.C. courses are to develop the student's personality and interest in working in harmony with other students, to provide maximum opportunity for the exercise of leadership ability, to arouse in the student a desire to meet his future military service obligation by service in the United States Air Force, to select for the advanced course those who are potentially best qualified to serve as future officers of the Air Force, and to develop the student's understanding of the application of his over-all education in the role of a leader.

With this mission and these objectives in view, the A.F.R.O.T.C. course of study has been divided into three phases: 1) the basic course, 2) the advanced course, and 3) summer training. Leadership laboratory and other basic military training are common to all three phases.

The lower division (basic) course includes an introduction to elements and potentials of air power, air vehicles and principles of flight, military instruments of national security, professional opportunities in the U. S. Air Force, evolution of aerial warfare, weapon system development, U. S. Air Force operations, and the future of air power.
Reserve Officers' Training Corps

The upper division (advanced) course is open to enrollment by students who have completed the basic course (or who have received credit in lieu thereof) and who have been selected for enrollment therein. Primary emphasis is given to the selection of students who are physically qualified for and desirous of flying training after graduation in order to qualify as air officers. However, special quotas are provided for those students majoring in engineering or certain basic sciences, who need not meet the flight physical requirements. The advanced course includes an introduction to leadership principles and practices, problem-solving, nature and uses of information, human behavior, staff action, problems in leadership, legal and physical environment, global relations, weather and navigation, international relations, military aspects of world political geography, and the Air Force officer.

Summer training consists of a four-week program conducted on an Air Force base between the junior and senior years. It is devoted to familiarization and firing of individual weapons, familiarization flying, field exercises, orientation in air base activities, and individual participation in various officer positions.

Successful completion of the advanced course and four years of education culminating in the award of a bachelor's degree qualifies the student for appointment as a Second Lieutenant in the Air Force Reserve.

Students who are designated "Distinguished Air Force Graduates" are eligible for appointment as Second Lieutenants in the Regular Air Force.

Military Science

The mission of the Army Reserve Officers Training Corps is to produce junior officers who by their education, training, and inherent qualities are suitable for continued development as officers in the Reserve and Regular components of the United States Army.

The Army R.O.T.C. program consists of three phases: 1) the basic course, 2) the advanced course, and 3) summer camp. Military leadership is emphasized throughout the course. Instruction is given in subjects common to all branches of the army. The complete course of instruction covers four broad and distinct areas of military knowledge and skill: American military history and the role of the Army in national defense; operations, tactics, and technique; logistics and matériel; and leadership, drill and command.

The lower division (basic) course includes an introduction to the mission and organization of the Army, a study of American military history, and basic military instruction.

The upper division (advanced) course is open to enrollment by students who successfully complete the basic course or who have received credit for military service in lieu thereof, and who have attained upper division standing in the University. In general, students selected for this course are those who have shown potentialities for leadership and command, and whose aptitude ensures their development into efficient officer material. The advanced course includes instruction in tactics, communications, logistics, operations, military teaching methods, military administration, and personnel management. The summer camp consists of a six weeks' program conducted on an army post. Its objective is to familiarize the student with army life and to afford practical training not available at the University. Advanced course students are paid approximately $600 for two years of participation in this program.

Successful completion of the Army R.O.T.C. course and four years' education of the college level qualify the student for appointment as a Second Lieutenant in the United States Army Reserve. Students who are designated "Distinguished Military Graduates" are given the opportunity of applying for commissions in the Regular Army.
**Naval Science**

The mission of the Naval Reserve Officers Training Corps is to provide by a permanent system of training and instruction a source from which qualified officers may be obtained for the Navy and the Marine Corps, and the Naval Reserve and the Marine Corps Reserve.

The Naval R.O.T.C. is made up of two types of students: contract students and regular students. Candidates for enrollment in the contract program of the N.R.O.T.C. are selected locally by the chairman of the Department of Naval Science from male students who voluntarily apply at the beginning of the fall semester. Selection is normally made just prior to or during registration week, and is based on an applicant's high school record, an aptitude test, two interviews by officers, and a physical examination. The best qualified candidates will be accepted to the limit of the quota established each year by the Navy Department. Applications will be accepted from entering students and from other students who have a minimum of eight semesters of college work remaining on this campus as undergraduates.

Regular N.R.O.T.C. students are selected by the Navy Department based on annual nation-wide competitive examinations. The regular program supplements the Naval Academy as a source of regular officers. Successful candidates within the established quota are sent to an N.R.O.T.C. university or college with tuition, books, and certain other fees paid by the Navy. Regular students take the same Naval Science courses as the contract students, except that they must complete three summer cruises, whereas contract students complete only one summer cruise.

The curriculum of the Department of Naval Science includes 24 units of Naval Science studies in eight semesters, one course of 3 units being taken each semester. In addition, students take one hour of drill and one hour of laboratory or practical work each week. The first two years of study cover naval orientation, history, leadership psychology, and weapons. Commencing with the third year, students have the option of taking the Line Officers' course, Marine Corps course, or Supply Corps course. The Line Officers' course includes naval engineering, navigation, operations, administration and leadership, while the Marine Corps course and Supply Corps course offer equivalent training. Upon successful completion of the 24 units of Naval Science courses and after earning a bachelor's degree in certain fields of study, regular students are commissioned Ensign, U.S.N. or Second Lieutenant, U.S.M.C., and contract students are commissioned Ensign, U.S.N.R. or Second Lieutenant, U.S.M.C.R. After graduation and commissioning, contract students are required to serve two years on active duty, and regular students to serve four years on active duty. Physically qualified graduates are also eligible for flight training leading to a designation as Naval Aviator.

For further information and application to the Naval R.O.T.C., students should consult the Chairman of the Department of Naval Science, Room 47, Harmon Gymnasium. Due to the limited quotas, this should be done as soon as possible, but not later than the week of registration.

**STUDY-LIST REGULATIONS**

At the beginning of each semester every student is required to file with the Registrar, upon a date to be fixed by the Registrar, a detailed study list bearing the approval of a faculty adviser or other specified authority.

The presentation of a study list by a student and its acceptance by the college is evidence of an obligation on the part of the student to perform faithfully the designated work to the best of his ability. Withdrawal from, or neglect of, any course entered on the study list, or a change in program without the formal permission of the dean of the college, makes a student...
liable to enforced withdrawal from the University, or to other appropriate disciplinary action.

The various colleges observe certain study-list limits with which the student must comply. For detailed regulations, see the announcements of the respective colleges in later pages of this bulletin.

Authority of Instructors.—No student will be permitted to enter upon or to continue the study of any subject if, in the opinion of the instructor, he lacks the necessary preparation to ensure competent work.

Every student is required to satisfy the instructor in each of his courses of study, in such ways as the instructor may determine, that he is performing the work of the course in a systematic manner. Instructors may report to the Dean of Students the names of students whose attendance or work is unsatisfactory.

Other General Requirements.—The attention of the student is directed to further University regulations concerning the requirements in scholarship, and for candidacy for degrees. The student should plan his program of studies carefully in relation to these requirements, and consult promptly with his adviser or the dean of the college or school concerning any irregularities in the program that may require special approval.

CANDIDACY FOR DEGREES

Every student who intends to become a candidate for a bachelor’s degree must file with the Registrar, on a date to be fixed by the Registrar, an announcement of candidacy for the degree. For filing this announcement later than the appointed date, a fee of $3 is charged. In 1959–1960 these dates are: Monday, October 5, for candidates who expect to complete their work in January, 1960; and Tuesday, February 23, for candidates for graduation in June, 1960.

All candidates for the bachelor’s degree are required to have been enrolled throughout the senior or final year of residence in that college of the University in which the degree is to be taken. This regulation applies both to students entering this University from other institutions and to students transferring from one college to another within this University. Of the 120 (or more) units required for the bachelor’s degree, at least 24 units must have been completed at this University in resident courses of instruction taken in the final or senior year.

All graduates of any one calendar year—January 1 to December 31—are considered as belonging to the “class” of that year.

CHANGE OF COLLEGE OR MAJOR

A student may be transferred from one college (major or department) of the University to another upon the approval of the dean or other responsible officer or committee of the college (or department) to which admission is sought. A form of petition for transfer is supplied by the Registrar.

No student is permitted to transfer from one major department to another after the opening of the last semester of his senior year.

HONORS

Honor students include those who receive honorable mention upon attaining junior standing in the colleges of Agriculture, Architecture, Chemistry, and Engineering, or in the schools of Business Administration, Criminology, Forestry, Nursing, Optometry, and Public Health. Honors are granted also with the bachelor’s degrees. For regulations concerning honors, see the sections explanatory of the curricula of the various colleges, in later pages of this bulletin.
CREDIT AND SCHOLARSHIP

In both the University and the high school the student is credited, in respect to amount of work accomplished, in terms of units; and in respect to quality of scholarship, in terms of grades. In a further, more exact determination of the student's scholarship, the University assigns a numerical value in points to each scholarship grade. These points are called grade points and are more fully described below.

High school credit, when it is offered in application for admission to the University, is reckoned in matriculation units; one matriculation unit represents one year's work in a given subject in the high school.

High school credit, when it is offered in satisfaction of high school graduation requirements, is measured in standard secondary units; that is, the credit granted for the study of a subject throughout the school year of from thirty-six to forty weeks is stated in terms of the standard secondary unit. Each unit represents approximately one-quarter of a full year's work in high school; in other words, four standard secondary units represent one full year's work in high school.

Relation between high school matriculation units and University units.—One year's work in the high school is considered to be equivalent to one University semester's work of college level; that is, a student who desires to make up any high school subject deficiency by offering work of college level can, in one University semester, earn credit equivalent to the credit of one year's work in high school.

The value of a course in units is reckoned at the rate of one unit for three hours' work per week per semester on the part of the student. The credit value assigned to a course is not determined by the number of class meetings per week, but by the number of hours of work required of the student. For most courses, it is expected that the average student will spend two hours in preparation for one hour of lecture or recitation.

GRADES OF SCHOLARSHIP; GRADE POINTS

In the University (except in the Schools of Dentistry and Medicine in San Francisco), the result of the student's work in each course (graduate and undergraduate, including courses in which credit is sought by examination) is reported to the Registrar in one of six scholarship grades, four of which are passing, as follows: A, excellent; B, good; C, fair; D, barely passing; E and F, not passing. Grades are not otherwise defined, as for example, by percentages, or by a rule stipulating the manner in which the several grades shall be distributed.

Grade E (not passed) or grade X (not passed) indicates a record below passing, but one which may be raised to a passing grade without repetition of the course by passing a further examination or by performing other tasks required by the instructor. Grade F (not passed) denotes a record so poor that it may be raised to a passing grade only by repeating the course.

The term "incomplete" is not used in reporting the work of students. The instructor is required to assign, for every student, a definite grade based upon the work actually accomplished, irrespective of the circumstances which may have contributed to the results achieved.

Course reports filed by instructors at the end of each semester are final, not provisional.

Grade points are assigned to the respective scholarship grades as follows: for each unit of credit, the scholarship grade A is assigned 4 points; B, 3 points; C, 2 points; D, 1 point; E and F, no points.

In order to qualify for the bachelor's degree in the College of Letters and Science, the College of Agriculture, the College of Architecture, the College
of Chemistry, or the College of Engineering, the School of Business Administration, the School of Criminology, the School of Forestry, the School of Nursing, the School of Optometry, the School of Pharmacy, or the School of Public Health, the student must have obtained at least twice as many grade points as there are units in the total credit value of all courses undertaken by him in the University of California.

For the grading systems in the schools of Dentistry and Medicine, see the Announcement of the School of Dentistry and the Announcement of the School of Medicine.

Every student who desires to obtain his scholarship grades at the end of the semester should deposit with the Registrar a self-addressed stamped envelope for a report of the grades.

**MINIMUM SCHOLARSHIP REQUIREMENTS**

Any student who receives a notice of dismissal from the University may petition the dean of his college or school for a hearing. Ordinarily, however, students dismissed for unsatisfactory scholarship will be excluded from the University for an indefinite period, with the presumption that their connection with the University will be ended by such exclusion. The conditions under which students may be dismissed follow.

**College of Letters and Science—**

*Probation.*—A student will be placed on probation if at the close of any semester his grade-point average is less than two (a C average), computed on the total of all courses undertaken in this University for which he has received a final report.

*Dismissal.*—A student will be subject to dismissal from the University

(1) If during any semester he fails to pass with a grade of C or higher courses totaling at least 4 units; or

(2) If, after one semester of probationary status, he has not obtained a grade-point average of two (a C average), computed on the total of all courses undertaken in this University for which he has received a final report.

**Colleges of Agriculture and Architecture; also Schools of Business Administration, Criminology, Forestry, Nursing, and Public Health—**

*Probation.*—A student will be placed on probation

(1) If at the close of his first semester his record shows six or more grade points less than twice the number of units undertaken; or

(2) If at the close of any subsequent semester his grade-point average is less than two (a C average), computed on the total of all courses undertaken in this University for which he has received a final report.

*Dismissal.*—A student will be subject to dismissal from the University

(1) If during any semester he fails to pass with a grade of C or higher courses totaling at least 4 units; or

(2) If while on probation his grade-point average for the work undertaken during any semester falls below two (a C average); or

(3) If after two semesters of probationary status he has not obtained a grade-point average of two (a C average), computed on the total of all courses undertaken in this University for which he has received a final report.

Students in the School of Nursing may, at the discretion of the faculty of the School of Nursing, be placed on probation or made subject to dismissal for deficiencies in qualifications for their profession other than those listed above.
A student who becomes subject to the provisions of this regulation will also be subject to such supervision as the faculty of his college or school may determine. The faculty may dismiss from the University students under its supervision or may suspend the provisions of this regulation and permit the retention in the University of the students subject to dismissal, and the return to the University of students who have been dismissed under this regulation.

**Colleges of Chemistry and Engineering**

A student will be subject to dismissal from the University (a) if during any semester or summer session he fails to attain at least a grade C average in all courses for which he was enrolled; or (b) if at the end of any semester or summer session he has failed to attain at least a grade C average in all courses undertaken in the University. A student who becomes subject to the provisions of this regulation will be under the supervision of the faculty of the college concerned. The faculty of the college may dismiss from the University students under its supervision, or may suspend the provisions of this regulation and permit the retention in the University of the students thus subject to dismissal, and the return to the University of students who have been dismissed under this regulation.

**School of Optometry**

*Probation.*—A student will be placed on probation if at the close of his first semester in the School of Optometry his record falls below a grade C average.

*Dismissal.*—A student will be subject to dismissal from the University

(1) If at the end of any semester subsequent to his first, he has failed to maintain a grade-point average of two (a C average), computed on the total of all courses taken subsequent to his admission to the School of Optometry for which he has received a final report; or

(2) If during any semester he fails to pass with a grade of C or higher courses totaling at least 4 units.

A student in the School of Optometry who becomes subject to the provisions of this regulation will be under the supervision of the faculty of the School. The faculty may dismiss from the University students under its supervision, or at its discretion may suspend the provisions of this regulation and permit the retention in the University of students thus subject to dismissal, and the return to the University of students who have been dismissed under this regulation.

**Graduate Division**

The action to be taken in respect to students in graduate status who acquire scholarship deficiencies is left to the discretion of the Dean of the Graduate Division.

**School of Medicine and the School of Pharmacy on the San Francisco campus**

Matriculants in the School of Medicine or in the School of Pharmacy on the San Francisco campus who are pursuing all their work in either school are not subject to the foregoing regulations. For the rules governing scholarship requirements in the School of Medicine and in the School of Pharmacy on the San Francisco campus, reference should be made to the Announcement of the School of Medicine and the Announcement of the School of Pharmacy.
CREDIT BY EXAMINATION

Provision is made whereby an undergraduate student in residence and in good standing may under certain conditions take examinations for degree credit either (a) in courses offered in the University, without formal enrollment in them, or (b) in subjects appropriate to the student's curriculum but not offered as courses by the University. The results of all such examinations, with grades and grade points, are entered upon the student's record in the same manner as for regular courses of instruction (see Grades of Scholarship, page 40). No fees are required.

The privilege of taking an examination for credit will ordinarily be granted only to students who have at least a grade B average for all courses undertaken in the University.

Arrangements must be made in advance with the dean of the student's college or school; his approval, and that of the instructor who is appointed to give the examination, are necessary before an examination can be given.

The application form for examinations may be obtained from the Registrar.

FINAL EXAMINATIONS

Final examinations are obligatory in most undergraduate courses. Each course in which a final examination is not required is so indicated in the Schedule of Classes at the beginning of the semester in which the course is given. All examinations will, so far as practicable, be conducted in writing, and a maximum time will be assigned beforehand for each examination which no student will be allowed to exceed. The time for examination sessions will not be more than three hours. Leave to be absent from a final examination must be sought by written petition to the proper faculty.

If a final examination is one of the regular requirements in a course, there can be no individual exemption from the examination, except as provided in the preceding paragraph.

Any department may examine a student, at the end of the semester immediately preceding his graduation, in the major subject in which the department has given instruction; and a student to be examined in a major subject may, at the discretion of the department, be excused from all final examinations in courses in the department of the major subject in which he has been enrolled during the semester. Credit value may be assigned to this general examination in the major subject.

In the year courses of the professional curriculum in law, mid-year reports may be made without formal examinations, and these reports will be final.

Reexaminations are permitted only for the purpose of raising grade E or X (not passed) to a passing grade. A student who received grade B, C, or D in any course is not allowed a reexamination for the purpose of raising the grade. Concerning methods of raising nonpassing grades to passing grades, see under Removal of Deficiencies, below.

Application for examination for advanced standing on the basis of work done before entrance to the University should be made to the Director of Admissions upon entrance to the University.

REMOVAL OF DEFICIENCIES

The following rules for removal of deficiencies are effective for all work completed on and after July 1, 1957.

In this section, whenever reference is made to removal of grade E (not passed), the statement applies also to grade X (not passed).

A student who receives a grade lower than C in a lower division course may repeat the course. The units will count only once toward the degree; however, he will be charged with the units undertaken on each attempt.
Upon repetition of the course, the student will receive the grade assigned by the instructor and grade points appropriate to that grade. The foregoing privilege does not apply to grades received in upper division or graduate courses. A student who receives grade E or F in an upper division or graduate course may repeat the course. The units will count only once toward the degree; however, he will be charged with the units undertaken on each attempt. Upon repetition, the student will receive the grade assigned by the instructor but for the repetition cannot receive more than two grade points per unit. (For exceptions, see below.)

Special provision is made for students whose university work has been interrupted by one year or more of service with the armed forces of the United States and who, prior to such service, had undertaken one or more courses forming part of an announced sequence of courses. Such a student may, with the approval of the dean of his college or school (or, in the case of graduate students, with the approval of the Dean of the Graduate Division), be permitted to repeat any course previously undertaken in the sequence, irrespective of the grade previously assigned, and to receive the new grade assigned by the instructor and grade points appropriate thereto; provided, however, that for a course so repeated, the student may receive unit credit toward graduation, or toward the satisfaction of major requirements, only in an amount not to exceed the difference between the full unit value of the course and the number of units, if any, which he has previously received from the same course.

For the purpose of raising grade E to a passing grade, the student may, with the consent of the instructor concerned and of the dean or director of the appropriate school, college, or division, have the privilege of a "condition examination." In Summer Sessions courses, however, reexaminations for the removal of deficiencies are not provided except upon approval of the Officer in Charge of Summer Sessions, or his authorized representative.

Any examination, term paper, or other exercise which the instructor may require of the student in order to raise grade E to a passing grade in a course is a "condition examination." For every such examination, a formal permit, to be obtained in advance from the Registrar, must be shown to the instructor in charge of the examination; otherwise, he will lack authority to consider and report upon the work submitted by the student. For every course in which a special examination is undertaken with a view to raising grade E to a passing grade, a fee of $4 is charged. The fee for a permit for two or more special examinations of this type is $4. There is no fee for a reexamination (final examination taken with the class), if the final examination is the only task required by the instructor for the purpose of raising grade E to a passing grade and if this final examination is taken with the class not later than the close of the next succeeding semester of the student's residence in which the course is offered. A form of petition for a special examination or for admission to an examination with a class, with instructions concerning procedure, may be obtained from the Registrar. Grade E in a course in which a final examination is regularly held can be raised to a passing grade only by passing a satisfactory final examination in the course.

If a student who has received grade E in any course fails to raise it to a passing grade by the end of the next semester of his residence in which the course is regularly given, then the grade shall be changed to F. If in the meantime, however, the student has repeated the course and has again received grade E, his grade in the course will remain grade E, as it would be if he were taking the course for the first time. A student who fails to attain grade D or a higher grade in any course following a reexamination for the purpose of raising grade E to a passing grade, will be recorded as having received grade F in the course.

A student who raises a grade E or F, incurred in an upper division or grad-
Transcript of Record; Leave of Absence

Graduate course, to a passing grade by successful repetition of the course will receive the grade assigned by the instructor but can not receive more than two grade points per unit. A student who raises a grade E, incurred in any course, lower division, upper division, or graduate, to a passing grade by examination or by performing other tasks required by the instructor (short of actual repetition of the course), shall ordinarily receive no grade points. An exception to this rule is permitted, however, when the deficiency consists solely in the omission of the final examination or other required exercise on account of illness or other unavoidable circumstances, the student's performance in all other respects having been satisfactory. In such circumstances the student may petition to have that grade assigned which he would have received had the work been completed without delay, together with the appropriate number of grade points. His petition must set forth in detail the reasons for his failure to complete the course within the usual limit of time. The petition must be endorsed by the instructor concerned, and must be submitted for final approval as follows: by undergraduate students (except students in the School of Pharmacy), to the Dean of Students; by students in the School of Pharmacy, to the Dean of that School; by graduate students, to the Dean of the Graduate Division.

TRANSCRIPT OF RECORD

Each student will be provided, upon request to the Registrar, with one official transcript (copy) of his University record, without charge. After the first request a minimum charge of $1 is made for each additional transcript of record. Students who plan to enter the teaching profession or to seek other employment following graduation, should provide themselves with one or more transcripts of their records so as to be ready at all times to show official evidence of attendance at the University.

Application for a transcript of record should be made directly to the Registrar well in advance of the time when the record will be needed by the applicant.

LEAVE OF ABSENCE AND HONORABLE DISMISSAL

Excuses for absence from classes because of extenuating circumstances are issued by the Dean of Students, on request. A brief leave of absence is issued in lieu of an excuse when the absence covers five days or more. Absences of less than one full day are to be arranged for by the student with his individual instructors.

It is the student's responsibility to notify the Registrar immediately in writing whenever circumstances prevent further class attendance. An undergraduate student who finds it necessary to withdraw from the University prior to the end of a semester will be granted an indefinite leave of absence or an honorable dismissal only upon the written approval of the dean of the school or college and the Dean of Students. Graduate students require the approval of the Dean of the Graduate Division. In addition, all men students must secure the written approval of the Supervisor of Special Services. Permission to withdraw from the University without scholarship penalty is usually not granted after the first few weeks of the semester except under unusual circumstances over which the student has no control.

An honorable dismissal or an indefinite leave of absence may be granted, upon written petition, at the close of any semester to a student in good standing. Students dismissed because of scholarship deficiencies, students on scholastic probation, and students under censure or suspension are not regarded as being in good standing.

An honorable dismissal or an indefinite leave of absence will not be granted during or at the close of a semester until all accounts due the University have
been satisfactorily adjusted, and all University property returned (laboratory equipment, uniforms, gymnasium clothing and equipment, keys, books).

Discontinuance without notice. Students who discontinue their work without formal leave of absence do so at the risk of having their registration privileges curtailed or entirely withdrawn.

**STUDENT CONDUCT AND DISCIPLINE**

When a student enters the University it is taken for granted by the University authorities that he 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 University authorities will take such action as, in their opinion, his conduct warrants. Students who fail to make proper use of the opportunities freely given to them by the University must expect to have their privileges curtailed or withdrawn.
MISCELLANEOUS INFORMATION

SITE, CLIMATE, AND TRANSPORTATION

The Berkeley campus of the University of California is situated on the eastern shore of San Francisco Bay, directly opposite the Golden Gate. The University grounds comprise five hundred and thirty acres, rising in gentle slopes to the Berkeley hills. From almost every part of the campus—and the city of Berkeley—there is a magnificent view over the bay and city of San Francisco, the neighboring plains and mountains, the Pacific Ocean, and the Golden Gate.

Berkeley has a climate well suited for university work throughout the year. Extremes of heat and cold, such as are experienced in many other parts of the country, are unknown in Berkeley. The average temperature for the winter months is about 53 degrees; for the month of May, June, and July, about 60 degrees. Temperatures as high as 85 degrees are of infrequent occurrence and brief duration.

The average rainfall is 24 inches, of which about three-fourths comes in the four months, December to March, when approximately one day out of three is rainy. Throughout the rest of the school year an average one-fifth of the days are rainy. In the rainy reason, fogs are infrequent. Fully half the foggy days of the year come in the summer months.

From the business center of Oakland, it is about thirty minutes' ride by bus to the University, and from San Francisco about thirty-five minutes by bus. Motorists from San Francisco may come by way of the San Francisco-Oakland Bay Bridge.

EXPENSES OF STUDENTS

General Expenses and Fees *

A table of estimated basic expenses for a college year of two semesters for a student who will enroll in a nonprofessional or nonprofessional course and who has been classified as a resident of the State is as follows:

<table>
<thead>
<tr>
<th>Principal Items of Expense Estimated for a College Year</th>
<th>Minimum</th>
<th>Moderate</th>
<th>Liberal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expense item</td>
<td>Men</td>
<td>Women</td>
<td>Men</td>
</tr>
<tr>
<td>Incidental Fee</td>
<td>$120.00</td>
<td>$120.00</td>
<td>$120.00</td>
</tr>
<tr>
<td>Books and Supplies</td>
<td>80.00</td>
<td>80.00</td>
<td>90.00</td>
</tr>
<tr>
<td>A.S.U.C. Membership</td>
<td>23.00</td>
<td>23.00</td>
<td>23.00</td>
</tr>
<tr>
<td>Athletic Privilege Card</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Board and Room</td>
<td>460.00</td>
<td>450.00</td>
<td>760.00</td>
</tr>
<tr>
<td>Total</td>
<td>$693.00</td>
<td>$683.00</td>
<td>$1003.00</td>
</tr>
</tbody>
</table>

* All fees are subject to change.
† Optional.
‡ Minimum price includes five hours work per week.
The question of expense while attending the University is of importance to every student. It is difficult, however, to give specific information about yearly expenditure. In a student body of some nineteen thousand members there are so many different tastes, as well as such a wide range of financial resources, that each student must determine his budget in keeping with his own needs and financial condition. It is possible to live simply, and to participate moderately in the life of the student community, on a modest budget. The best help the University authorities can offer the student in planning his budget is to inform him of certain definite expense items, and acquaint him with others that he will in all probability have to provide for.

**Incidental Fee.**—The incidental fee is $60 each semester, for both undergraduate and graduate students and is payable at the time of registration. It covers certain expenses of students for laboratory costs, for athletic and gymnasium facilities and equipment, for counseling and placement as provided on the local campus, and for such consultation, medical advice, and hospital care or dispensary treatment only as can be provided at the Cowell Memorial Hospital by the local campus Student Health Service, with the aid of the visiting staff. No part of this fee is remitted to students who may not desire to make use of all or any of these privileges. Payment by check, draft, or money order must be for the exact amount for all fees, and should be made payable to The Regents of the University of California. If a student withdraws from the University within the first five weeks from the first day of classes for the semester, a part of the incidental fee may be refunded.

Students who are classified as nonresidents of the State are required to pay each semester, in addition to the incidental fee, a tuition fee of $200. It is important for every prospective student to note carefully the rules governing legal residence in the University, which are stated on page 49. For conditions governing the commutation of the tuition fee for graduate students, see the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION.

**Fees in the Professional Schools and Colleges.**—In the professional schools and colleges tuition and general expenses differ. Nonresidents of California enrolled in the School of Law pay a fee of $360 a semester, which includes the incidental fee paid by all students.

In the School of Medicine, tuition for residents is $125 a semester; for nonresidents, $300. (Note that entrants are required to make an advance payment of $50 upon acceptance of the application for admission.) Undergraduate resident students in the School of Dentistry pay a tuition fee of $100 a semester, nonresidents, $225; resident graduates, $150, nonresidents, $225. In the School of Pharmacy, the tuition fee for undergraduate resident students is $100 a semester; for nonresidents, $225.

Further information about fees and expenses in the professional curricula is given in detail in the separate announcement of each school or college. A copy may be obtained from the dean in charge.

**Laboratory Fees.**—There are no laboratory fees.

**Living Expenses.**—The main item of expense for students living away from home is room and board. A detailed statement of prices will be found below, under Living Accommodations.

**Other Expenses.**—Books and stationery for a student in the liberal arts courses average about $80 to $90 a year. Books and special equipment for students in the preprofessional and professional schools cost from $60 to $200. Exact information on these items may be obtained by writing directly to the school or department. Women students taking physical education are required to buy shoes which cost about $4. Students failing the required examination in Subject A must pay a fee of $35 for the course in Subject A (see page 34).

Universal membership in the Associated Students of the University of California costs $11.50 each semester (fall and spring) and is payable at the time of registration. This membership entitles both undergraduate and graduate students to the use of the University Library, to the privilege of attending University classes free of charge, and to a list of academic and extracurricular events organized by the Associated Students.
students to reduced rates on a number of student activities, including dances, dramatic presentations, and musical productions, etc.; a subscription to the student newspaper, the *Daily Californian*; use of the Henry Morse Stephens Memorial Student Union; and active participation in student government, including the privilege of voting and holding office.

In addition, voluntary purchase of the athletic privilege card for $10 for the entire year (fall and spring semesters) entitles the student to free admission to most athletic contests, and reduced admission to others.

It is impossible to include in the foregoing figures miscellaneous items such as cleaning, laundry, clothes, transportation to and from home, or fees other than the incidental fee. Students classified as nonresidents of the State must also add to their estimated budgets the tuition fee of $200 a semester.

*Tuition.*—The University charges a tuition fee to every student who has not been a legal resident of the State of California for a period of one year immediately preceding the opening day of the semester during which he proposes to enroll. Such a student is classified as a nonresident. A student entering the University for the first time should read carefully the rules governing determination of residence, as quoted below, that he may be prepared, in the event of classification as a nonresident, to pay the required tuition fee. This fee must be paid at the time of registration. The attention of the prospective student who has not attained the age of 22 years and whose parents do not live in the State of California, is directed to the fact that presence in the State of California for a period of more than one year immediately preceding the opening day of the semester during which he proposes to attend the University, does not, of itself, entitle the student to classification as a resident. The attention of a veteran, who was not a resident of the State of California at the time of his entrance into the armed forces, is directed to the fact that residence in California under military orders does not, of itself, entitle the student to classification as a resident. Every alien student shall be deemed to be a nonresident student unless he has been lawfully admitted to the United States for permanent residence in accordance with all applicable provisions of the laws of the United States.

Tuition in the academic colleges is free to students who have been residents of the State of California for a period of one year immediately preceding the opening day of the semester during which they propose to attend the University. Students who are classified as nonresidents are required to pay a tuition fee of $200 each semester. This fee is in addition to the incidental fee. Exceptions will be limited to graduate students who are unable to devote more than half time to academic work in the “200” series or the equivalent thereof, and the nonresident tuition fee will be $100 a semester. Petition for half fee based on the above criteria must be submitted to the office of the Dean of the Graduate Division; otherwise, all students are presumed to be full-time students, irrespective of the number of units for which they are enrolled. On the approval of the Dean of the Graduate Division, the nonresident tuition fee may be remitted in the case of graduate students in the academic departments who are admitted without deficiencies, who have proved that they are distinguished scholars, and who are carrying full programs toward the fulfillment of requirements for academic higher degrees. See further the Announcement of the Graduate Division, Northern Section.

If the student is in doubt about his residence status, he may communicate with the Attorney for The Regents in Residence Matters, 590 State-wide Administration Building, University of California, Berkeley 4, California.

*Special commutation of nonresident tuition fee.*—Exemption from payment
of the nonresident 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 semester during which the unmarried minor proposes to attend the University. A student who believes he qualifies under this measure should request further information from the Attorney in Residence Matters.

The eligibility of a student to register as a resident student may be determined only by the Attorney for The Regents in Residence Matters. Every entering student, and every student returning to the University after an absence is required to make a "Statement as to Residence" on the day of registration, upon a form which will be provided for that purpose, and his status with respect to residence will be determined by the Attorney soon after registration. Application for a change of classification with respect to some preceding semester will not be received under any circumstances.

**Refunds.**—For students who withdraw with official approval during the first few weeks of the semester, part of the fees enumerated above may be refunded. A schedule of refunds and other information will be found in a separate circular (STUDENT FEES AND DEPOSITS) which may be obtained from the Registrar, University of California, Berkeley 4.

**Rules Governing Residence**

The term "nonresident student" is construed to mean any person who has not been a bona fide resident of the State of California for more than one year immediately preceding the opening day of a semester during which he proposes to attend the University.

The residence of each student is determined in accordance with the rules for determining residence prescribed by the provisions of Section 244 of the Government Code of California, and Sections 20005 and 20007 of the Education Code of California, provided, however:

That every alien student who has not been lawfully admitted to the United States for permanent residence in accordance with all applicable provisions of the laws of the United States, or whose status, having been so admitted, has been changed, is deemed to be a nonresident student.

Every person who has been, or who shall hereafter be classified as a nonresident student shall be considered to retain that status until such time as he shall have made application in the form prescribed by the Registrar for reclassification, and shall have been reclassified as a resident student.

Every person who is classified as a resident, but who becomes a nonresident at any time by virtue of a change of domicile by his own action or by the person controlling his domicile, is obliged to notify the Attorney in Residence Matters at once.

Every person who has been classified as a resident student shall, nevertheless, be subject to reclassification as a nonresident student and shall be reclassified as a nonresident student whenever there shall be found to exist circumstances which, if they had existed at the time of his classification as a resident student, would have caused him to be classified as a nonresident student. If any student who has been classified as a resident student shall be determined to have been erroneously so classified, he shall be reclassified as a nonresident student, and if the cause of his incorrect classification shall be found to be due to any concealment of facts or untruthful statement made by him at or before the time of his original classification, he shall be required to pay all tuition fees which would have been charged to him except for such erroneous classification, and shall be subject also to such discipline as the President of the University may approve.
Living Accommodations

Advice and information about all types of living accommodations may be obtained from the Housing Office, University of California, 2620 Bancroft Way, Berkeley 4, California. Lists of privately operated student residences that have been inspected and approved by the University are available for single men and women. This office also maintains card files of accommodations for single men, for single women, and for married students. These accommodations have not been inspected, and students must call in person at the Housing Office in order to make arrangements for rentals through the card file. The Housing Office maintains a waiting list for accommodations for married students in the University Village, Albany. Applications for these apartment units may be made by calling in person or writing to the Housing Office.

The price of room and board depends upon the type of accommodations desired. In the Residence Halls, owned and operated by the University, the estimated price is between $380 and $435 a semester. This price includes three meals per day. In the boarding houses for men, the price is between $315 and $380 a semester; and in the boarding houses for women, between $345 and $425 a semester. The prices quoted for most boarding houses do not include the price of lunches and Sunday meals, which average $125 to $150 a semester. In cooperative houses for single men, the price is approximately $225 to $230 a semester plus five hours of work a week. In cooperative houses for single women, the price is between $225 and $245 a semester plus five hours of work a week. All cooperative houses serve three meals a day, seven days a week.

Householders and students are expected, at the time arrangements are made for accommodations, to have a contract in writing covering terms of payment, indicating whether or not rent is to be paid during vacations, what laundry facilities are available, stating the number of meals served per day, and including any other matters which would affect their business relations. Students should read with care any contemplated contract, in order that no misunderstanding may arise either on the part of the householder or the student. Contracts for residence are for the period of a semester in the University Residence Halls and the approved houses.

All undergraduate students will be required to file a residence card. Any change of address during the semester must be filed in the office of the Registrar. No approval is required for the college residence of men students. New undergraduate women students who do not live in their own homes are expected to live in houses approved by the University. Every undergraduate woman under 21 years of age not living in an approved house must have not only the permission of the Dean of Women for her college residence, but also the permission of her parents or guardian, whose approval must be indicated by signature on the residence card which she will receive at registration.

The University operates nine residence halls for women accommodating a total of 1,252 undergraduate students. Stern Hall was a gift of Mrs. Sigmund Stern; it has single and double rooms accommodating 136 women. The semester charge is $435. The four Fernwald Halls, namely, Mitchell, Oldenberg, Peixotto, and Richards accommodate 276 women. Two of the halls have 78 women each, the other two accommodate 40 and 80 students. The four new halls, south of the campus; Cheney, Cunningham, Davidson, and Freeborn accommodate 210 women each. All of these halls have double rooms. The semester charge is $380, payable in full at the beginning of the semester or in five equal installments.

There are six University Residence Halls for men which accommodate 1,252 undergraduate men. Bowles Hall has 204 men and was a gift in memory of Philip Ernest Bowles. The men live in suites accommodating four men. Smyth Hall, 208 men, has double rooms. The four new halls, located adjacent to the
four new women’s halls: Deutsch, Ehrman, Griffiths, and Putnam, accommodate 210 men each. The price for room and board in all of the men’s halls is $380 per semester, payable in full at the beginning of the semester or in five equal installments.

Applications for residence halls will be available on November 1 for the spring semester, and April 1 for the fall semester. During the first week (November 1-8 and April 1-8) they may be obtained and will be accepted by mail only. After these dates, applications may be secured or submitted in person at the Housing Office. Applications will be mailed to the student on request. Completed applications should be returned as soon as possible after these dates. Two letters of recommendation, one from an official of the school last attended, and a $25 deposit are required. Students who are assigned to a University Residence Hall should not participate in fraternity or sorority rushing and may not join a fraternity or sorority during the semester while they are residents of the halls.

International House is a residential and social center for American and foreign students. The residence facilities for men and for women are separate, the social halls and dining rooms being used in common. Ordinarily, residence is open only to graduate and upper division students; however, application from all non-Caucasian Americans and from all foreign students will be given careful consideration. Applications and requests for information should be sent directly to International House, University of California, Berkeley 4.

Fraternities and sororities. Membership in these organizations is by invitation. Men students who are interested in fraternity membership should request a rushing registration form from Interfraternity Council, Stephens Union. The majority of the national sororities maintain chapters here, and there are also several local sororities and clubs. Women students who are interested in sorority membership may obtain general information by writing to the Dean of Women. Information about average monthly rates, and initiation and pledge fees of the fraternities and sororities may be obtained by calling in person at the Office of the Dean of Students, 201 Sproul Hall.

Men students who anticipate living in fraternity houses during their first semester should make temporary living arrangements at hotels or with friends for the rushing period. Women students participating in sorority rushing which takes place in the fall semester only must make housing arrangements for this rushing period through the Panhellenic Association, Office of the Dean of Students, 201 Sproul Hall. Rushes should not sign contracts for the fall semester with the University Residence Halls and other approved houses.

PLACEMENT SERVICE

The Student and Alumni Placement Center assists students interested in part-time, temporary and summer work, and graduating students and alumni seeking career positions in business, industry and government. There is no charge for this service. Teacher placement is handled by a separate office and is described below. The Placement Center operates on a twelve-month basis, with the exception of recognized legal holidays. The office is open for student interviews from 9:00 to 11:00 a.m. and from 1:00 to 4:00 p.m. The remaining hours are used to contact employers. The Student and Alumni Placement Center is located in South Hall Annex, just west of the Campanile.

STUDENT EMPLOYMENT

Students seeking part-time, temporary, odd jobs or summer employment are eligible for the services of the Student and Alumni Placement Center as soon as they have been admitted to the University. A current registration
card or a letter of admission from the University should be presented at the time of application.

In most cases, it is advisable for students to visit the Student and Alumni Placement Center after they have arranged their class schedules. Each student registered with the placement center is assigned to a placement counselor. Students should check frequently with their placement counselor until they are suitably employed.

While students are eligible to use the services of the Student and Alumni Placement Center as soon as they have been admitted to the University, whenever possible, finances should be planned to avoid the necessity for part-time work during their first semester at Berkeley. Students should avoid carrying too strenuous a load of work and study. Rather than endanger health or handicap the academic program, students who are largely self supporting may wish to consider taking five or six years to complete the requirements for graduation.

A variety of part-time employment opportunities are available to students registered on the Berkeley campus. Positions for men include gardening, maintenance, night watchman, and such meal jobs as dishwashing and waiting on table. Among the employment possibilities for women are housecleaning, baby-sitting, and waiting on table. There is also a limited number of opportunities for sales positions with stores in the campus area, and students are also used periodically for checking inventory. Some office positions are available both on and off campus, particularly for women with good secretarial skills. Students in science and engineering are eligible for positions as laboratory assistants on and off the campus.

Women students are often able to secure positions in private homes working approximately 18 hours a week in exchange for room and board, bus fare and $10 a month. Some of these positions offer room and board and bus fare only in exchange for 15 hours of work a week. There is also a limited number of room and board jobs for men.

There are usually not sufficient opportunities to provide immediate employment for all those who apply at the beginning of a semester. Students whose job interests are flexible and whose schedules permit 20 hours of work a week find it easier to secure part-time employment.

SENIOR AND ALUMNI PLACEMENT

The Student and Alumni Placement Center engages actively in the full-time placement of University of California graduates from all campuses. Seniors and graduate students should register with the center early in their final year at the University. Alumni are eligible and encouraged to make use of the services and facilities of the center for career consultation and placement assistance at all times.

The center arranges interviews for degree candidates with employer representatives who visit the campus each fall and spring. Throughout the year, the center also receives information on a large number of employment opportunities open to recent or experienced graduates.

BUREAU OF SCHOOL AND COLLEGE PLACEMENT

The Bureau of School and College Placement has as its chief function the coordination, under one executive officer, of the teacher placement activities on the Berkeley, Davis, Los Angeles, and Santa Barbara campuses.

OFFICE OF TEACHER PLACEMENT

The Office of Teacher Placement recommends graduates, students, and former students for positions in universities, colleges, junior colleges, high schools, and elementary schools, and for educational research, thereby assisting quali-
fied candidates to obtain permanent employment or promotion in the work for which they have prepared themselves. A fee of $5 is charged for the clerical services of this office. Communications should be addressed to the Manager of the Bureau of School and College Placement, 2580 Bancroft Way, University of California, Berkeley 4.

The University reserves the right to recommend only those persons who are considered to be fully qualified. In every recommendation the aim is to keep in mind the best available persons, remembering candidates already employed as well as those who may be out of employment.

**COUNSELING CENTER**

The Counseling Center of the University offers vocational, educational and personal counseling to all regularly enrolled students of the Berkeley campus throughout their college careers.

Many students face such problems as choice of major or future vocation; questioning of ability to complete the work necessary for a degree in a chosen field; how to study effectively; adjustment to college life; lack of knowledge concerning personal interests and aptitudes as they relate to the requirements of a vocational field, or perhaps knowledge of the field itself.

Any student may arrange to talk with a professionally trained and experienced counselor regarding his particular situation. Where appropriate, psychological tests, individually selected according to the student’s needs, are provided to give information about such factors as interest, academic aptitude, personality traits.

A library of occupational literature is also available to provide necessary knowledge of all aspects of the world of work, including educational requirements.

For assistance with specific course selection and academic planning, students should consult with faculty advisers.

The Counseling Center is located in Building T-5, just north of the Campanile. Further inquiry or appointments for service may be made at Building T-5.

**VETERANS INFORMATION**

Dean of Students–Special Services maintains liaison between certain veterans and veterans’ dependents and the Veterans Administration, the State Department of Veterans Affairs, and other agencies offering veterans educational benefits; and assists veterans in becoming assimilated into the life and spirit of the University. On the Berkeley campus, this office is located in Room 313, Sproul Hall. Offices of the United States Veterans Administration are located as follows: Regional Office, 49 Fourth Street, San Francisco 3, California; Regional Office, 1380 South Sepulveda Boulevard, Los Angeles 25, California.

Veterans wishing to enroll under the provisions of Public Law 550 (“Korean” G. I. Bill) should first obtain from the United States Veterans Administration a Certificate for Education and Training which should be filed with the Dean of Students–Special Services after completion of registration and filing of the study list. These veterans must be prepared to pay all fees and educational costs at the time of registration as education and training allowances are paid to the veteran by the Veterans Administration. The first monthly payment will normally be received 60 to 75 days after compliance with the above.

Information regarding educational benefits available from the State of California (CVEI) may be obtained from the State Department of Veterans Affairs, Division of Educational Assistance, P. O. Box 1559, Sacramento 7, California; or Room 225, 542 South Broadway, Los Angeles 13, California; or 515 Van Ness Avenue, San Francisco 2, California.
SELECTIVE SERVICE

Matters relating to the deferment of students eligible under Selective Service are handled by the Dean of Students—Special Services, Room 311, Sproul Hall. Certifications regarding enrollment, class standing, and other pertinent information will be submitted to the student's Selective Service Board upon request. To be considered for deferment by Selective Service, the student must be pursuing a full-time course of instruction which, for undergraduates, consists of at least 15 units. This does not include noncredit courses such as Subject A. Students who plan to seek deferment continuously until qualified for the bachelor's degree should understand that present policies of Selective Service permit continuous deferment only through the eighth term of college residence, including not only the period of residence at the University of California but also all terms spent at junior colleges or other collegiate institutions. Students should plan course sequences for several terms ahead so that prerequisites for all desired advanced courses can be satisfied within the eight-term period. To qualify as a full-time graduate student, the student must be in residence, actually spend full time on his studies, and meet the criteria generally applied for normal progress toward the degree—i.e., two years or less for the master's degree and four years or less for the doctor's degree (including time spent working toward the master's degree, if taken). Students desiring deferment on the basis of enrollment in the University R.O.T.C. programs should consult the proper R.O.T.C. department.

SCHOLARSHIPS, PRIZES, LOANS

Through the generosity of alumni and friends of the University, scholarships, fellowships, prizes, and loan funds have been established which are available to undergraduate and graduate students in accordance with the conditions laid down by the donors.

Scholarships and Fellowships.—A circular giving information about undergraduate scholarships may be obtained from the Committee on Undergraduate Scholarships and Honors, Room B-1, 2251 College Avenue. Students who maintain a good scholarship standing are eligible to make application. Awards are made on the basis of scholarship, financial need, and character and promise. Holders of undergraduate scholarships must carry a minimum of 12 units a semester. Applications for scholarships must be filed with the Committee on Undergraduate Scholarships and Honors by mail or in person for the succeeding academic year (September through June), or either semester thereof, during the following periods: Applicants in residence at the University file applications between December 1 and January 10 (January 11 when January 10 falls on Sunday). Entering students file applications between December 1 and March 1 (March 2 when March 1 falls on Sunday). Under no circumstances will applications be accepted after these dates. Application forms are available in the office of the Committee on Undergraduate Scholarships and Honors, Room B-1, 2251 College Avenue, each year from the beginning of the last week in November.

Information about fellowships for graduate students may be obtained from the Dean of the Graduate Division. Fellowships and graduate scholarships are ordinarily awarded as a mark of honor, on the basis of scholarship, not of need. The holders of fellowships or graduate scholarships are expected to devote all their time to graduate study and research in the University. Applications for fellowships and graduate scholarships must be filed with the Dean of the Graduate Division on or before February 7 (February 8 if the 7th falls on Sunday) preceding the academic year for which awards are to be made.

Prizes.—A complete list of available prizes, together with the regulations governing each competition, may be obtained from the Registrar.
Loans.—The loan funds for both graduate and undergraduate students are administered in the office of the Dean of Students. Loans are not available to students in their first semester of residence at the University. Applicants are required to have a creditable scholarship record and must present a satisfactory repayment program. There are no loans available by which a student may finance his entire college course.

RELIGIOUS FACILITIES

Twenty religious centers and clubs are located close to the campus, offering programs of interest to students of various nationalities and creeds: Bahai, Buddhist, Jewish, Protestant, Roman Catholic, Vedanta.

Within three blocks of the campus, for example, are the following:
- Baptist Student Center (Southern Baptist)
- Calvin Club (Presbyterian)
- Canterbury Association (Episcopal)
- Channing Club (Unitarian)
- Disciples Club (Christian)
- Hillel Foundation (Jewish)
- Horton Hall (Interdenominational)
- Institute of Religion (Latter-Day Saints)
- Lutheran Student Center
- Newman Hall (Roman Catholic)
- Organization at the University (Christian Science)
- Plymouth House (Congregational)
- Roger Williams Club (American Baptist)
- Wesley Foundation (Methodist)
- Westminster House (Presbyterian)
- University YMCA and YWCA

At these centers are held discussion groups, religious study classes, luncheons, dinners, social gatherings, and other student meetings.
Requirements in the Several Colleges, Schools, and Curricula

College of Letters and Science

Entering freshman students.—Attention of students entering the College of Letters and Science in September, 1959, or later is directed to the revised requirements for the A.B. degree. A statement of the new requirements appears in a separate bulletin of the College of Letters and Science.

The new requirements for the A.B. degree will apply to new students entering the College of Letters and Science as follows:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall, 1959</td>
<td>Freshman and sophomore students with less than 60 semester units of transfer credit.</td>
</tr>
<tr>
<td>Spring, 1960</td>
<td></td>
</tr>
<tr>
<td>Fall, 1960, and all subsequent semesters</td>
<td>All entering students.</td>
</tr>
</tbody>
</table>

The following statement of A.B. degree requirements applies to continuing Old Plan students and students entering in 1959-1960 with 60 or more units of advanced standing credit.

The first two years in the College of Letters and Science constitute the lower division. During this period it is expected that the student, besides fulfilling the prerequisites for the major work upon which he will later concentrate, will make an effort to establish a basis for that breadth of culture which will give him a realization of the methods and results of some of the more important types of intellectual endeavor, and a mental perspective that will aid him in reaching sound judgments. The requirements of the first two years are designed for these purposes and are given in detail later on. Upon completion of the program for the first two years, including a minimum of 60 units of credit, the student must apply to the Dean for upper division standing in the College of Letters and Science. (The Associate in Arts degree was abolished by The Regents as of June, 1958.)

The upper division, consisting of the third and fourth years, constitutes a period of more advanced study and limited specialization. In order to be admitted to the upper division, a student must have completed, at this or another institution, at least 60 units of credit. The lower division requirements (see page 59) should have been included. Any uncompleted lower division requirements must be included in the upper division program.

Approximately half of a student's time in the upper division is devoted to advanced study in some particular field, called the major. In many cases, the major consists of a program of related courses as set up by one of the departments. In other cases, combinations chosen from more than one department have been set up and are known as group majors. Again, a student has the privilege of presenting for approval his own program of correlated studies known as an individual group major. The major or group major that the student has completed is stated on his diploma.

The courses and curricula in the College of Letters and Science are designed to give the student an education, the value of which is not limited by its possible vocational use. In this respect, it differs from a purely technical college, the value of which is realized mainly in the vocational application of the instruction offered. For example, a major in Greek might, of course, lead ultimately to a professorship in Greek, but its value would not disappear on entering some other occupation. Again, zoology is a subject basic to the
profession of medicine, but it also reveals the nature of life processes, a topic to exite the curiosity of a person with an inquiring mind.

To safeguard this character of instruction in the College, there has been set up a Letters and Science List of Courses, the educational values of which are regarded as not dependent upon their vocational applications. Nearly all courses elected by the student must be chosen from this list.

The maintenance of a B average or better secures privileges that the student may well regard as valuable, particularly in the upper division, where this standing qualifies the student as an honor student.

Following this general introduction, a prospective student should familiarize himself with the more detailed information given in the following paragraphs.

Faculty Advisers and Study-List Regulations

Lower Division.—Every lower division student at the time of registration will report to a lower division faculty adviser to have his study list approved. Study lists aggregating 12 units or more a semester may be presented without special permission in respect to quantity of work except that during the freshman year or, in the case of transfer students, their first semester of residence at the University, the maximum is 16 units. Requests to take fewer than 12 units must be approved by the Dean of the College.

Two lower division courses in physical education activities may be included in a student’s academic program to the extent of not more than 1 unit in any semester or session, in addition to the above study-list limits, and with degree credit totaling not more than 4 units.

A student in the lower division may each semester designate his intended major. The student may seek advice from his proposed major department or committee. Students who fail in the lower division to fulfill the requirements of a department regarding both subjects and grades may be denied the privilege of a major in that department.

Upper Division.—Each upper division student must designate his major or group major on his study-list card (for list of Letters and Science majors see pages 62-73). He must register with his major department, or committee in charge of the group major, and his study list must be approved by a representative of the major department or group major committee before it will be accepted by the Registrar. Furthermore, all cards must be presented at the office of the Dean of the College for approval if totaling less than 12 units.

Students who fail in the lower division to complete the preparation for a major, both in subjects and grades, may, at the option of the department, be denied the privilege of a major in the department concerned.

A change in the major may be made only by permission of the Dean of the College and of the department to which the student petitions to transfer. Notice that the change has been authorized will be sent by the Registrar to the departments concerned.

All students are required to complete at least 6 units in their major during their last or senior year: either 3 units each semester, or 2 units in one semester and 4 units in the other.

Students Entering with Advanced Standing.—A student entering this College after attendance at another collegiate institution will be advised, through the Director of Admissions, with respect to his classification in the lower or upper division. Such a student should report to the appropriate lower or upper division adviser. For assistance with problems unrelated to the major, students should call at the office of the Dean of the College.

A student who enters this College after attendance at another institution, or other college of this University, with senior standing at the time of his admission, must complete at least 24 units, including 18 units of work in upper division Letters and Science courses, of which at least 12 units must be in his major department or group major in this University.
College of Letters and Science

Special Students.—Each special student must report to one of the College of Letters and Science advisers designated to advise special students during the registration period. Problems may be taken to the office of the Dean of the College throughout the semester.

Limited Students.—Each student admitted to the College in limited status must present his study list for approval to the Dean's office, Room 210, Sproul Hall.

Lower Division Requirements

Students who transfer from other colleges of the University of California or from other institutions will be required to meet the lower division requirements in this College, but will not be held strictly to the time distribution of requirements, if the credit allowed them in the College of Letters and Science at the University of California amounts to at least 60 units.

Certain of these requirements may be satisfied by courses taken in the high school. It is desirable that the student should so arrange his high school program as to reduce the required work in the fields of foreign language, mathematics, and natural science. This makes his program more flexible, gives him a greater freedom of choice, and prepares him to pass more quickly into advanced work or into new fields of study. The satisfaction of requirements in the high school does not, however, reduce the amount of work required in the University for the A.B. degree (120 units).

Upper division standing will be granted on the completion of not less than 60 units of college work; the following general and specific requirements should have been fulfilled:

(a) General University Requirements†.
   Subject A. (See page 34.)
   Military science and tactics, 8 units. (See page 37.)

(b) Foreign Languages. At least 16 units in not more than two languages, with not less than 4 units in any one language. The first two years of high school work in a foreign language will be counted in satisfaction of 4 units of this requirement and each year thereafter as 4 units. Courses given in English by a foreign language department will not be accepted in fulfillment of this requirement. A student may satisfy this requirement either in whole or in part by giving such evidence of his proficiency in foreign language as may be authorized by the Executive Committee of the College.

(c) Mathematics. Elementary algebra and plane geometry.

(d) Natural Science. At least 12 units chosen from the following list:
   High school physics*, 3 units (1 high school credit).
   High school chemistry*, 3 units (1 high school credit).
   Anthropology 1.
   Astronomy 1, 2, 7A–7B*.
   Bacteriology 1*.
   Biology 11A–11B*, **.
   Botany 1*, 12.
   Chemistry 1A*–1B*, 5*, 8.
   Genetics 10.
   Geography 1‡.
   Geology 1, 3, 5, 10.
   Paleontology 1, 10.

* Will be accepted as a laboratory course.
† For information concerning exemption from these requirements, apply to the Registrar.
‡ Geography 1 may be used in partial satisfaction of the natural science requirement; if so used, it may not be included in requirement (e), group 4.
** Will be accepted as credit toward the natural science requirement only if both parts are completed.
Physiology 1, 1L*.
Zoology 1A*, 1B*, 10.

The student must include among the courses taken in satisfaction of the requirement in natural science at least one course in a laboratory science. Any of the courses marked with an asterisk in the foregoing list will be accepted in fulfillment of this requirement. Courses with but one unit of laboratory science are not accepted as fulfilling this requirement and are not marked above unless they have as prerequisite a course that also requires one unit of laboratory work.

(e) A sequence (of 5 or 6 units) in the subjects indicated below, except as otherwise provided, in each of four of the following six groups, one of which may be postponed to the upper division:

1. English 1A–1B; Speech 1A–1B.
2. Foreign language (additional to b). Two years of high school Latin or not less than 4 units in a college language course from the following: Classics: Greek 1 or 1A–1B, 100, 101, 102, 103; Latin 1, or 1A–1B, 2, 3, 4.
   Any year sequence from the following: Latin 105, 106, 107, 108.
   French: 1, 2, 3, 4 or 4R, or any upper division year sequence.
   German: 1, 2, 3, 4, 3S or 4S, or any upper division year sequence.
   Italian: 1, 2, 3, 4, 13, 30A–30B or any upper division year sequence.
   Oriental Languages: 1, 2, 3, 4, 7A–7B, 8–18, 9, 19, 39.
   Portuguese: 1, 2, 21A, 21B, 122, 123.
   Slavic Languages and Literatures: 1, 2, 3, 5A, 5B, 6A, 6B, 10A, 10B, 12A, 12B, 14A, 14B, 18A, 18B, 19, or any upper division year sequence.
   Spanish: 1, 2, 3, 4 (as formerly given), 4C, 4L, 5, 25 or 25A–25B, or any upper division year sequence.
3. Mathematics. Any two courses from the following: High school trigonometry or Mathematics C, 5, 3A or 3R or 16A, 3B or 16B, 11, Statistics 1 or 12.
4. Social Sciences:
   Anthropology 2A–2B.
   Classics 10A–10B.
   Economics 1A–1B.
   English 33A–33B.
   *Geography 1–2, 5A–5B.
   History 4A–4B, 8A–8B, 17A–17B, 33A–33B.
   Political Science 1–2, 33A–33B.
   Psychology 1A, and 1B or 33.
   Social Science 1A–1B.
   Sociology and Social Institutions 1 and 30.
5. Philosophy:
   Philosophy 6A–6B.
   Philosophy 12A–12B.
   Philosophy 20A–20B.

* If Geography 1 is used in satisfaction of requirement (e), it may not be used in satisfaction of requirement (d).
† Will be accepted in satisfaction of requirement (e), group 4 or group 6. Both parts must be completed for either requirement.
§ Two courses from 4A–4B–4C satisfy the laboratory requirement.
(6) Fine arts and literature. Two or more courses from the following, which may or may not form a sequence:
Art 1A, 1B, 1C, 1D, 10.
Classics 28, 34, 35, 36.
Decorative Art 1A.
French 39A, 39B, 39C.
German 39A, 39B, 39C, 39D.
†History 33A-33B.
Italian 39A, 39B.
Music 27A, 27B.
Oriental Languages 38A, 38B.
†Political Science 33A-33B.
Slavic Languages and Literatures 39.
Spanish 5, 39A, 39B, 39C, 39D.
Speech 2A, 2B.

Summer Session courses.—Students who desire to satisfy specific lower division subject requirements in the Summer Sessions may use only those courses which are the equivalent of courses offered in the regular semesters. Requirements (b), (c), (d), and (e) and other specific requirements for the Bachelor of Arts degree may be met in whole or in part by the completion of acceptable courses in University Extension with specific approval of the Dean of the College. Grade points shall not be allowed on a University of California record for courses completed in University Extension. Resident students are expected to fulfill all requirements with courses taken in residence. The requirements in units must be met in full.

American Studies.—The American civilization honors course, American Studies, is offered in the College of Letters and Science through the departments of English, History, and Political Science. For further information see the departments of English, History, and Political Science in the Announcement of Courses, Berkeley.

Upper Division Requirements

The degree of Bachelor of Arts is granted upon the following conditions:
1. The total number of units in college courses in the lower and upper divisions offered for the degree must be at least 120, of which at least 108 must be in courses chosen from the Letters and Science List of Courses (see pages 73, 74). Not more than 6 units of courses numbered in the 300 or 400 series will be accepted toward the A.B. degree.
2. The student must attain twice as many grade points as there may be units in the credit value of all courses undertaken by him in the University.
3. At least 54 units of college work must be completed after admission to the upper division. No unit credit will be allowed toward the A.B. degree for work completed at a junior college after the student has completed 66 units toward the degree.
4. The requirement of American History and American Institutions must be completed by all candidates for the bachelor’s degree. (See American History and American Institutions, page 35.)
5. At least 36 units of work chosen from the upper division courses named in the Letters and Science list (see pages 73, 74), with the exceptions noted, must be completed after the student has attained upper division standing.
6. Fulfillment of the requirements for a department, group, or individual group major, according to the rules given below.
7. All candidates for the A.B. degree entering this College after attendance

† Will be accepted in satisfaction of requirement (e), group 4 or group 6. Both parts must be completed for either requirement.
at other institutions, or colleges of this University, with senior standing at the time of admission, are required to have been enrolled during the senior or final year in resident courses of instruction on this campus of the University in the College of Letters and Science. At least 24 units, including at least 18 units in upper division courses, of which 12 units must be in the major, must be completed in this period. It is permissible to offer two summer sessions as equivalent to one semester; but in any event, the student must complete in resident instruction at least one regular semester of his senior year.

8. No student is permitted to transfer from one major department to another after the opening of the last semester of his senior year.

Majors for the A.B. Degree

A major consists of a substantial group of coordinated upper division courses, representing one or more departments of the College.

Majors may be offered for the A.B. degree in any of the subjects or departments listed below. The details of the program must be approved by the authorized adviser in the major chosen.

Special attention is directed to the courses listed as preparation for or prerequisite to the major. Usually it is essential that these courses be completed before upper division major work is undertaken. In any event, they are essential requirements for the completion of the major.

The 24-unit major must in its entirety be completed in the upper division. In exceptional cases, however, students who have completed all lower division requirements while in the lower division may be permitted by the Dean, on recommendation by the department, to count not more than 6 units of upper division work taken in the lower division as part of the major, but not as part of the 36 units of upper division work required to be completed in the upper division.

Not more than 30 units of upper division courses taken in one department after admission to the upper division will be counted toward the A.B. degree.

The major must consist (1) of courses taken in resident instruction at this or another university (in a regular semester or in a summer session) or (2) of courses in University Extension with numbers having a prefix X, XB, XL, XR, or XSB (with approval of department and the dean concerned). See, however, paragraph 7, page 61.

No courses numbered in the 300 series (teachers' courses) or 400 series (professional courses) will be accepted as part of the major.

See further, under Study-List Regulations, page 58.

Organized Majors

In order to fulfill the major requirement for the A.B. degree, a student may select one of the organized programs listed below. It is recognized, however, that suitable programs may be prepared that are not included in the published announcements. A student may therefore present a plan for a major program to the Executive Committee. If this meets the committee's approval, the committee will designate a member of the faculty to take charge of the student's special major and to approve his upper division study list and the final completion of the major.

Detailed descriptions of the departmental programs designated below will be found under their respective departments under Courses of Instruction in the Announcement of Courses. Descriptions of the group majors follow the list hereunder.

American Civilization  Astronomy
Anthropology  Bacteriology
Art  Biochemistry
Description of Group Majors

Students who plan to complete a group major should note the requirements for admission to the upper division as well as the prerequisite courses for the major.

AMERICAN CIVILIZATION

Group Major Advisers: Mr. Jacobson (fall semester only), Miss Koch.

Preparation for the Major.—Required: Economics 1A–1B; English 1A–1B or Speech 1A–1B; History 4A–4B; Political Science 1, 2. Students must have maintained an average grade of C or higher and must have attained upper division standing.

The Major.—Twenty-four units, of which 21 units are to be selected by the student with the approval of the major adviser in such fields as American history, political science, economics, literature, philosophy, and the fine arts. The student will stress one of these fields, and conferences will be held to adapt the program to the student's particular needs. A comprehensive final examination to be taken at the end of the senior year will count for 3 of the 24 units. A student must maintain an average of 2.0 in courses of the major in order to continue in the major and must receive at least an average of 2.0 in the comprehensive final examination.

BIOLOGY, PHYSICS, AND MEDICINE

Students interested in the physical sciences and their applications to biology and the medical sciences may elect to major in one of the physical or biological sciences, adding appropriate electives to the program, or they may propose an individual group major, selecting courses from the physical and biological science departments. See above; see also the Department of Physics in the Announcement of Courses.
CHILD DEVELOPMENT

Group Major Adviser: Mrs. Jones.

Preparation for the Major.—Required: Psychology 1A, Psychology 5, or Economics 2, Economics 1A, Physiology 1 and 1L, Sociology and Social Institutions 1.


Students interested in undertaking professional preparation as teachers, psychometricists, school psychologists, social welfare or public health workers, will be helped by consulting faculty advisers in the professional schools indicated as early as possible in their undergraduate career.

Students planning to continue in graduate work leading to the M.A. or Ph.D. degree in child development are advised to consider the course requirements for these degrees in planning their upper division program.

Freshman students interested in a child development major are advised to consider the merits of the major offered in the Department of Nutrition and Home Economics as well as the group major outlined above.

CIVILIZATION OF THE MIDDLE AGES

Adviser: Mr. Schaeffer.

By the term “Middle Ages” is meant the civilization which reached its climax in France in the thirteenth century.

Preparation for the Major.—Required: a reading knowledge of French, at least equivalent to that attained by passing French 3 (Intermediate French); History 4A; English 1A-1B, 46A; French 39A; Philosophy 20A-20B. Recommended: German 39A; and a reading knowledge of Latin, German, or Italian, similar in scope to the reading knowledge of French required above.

The Major.—French 142A-142B; History 121A-121B; Italian 109A-109B; Art 175C (or, when this is not offered, 175A or 175B); a course in medieval thought, or a suitable course in medieval philosophy. A minimum of 9 units selected from the following list: German 118A, 135A; Spanish 107A, 112A; History 122, 123; English 151L, 155.

CLASSICAL CIVILIZATION

Adviser: Mr. Fontenrose.

The term “classical civilization” is meant to designate the civilization of ancient Greece and Rome. This major is designed (1) to provide a curriculum for those students who wish to study classical culture, but are not chiefly interested in the Greek and Latin languages, and (2) to provide, as a possible second major, a convenient group of courses which will offer the essential background for advanced work in those fields where a foundation in classical civilization is desirable; for example, language, literature, philosophy, religion, history of art, law.

Preparation for the Major.—Required: a reading knowledge of Latin, at least equivalent to that attained by passing Latin 20A-20B, or a reading knowledge of Greek, at least equivalent to passing Greek 1 or 1A-1B; Art 1A; Classics 10A-10B. Recommended: a reading knowledge of both Greek and Latin as required above for one or the other; Classics 34, 35, 36; Near Eastern Languages 113B; Philosophy 20A.

The Major.—Required: a minimum of 24 units selected from the following list in consultation with the major adviser: Art 153, 154A-154B, 159; Classics 138, 151, 170A-170B-170C, 178; Dramatic Art 130A, 140A; Geography 123A; History 111A-111B, 115A-115B; Philosophy 116, 117; any upper
division language course in Greek or Latin. Courses may be added to, or
dropped from, the above list as departmental offerings are increased or
changed; and the adviser will consider other courses which the student may
suggest.

COMMUNICATION AND PUBLIC POLICY

Advisers: Mr. BARNHART, Mr. BELKNAP.
The group major in communication and public policy is designed to con­
tribute to an understanding of the role of mass communication in society.
It introduces the student, in general, to the study of the nature, function,
content, values, and effects of communication in society and directs his atten­
tion specifically to the effects of communication on public policy and opinion.
The courses selected cover both these interrelated fields of study—the nature
of language, and the nature of the media of mass communication: radio,
press, film, as well as the role played by informative and persuasive communi­
cation in modifying the character of public opinion and public institutions.
Students preparing for employment in propaganda analysis or related fields
in governmental agencies are urged to discuss their lower division program
with the advisers.

Preparation for the Major.—Required: English 1A-1B or Speech 1A-1B;
Speech 12; Psychology 1A. Recommended: Economics 1A-1B; History 4A-
4B, 17A-17B; Sociology and Social Institutions 1, 30; Speech 10A; Psychol­
ogy 5; Economics 2 or Statistics 2.
The Major.—Required: 18 units from Philosophy 108 or 104 or 128; Poli­
tical Science 161A; Psychology 145; Speech 119; Speech 137 or 135 or 138;
Speech 121B; and 6 units from Anthropology 118; Business Administration
150; Business Administration 163; Journalism 141, 190A; Political Science
161B or 162A or 160A-160B; Sociology and Social Institutions 104, 141, 175;

DRAMATIC LITERATURE

Group Major Adviser: Mr. ROSENBERG.
The major is concerned with the drama primarily as literature and as a
manifestation of human culture. But since all plays are written for production
on a stage, the relation of the drama to the theater is also emphasized, and
candidates for graduation in this major should have acquired such practical
experience in the theater, amateur or professional, as will enable them to
recognize a play's theatrical as well as its literary value.

Preparation for the Major.—Classics 35 (if offered) and 6 units from the
following: English 1A-1B; Dramatic Art 10A-10B.
The Major.—Thirty units, of which the comprehensive examination counts
for 3 units. Required: English 114A-114B, and one of the Shakespeare
courses (English 117A-117B, 117E); Dramatic Art 123A-123B, 160A-160B;
6 units selected from the following: Dramatic Art 120, 125, 159A, 159B;
Scandinavian 106, 107, 108, 109; Slavic 135; or the following courses in the
foreign language departments which, it should be noted, are not given in
English: French 115A-115B; Greek 103; Latin 108; German 104B, 106, 109;
Spanish 105, 109A-109B. Recommended related courses (the following
courses are recommended as supplementary to, but not required for, the
major): Philosophy 136A-136B, 137, 146A-146B; Dramatic Art 110, 130A-
130B-130C-130D, 140A-140B, 180A-180B; Music 127A, 117B, 118B, 118D.
The student must, at the end of the senior year, satisfy with a grade of C
or higher either (1) an examination consisting of two three-hour papers, or
(2) an examination of one three-hour paper and the submission of an original,
sustained piece of research or criticism, developed after conference with the
adviser. The student's preparation for 1 or 2 should extend through his junior
and senior years. Credit: 3 units.
To graduate in this major, the student must maintain at least a C average in all courses required for the major.

Graduates in this major may continue work in this field for the master's degree, under the direction of the committee administering that degree in comparative literature. See under Comparative Literature in the Announcement of Courses.

EAST ASIATIC STUDIES

Adviser: Mr. Schurmann.

The major is for those students who wish to gain a broad understanding of the life and civilization of East Asia as a whole, applying the techniques of and becoming acquainted with the contributions of anthropologists, linguists, historians, political scientists, economists, sociologists, geographers, and students of art.

Attention is called to the fact that students interested in the Far East may, if they wish, offer programs under the regional group majors on China, Japan, and Southeast Asia (see pages 69-70).

Preparation for the Major.—Required: two of the following: Anthropology 2A-2B; Art 1D; Economics 1A-1B; Geography 1-2, 5A, 5B; Oriental Languages 38A-38B; Political Science 1, 2.

The Major.—Required: 24 units (which must include courses in five departments) from the following: Anthropology 115, 143A-143B; Economics 115, 190A-190B; Geography 125A, 125B; History 19A-19B, 194A-194B, or 195A-195B, or 197A-197B; Oriental Languages 142C, 142K; Political Science 115A, 138A-138B, 145A, 145B; Sociology and Social Institutions 166 and 167. Twelve additional units of upper division courses dealing with East Asia, selected in consultation with the adviser, are required. A student is advised to concentrate his electives in courses applying to a particular area, or to the courses of one particular department. If planning to continue in graduate work, the student is advised also to take courses in a modern language of East Asia.

GENETICS

Adviser: Mr. Dempster.

Genetics deals with the study of fundamental properties common to all forms of life—heredity, variation, and evolutionary change. The group major in genetics therefore cuts across departmental lines in order to provide students both with a broad background in general biology and an understanding of the principles and experimental methods of genetics. Students completing the major should be qualified to enter graduate study in genetics whether their interests lie in a particular branch of the subject (behavioral, biochemical, biometrical, developmental, ecological, physiological, population genetics) or in a particular kind of organism (microorganisms, plants, animals, man).

Preparation for the Major.—Bacteriology 1 (can be satisfied by Bacteriology 104), Botany 1, Chemistry 1A, 2A, 2B, Statistics 2, Zoology 1A. Recommended: Mathematics 3A, 3B, or 16A, 16B, or 190A, 190B.

The Major.—Genetics 100 or Zoology 114, Genetics 100C, Botany 130 or Zoology 107, 107C; 10 units of electives from the following group: Bacteriology 107, Genetics 101, 102, 103A, 103B, 104, 105, Zoology 115; 6 units of upper division electives approved by the major adviser from one of the following departments (courses must be on the Letters and Science List): Anatomy and Physiology, Anthropology, Bacteriology, Biochemistry, Botany, Entomology and Parasitology, Medical Physics, Psychology, Zoology.

INTERNATIONAL RELATIONS

Group Major Adviser: Mr. Seabury.
Committee in Charge of the Major: Mr. Letiche, Mr. Sontag.

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, as well as the main problems and policies of organized states in their relations with one another in the twentieth century. These problems and policies must be dealt with and determined by governments, and consequently the major is built around courses dealing with intergovernmental legal, diplomatic, and economic relations. But the major cuts across departmental lines, for statesmen develop their policies in relation to geographic, economic, and social conditions, and in the light of historic policies. History reveals these traditional policies, regional geographic and anthropological studies provide an acquaintance with relevant physical and biological factors, and social psychology contributes to an understanding of nationalism and other phenomena in the field of study. Courses in other fields likewise make their contribution.

Preparation for the Major.—Economics 1A–1B; History 4A–4B, 17A–17B; Political Science 1, 2.

The Major.—Economics 190A–190B; Political Science 120A, 121 (formerly 124), 133A–133B; 6 units of history selected in consultation with the adviser. A minimum of 15 units (exclusive of the 4-unit beginners' course) in one of the following languages: French, German, Spanish; or 15 units in Russian, Chinese, Japanese, or Portuguese. With the consent of the major adviser, Anthropology 118A–118B may be substituted for 6 of the 15 required language units. The language requirement may be met by passing a written reading test.

Attention is directed to the following courses as useful in the study of certain aspects of this field: Economics 197, Geography 153, Psychology 145. Others, dealing with areas of significance to students of international relations, are to be noted in the departments of Anthropology, Economics, Geography, History, Oriental Languages, Slavic Languages and Literatures, and Sociology and Social Institutions.

LABOR AND INDUSTRIAL RELATIONS

Group Major Adviser: Mr. Kennedy.

The purpose of this program of study is to give the undergraduate student a broad, nontechnical understanding of the problems of wage and salary earners and of managers, the role of employers and unions in our society, and the nature and implications of union-management relationships. The program is designed to meet the needs of students who have not decided upon specific vocational objectives or who do not wish to specialize to the extent of taking a departmental major, but who do desire a general orientation in this important area of social relations.

Students who have more specific objectives or graduate study in mind should note that this is a nonprofessional program of study and that it does not satisfy all the prerequisites for graduate study in such departments as Economics and Business Administration.

Preparation for the Major.—Required: Economics 1A–1B, Economics 2 or Psychology 5, and Psychology 1A; and one of the following: Political Science 1, Social Science 1A–1B, Anthropology 2B or Sociology and Social Institutions 1. Recommended: selections from Anthropology 1, 2A–2B; Economics 10; Political Science 1, 2; Psychology 33; Sociology and Social Institutions 1.

The Major.—Required: 36 units of upper division work as follows: (a) 24 units of background courses: Sociology and Social Institutions 141B, Anthropology 118B, Political Science 113, Psychology 145, Economics 113, Economics 121A, Business Administration 140, and one of the following—Philosophy 108, Economics 106A–106B, Political Science 150B, and Sociology and Social Institutions 120 and 132. (b) 12 units of specialized courses:
Economics 150 or Business Administration 150; and 9 units selected from
Business Administration 151, 152, 153, and for seniors who have met the
requirements for admission to graduate courses, 256, Economics 152, 153, 185,
Industrial Engineering 143, 146, Political Science 160A-160B, Psychology
185, 186, 187, 188, Sociology and Social Institutions 129, 161.

The adviser must approve the 9-unit core program selected by the student
under (b) and should be consulted as to the sequence of the entire 36 units.
The adviser has a list of other related upper division courses which may aid
the student in choosing electives.

MUSIC EDUCATION

Adviser: Mr. Sparks.

This curriculum leads to the A.B. degree in four years and to a general
secondary credential in five years, or a special credential in four and one-half
years. The curriculum coordinates (1) the State requirements for the general
secondary and special credentials; (2) the general requirements of the Uni­
versity; and (3) training in music, embodying (a) the main requirements of
the music major, including group performance, (b) instrumental and vocal
methods, (c) conducting and orchestration, and (d) instruction in individual
instruments or the voice. Instruction under (d) is undertaken in University
Extension.

Instruments and Voice.—Required: Major instrument or voice, Music
X429A-B-C-D. Minor instrument or voice: minor piano, Music X405A-B,
X406A-B (required for all students except piano majors); or other minor
instrument, Music X430A-B-C-D; or the minor in voice, Music 328A-B-C.
The foregoing courses should be completed in the freshman and sophomore
years. Instrumental and vocal methods: Music 328A-B, and 4-6 units of
Music 329A-B-C-D-E. A limited number of methods courses may be deferred
to the graduate year at the discretion of the adviser.

Preparation for the Major.—Music A-B, 1A-B, 2A-B-C-D, 3A-B-C-D,
and Psychology 1A. (Music 2A-B-C-D may be taken in the sophomore and
junior years.)

ters of Music 144, and two other courses selected from the series Music 140-
149; Education 100A-B. The program also allows the student to substantially
complete a teaching minor of 20 units before graduation.

The Graduate Year.—In addition to required courses in Education, the stu­
dent will normally take 12 units of courses in the fields of the teaching major
and the teaching minor.

Music courses X405, X406, X429, X430 carry University credit toward the
degree but are taught in University Extension only. For information concern­
ing these courses, consult the major adviser.

PHYSICAL EDUCATION

Group Major Advisers: for women—Miss Hodgson, Miss Espenschade,
Miss Felshin, Mrs. Glass; for men—Mr. Nordly, Mr. Henry, Mr. Keeney,
Mr. Miller, Mr. Royce.

Preparation for the Group Major.—High school chemistry or the equiva­

tent, Public Health 5A, Physiology 1-1L, Psychology 1A, Zoology 1A or 10,
Nutrition 10; physical education activities (Physical Education 1 or 26); for
women—rhythmic basis of dance and allied arts (Physical Education
35); introduction to physical education (Physical Education 20).

The Group Major.—Physical Education 130, 105, 101, 110; Anatomy 102;
Education 100A; Community Recreation (Physical Education 140) and Tests
and Measurements (Physical Education 135A); an upper division course
dealing with the problems of society and human relations (3 units), to be
chosen with the approval of the adviser.
Completion of a major program for graduation will be certified only on the basis of at least a C average in the courses required in the group major. Students who do not maintain such an average may be required at any time to withdraw from the group major in physical education.

REGIONAL GROUP MAJORS
The following group majors are designed to combine studies in the geography, history, government, and ethnography of an important region or country with intensive study of the corresponding foreign language. Their purpose is to afford a liberal education through an integrated group of courses, and at the same time to provide trained personnel for diplomatic, commercial, and cultural relations between the United States and other nations. These majors will be administered with reasonable flexibility in view of the various fields of study involved and the different directions from which they may be approached. The usual differentiation between lower and upper division work will not be insisted upon. Although it is desirable that the prerequisites for the required upper division courses be taken in the lower division, admission to the major will not be refused if the student’s program leaves room for such prerequisites in the upper division. The total of upper division credit in the major should normally be not less than 30 units.

Regional Group Major on China

Adviser: Mr. Boodeberg.
Preparation for the Major.—Required: 12 units of Chinese (minor shortages may be made up in the upper division) and two of the following: Anthropology 2A-2B; Art 1D; Economics 1A-1B; Geography 1, 2, 5A-5B; Oriental Languages 38A-38B or Political Science 1, 2.
The Major.—Required: 24 units, of which 8 to 12 units must be in upper division Chinese and the remainder must be selected from the following: Art 160A-160B; Economics 115; Geography 125B; History 193C, 194A-194B; Oriental Languages 112, 142C; Political Science 143A-143B. An additional 6 units are to be selected from courses dealing with China or the Far East.

Regional Group Major on France and French Colonies

Adviser: Mr. Guy.
Preparation for the Major.—Required: 16 units of French. (Minor shortages may be made up in the upper division.) Recommended: Economics 1A-1B; History 4A-4B; Political Science 1, 2.
The Major.—Required: a one-year upper division course in French; Economics 112; Geography 123A; History 134A-134B, 144A-144B. Recommended: French 101A-101B, 134A-134B; Education 105; History 141; Political Science 121 (formerly 124), 128A, 128B, 133A, 133B, 147B.

Regional Group Major on Germany and Central Europe

Advisers: Mr. Sontag, Mr. Jelavich.
Preparation for the Major.—Required: 16 units of German. (Minor shortages may be made up in the upper division.) Anthropology 2A-2B; History 4A-4B; Economics 10. Recommended: Philosophy 20A-20B; Political Science 1, 2.
The Major.—Required: a one-year upper division course in German; Economics 112; Geography 123A-123B; History 143A-143B, or 140A-140B; Political Science 147B. Recommended: German 112; History 144A-144B, or 145 and 146, or 136, or 140A-140B.
Regional Group Major on Hispanic America

Adviser: Mr. Woodbridge.
Preparation for the Major.—Required: 10 units of Spanish and/or Portuguese; History 8A–8B. Recommended: Anthropology 2A–2B; Economics 1A–1B; Geography 1, 2; History 4A–4B.
The Major.—Required: Spanish 104A–104B or Portuguese 21A and 123; History 161A–161B; Geography 122A or 122B; Anthropology 141 or 142. The remainder of the 30 units are to be selected from the following list of courses: Anthropology 105A–105B, 161, 191A–191B; Political Science 136A, 148; Spanish 102, 113A–113B, 114A–114B; History 160A–160B, 162, 163, 164, 165A–165B, 166A–166B, 168; Economics 114, 190A–190B; or from additional courses not used in the required group.

Regional Group Major on Japan

Adviser: Mr. Shively.
Preparation for the Major.—Required: 12 units of Japanese (minor shortages may be made up in the upper division) and two of the following: Anthropology 2A–2B; Art 1D; Economics 1A–1B; Geography 1, 2, 5A–5B; Oriental Languages 32, 38A–38B or Political Science 1, 2.
The Major.—Required: 24 units, of which 8 units must be in upper division Japanese and the remainder must be selected from the following: Anthropology 186; Art 162; Economics 125B; History 195A–195B; Oriental Languages 132; Political Science 143A–143B. An additional 6 units are to be selected from courses dealing with Japan or the Far East.

Regional Group Major on Russia and Eastern Europe

Adviser: Mr. Jelavich.
Preparation for the Major.—Russian 1, 2, 18A–18B; History 4A–4B; Slavic 39; and one of the following: Anthropology 2A–2B; Economics 1A–1B; Geography 1, 2 or 5A–5B; Political Science 1, 2.
The Major.—Required: 24 units comprising the following: Russian 103A–103B; History 135A–135B or 136A–136B; Geography 124A; Political Science 141A; Economics 118; and an additional 3 units from the following: any course in Slavic Languages and Literatures in the 130 group, Slavic Languages and Literatures 180A–180B, History 137A–137B. Recommended: Economics 110, 112, 190A–190B, 197; History 139A–139B, 140A–140B; Political Science 131.

Regional Group Major on Southeast Asia

Adviser: Mr. Pauker.
Preparation for the Major.—Required: (emphasis on Indonesia) 6 units of Dutch and 3 units of Indonesian; or (emphasis on continental Southeast Asia) 16 units of French. In addition, all students, regardless of emphasis, are required to take any two of the following courses: Anthropology 2A–2B; Economics 1A–1B; Geography 1, 2 or Political Science 1, 2.
The Major.—Required: (emphasis on Indonesia) Anthropology 115; or (emphasis on continental Southeast Asia) Oriental Languages 174A–174B and Anthropology 143A. In addition, all students, regardless of emphasis, are required to take Geography 125A and 21 units from courses dealing with Southeast or South Asia, selected in consultation with the adviser. Recommended: Near Eastern Languages 125 and Sanskrit 190A–190B.
RELIGION

Students interested in the study of religion, either from the standpoint of liberal education, or of preparation for the ministry or some other phase of religious education, may select a major in one of the departments germane to the purposes of the student, or they may propose an individual group major (see page 62).

Courses appropriate for such purposes may be found in a number of departments, such as Anthropology, Classics, Economics, Education, English, History, Oriental Languages, Philosophy, Psychology, Semitic Languages, Sociology and Social Institutions, Social Welfare. Particular attention is directed to the following courses: History 122, 131A–131B; Near Eastern Languages 100A–100B, 102A–102B; Philosophy 104, 112.

THE RENAISSANCE

Group Major Adviser: Mr. Ramsey.

Study of that period of European civilization the chronological limits of which may be set between the Middle Ages and the Counter Reformation; or more specifically, between the Age of Petrarch in Italy and that of Shakespeare in England.

Preparation for the Major.—Required: English 1A–1B, 46A; History 4A; Philosophy 20A–20B. Recommended: a reading knowledge of Latin, French, German, Spanish, or Italian.

The Major.—Required: Art 176A or 176B; English 117A, 117B, or 117E, 158A; History 131A; Comparative Literature 151A; Classics 178; and 6 or more units from the following: French 109A; German 118B; History 131B; Philosophy 115, 116; Political Science 118A; Spanish 107A–107B, 111A or 111B, Portuguese 120.

SOCIAL WELFARE

Group Major Adviser: Mr. Hearne.

The group major in social welfare is designed to meet the needs of three classes of students:

(a) Those who propose to take graduate professional education in social welfare, by providing for them an integrated program of preprofessional preparation for graduate study;

(b) Those who look forward to positions in public assistance, social security administration, employment services, recreation, group work, correctional and other branches of the social services for which graduate education in social welfare is not now always required, by providing for them an orientation to the social services through a broad background in the social sciences;

(c) Those who, having no specific vocational objectives, desire to become familiar with a wide range of social problems as a contribution to their general education, by offering them a general acquaintance with the contributions of several fields of social science.

Preparation for the Major.—Required: Economics 1A–1B; Psychology 1A, 33; one course selected from Economics 2, Psychology 5, Statistics 2; and 6 units selected from History 4A–4B, Anthropology 2A–2B, Sociology and Social Institutions 1, 2, Physiology 1, Zoology 10.

The Major.—Required: 36 units of upper division work, including (a) the following courses, to the value of 9 units: Social Welfare 102, 110A–110B; and (b) 27 units selected from the following courses (with the permission of the faculty adviser and to meet the specific needs of individual students, some upper division courses may be substituted): 6 units from Home Economics 132, Psychology 141, 161, and 168; 3 units from Economics 130A,
Requirements of Colleges, Schools, and Curricula

Political Science 102, 104A, 175, 181; 9 units consisting of Psychology 145, 3 units from Business Administration 150, Economics 150, 152, 180, and 3 units from Anthropology 118A-118B, Economics 106A-106B, Sociology and Social Institutions 142, 148, 175, 178; 9 units from City and Regional Planning 111, Criminology 100A-100B, Economics 185, Home Economics 137, Physical Education 140, Public Health 106, Sociology and Social Institutions 110, 132.

WILDLIFE CONSERVATION

Group Major Adviser: Mr. Leopold.

The curriculum in wildlife conservation leading to an A.B. degree is designed to offer sound, basic training for students professionally interested in fish and game management and research. Emphasis is placed upon an adequate foundation in the basic sciences.

Training in this curriculum meets the minimum requirements for various positions as fish or game managers or as wardens with such federal agencies as the Fish and Wildlife Service, Park Service, Forest Service, and Soil Conservation Service, and with state agencies such as the divisions of Fish and Game, Forestry, and Public Health. Likewise, certain beginning positions as field or laboratory biologists are open to the recipient of the A.B. degree.

To become adequately prepared as a professional fish or game biologist, however, the student should pursue further study leading to the M.A. or Ph.D. degree. The same is true of students who may wish to teach biology and conservation in high schools or junior colleges. The higher degree may be taken in the Department of Zoology at Berkeley or at some other university.

At least a 2.0 grade-point average must be maintained in all required courses in the curriculum.

Preparation for the Major.—Lower division. Required: Botany; Chemistry 1A and 8; English 1A-1B; Geography 1 or Geology 1; Mathematics C or equivalent; Statistics 1 or 2 or equivalent; Zoology 1A-1B. Recommended electives: Agricultural Economics 1 or Economics 1A-1B; Physics 2A-2B, 3A-3B; Engineering 21; Physiology 1, 1L; Soils 10; Speech 1A-1B or 2A-2B.

The Major.—Required: Botany 108; Geography 153; Zoology 113, 116, 138 and 145; one course from each of the following groups: (1) Ecology: Forestry 103, Zoology 125, Botany 151; (2) Entomology: Entomology 100, 133; (3) Forestry and Range Management: Range Management 101, Forestry 104, 125; (4) Parasitology: Entomology 117, Zoology 111.

PREPARATION FOR THE STUDY OF MEDICINE

Students in the College of Letters and Science who plan to pursue a program leading to admission to the School of Medicine may reduce by one year the total time for attaining the M.D. degree by entering the School of Medicine after completion of the junior year in the College. While he is enrolled in the College of Letters and Science, the student must complete the regular lower division requirements and prepare to undertake a major for the A.B. degree (see pages 58-59), and when he enters the junior year, he must enroll in that or another authorized major for the A.B. degree. The specific courses required for admission to the School of Medicine* may be included in the undergraduate program in the College of Letters and Science without interfering with completion of major requirements; some of these courses may also serve as preparation for various majors.

A student who has completed all of the lower division requirements and at least 4 units of upper division courses on the Letters and Science List, and

* Premedical subject requirements: English 1A-1B or Speech 1A-1B; Chemistry 1A-1B, 5, 8; Physics 2A-2B, 3A-3B; Zoology 1A-1B, 100; and eight semester units in a modern foreign language.
who has completed his junior year in the College of Letters and Science on
the Berkeley campus of the University, becomes a major in medical sciences
if he enters the School of Medicine in his senior year. Upon satisfactory
completion of the general University requirements and the first year in the
School of Medicine, he will be a candidate for the A.B. degree with a major
in medical sciences or the B.S. degree in the School of Medicine. A student
who is not admitted to the School of Medicine at the end of the junior
year may continue his regular major in the College of Letters and Science
as a candidate for the A.B. degree. It may not be possible for such a
student to complete his chosen major program and the other requirements
for the A.B. degree in one year unless he has already partly fulfilled these
requirements before entering the senior year. Certain medical schools re­
quire the A.B. degree for admission; also, some students not admitted to a
medical school at the end of the junior year may wish to graduate with the
A.B. degree and then apply again for admission to a medical school.
Some students already enrolled in the College of Letters and Science before
September, 1958, may have been enrolled in the “Premedical Curriculum.”
These students are urged to prepare for and enroll in a major for the A.B.
degree while they are completing the courses required for admission to the
School of Medicine. Certain of these students may be permitted, after con­sultation with Professor Ballou, the premedical adviser, to continue in the
“Premedical Curriculum” for a limited time if it is apparent that immediate
change to a major program would be an undue hardship.

LETTERS AND SCIENCE LIST OF COURSES

At least 108 units offered for the degree of Bachelor of Arts must be in
courses chosen from the Letters and Science List of Courses.

Courses not on the list, but taken for credit to satisfy a general University
requirement established by the Board of Regents, will be accepted as equiva­
 lent to courses in the Letters and Science List up to a maximum of 8 units.

Any course not included in the Letters and Science List of Courses, but
required, or accepted, as part of a major or group major or as a prerequisite
therefor, shall, for students offering that major or group major at gradua­
tion, but for no others, be treated as if it were in the Letters and Science
List of Courses.

Thirty-six units of upper division courses, selected from the following list,
must be completed after the student has attained upper division standing.

Agricultural Economics 112A, 112B, 120.
Anatomy. All undergraduate courses.
Anthropology. All undergraduate
courses.
Architecture 110, 121, 122, 126, 127.
Art. All undergraduate courses.
Astronomy. All undergraduate
courses except 3 and 11.
Bacteriology. All undergraduate
courses.
Biochemistry. All undergraduate
courses.
Botany. All undergraduate courses
except 155.
Business Administration 1A, 1B, 10,
18, 101 (formerly 100), 150.
Chemistry. All undergraduate courses
except 125, 125L.

City and Regional Planning. All under­
grade courses.
Classics. All undergraduate courses.
Comparative Literature. All under­
grade courses.
Decorative Art. All undergraduate
courses.
Dramatic Art. All undergraduate
courses except 190, 191, 192, 193.
Economics. All undergraduate
courses.
Education 100A and not more than 3
units from 101, 102, 105.
English. All undergraduate courses.
Entomology 100, 106, 110, 112, 117,
119, 126, 127, 129, 131, 133.
Forestry 1, 103, 122, 125.
French. All undergraduate courses
except 20.
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.

Italian. All undergraduate courses.

Journalism 21, 121, 140, 141, 145, 147, 151, 165, 190A–190B, 195, 196, 199.

Latin. All undergraduate courses.

Linguistics. All undergraduate courses.

Mathematics. All undergraduate courses.

Medical Physics (see Physics).

Music. All undergraduate courses; a total of not more than 8 units from the following courses will be accepted as Letters and Science credit: 43, 46, 48, 143, 146, 148.

Near Eastern Languages. All undergraduate courses.

Optometry (see Physiological Optics, below).

Oriental Languages. All undergraduate courses.

Paleontology. All undergraduate courses.

Philosophy. All undergraduate courses.

Physical Education 105.

Physics. All undergraduate courses except 131.

Physiological Optics 105A, 105B, 106A, 106B.

Physiology. All undergraduate courses.

Plant Nutrition 115, 117.

Political Science. All undergraduate courses except 183.

Psychology. All undergraduate courses except 3, 104, 114, 116, 117, 180, 185, 186.


Sanskrit. All undergraduate courses.

Scandinavian. All undergraduate courses.

Slavic Languages and Literatures. All undergraduate courses.

Social Science 1A–1B.

Social Welfare 100, 106, 110A, 110B.

Sociology and Social Institutions. All undergraduate courses.


Spanish and Portuguese. All undergraduate courses.

Speech. All undergraduate courses.

Statistics. All undergraduate courses except 7, 134, 142A, 142B, 142C, 142D, 144.

Virology. All undergraduates courses.

Zoology. All undergraduate courses except 116, 119A–119B, 120, 145, 146.

**HONORS AND HONOR STUDENT PRIVILEGES**

*Honors* are granted only with the bachelor's degree. Honor students in the upper division are those who meet the following conditions:

(a) Upper division students who have an average of at least 3 grade points for each unit of undergraduate work undertaken at the University of California.

(b) Other upper division students specially approved for listing in the honors status by the Committee on Honors, either on recommendation made to the committee by departments of instruction, or on such other basis as the committee may determine.

Any department is authorized to post a departmental honors list on its bulletin board at the beginning of a semester. Copies are sent by the departments to the Committee on Honors and to the Registrar.

*Honors Courses.*—Departments may offer special honors courses* 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 Northern Section of the Academic Senate. The work of the student in such an honors course may consist of addi-

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* Honors courses are distinguished by the prefix "H."
tional work in connection with regular courses of instruction, or may be independent of such courses.

Special honors courses may not be taken by a student whose name is not on the honors list of the college in which he is registered except with the consent of the Committee on Honors.

Credit in a special study course for undergraduates may not exceed 5 units a semester.

At the discretion of the Dean, an honor student may make study-list changes involving honors courses under suspension of the regulations fixing the time during which such changes are ordinarily permissible and of the rules requiring fees for such changes, but if this is done, the student is expected to complete the reorganization of his program with all possible diligence, and to report promptly to the Dean concerning proposed changes.

"Passed" or "Not Passed" Credit.—Honor students may have (subject to the approval of the instructor concerned) the privilege of taking each semester one course, not offered by the student in satisfaction of requirements for the major, in which they will be marked "passed" or "not passed." The course must be included on the study list for the semester in which it is taken. Units gained in this way will be subtracted from the units required for graduation for which grade points are recorded. A petition for such a request, approved by the instructor, must be presented to the Dean of the College of Letters and Science prior to the last day on which courses may be dropped from the study list. The status of a course taken on the "passed" or "not passed" basis may not be changed after the last day on which the student is permitted to drop a course from the study list.

Additional Privileges.—Honor students who have senior standing and have attained at least a B average in the junior year at the University of California have the following additional privileges:

(a) The study-list total may be less than 12 units.
(b) The number of units in upper division (or graduate) courses required after admission to the upper division may be less than 36.
(c) The number of upper division units which may be taken in one department after admission to the upper division may exceed 30.
(d) With the consent of the major department, requirements concerning specific courses or sequences in the major may be set aside.

Except as specifically provided, all existing regulations for students in the upper division apply to honor students.

Honors with the Bachelor's Degree

Honors at graduation are granted to those students only who have completed a major with distinction, and who have a general record satisfactory to the Committee on Honors.

Before Commencement each department and also the major adviser for each group major determine, by such means as they may deem best (for example, by means of a general final examination), which students are to be recommended to the Dean of the College for honors at graduation.

Students who, in the judgment of proper authorities, display marked superiority may be recommended for the special distinction of highest honors.

The Committee on Honors will consider recommendations from the department, the group major advisers, and the Dean, confer with the several recommenders about doubtful cases, and transmit to the faculty of the College of Letters and Science its recommendations concerning the award of Honors and Highest Honors.

The list of students to whom honors or highest honors in the various departments have been awarded is published in the annual Commencement Program.
Requirements of Colleges, Schools, and Curricula

COLLEGE OF AGRICULTURE

The prospective student should read the requirements and recommendations for admission on pages 20–31. Entrants will be seriously handicapped in undertaking most of the lower division courses required in the various curricula of the College of Agriculture unless they have completed as a part of, or in addition to those subjects required for admission, the following subjects in high school: algebraic theory, \( \frac{1}{2} \) or 1 year; trigonometry, \( \frac{1}{2} \) year; physics, 1 year; and chemistry, 1 year. Students proposing to major in agricultural engineering, forestry, irrigation science, landscape architecture, or range management should have in addition 1 year of mechanical drawing. Failure to take the proper subjects in high school may delay completion of the University course beyond the usual four-year period.

Students are advised to read the detailed information concerning instruction in agriculture on the Berkeley, Davis, and Los Angeles campuses, including the various curricula and suggested programs of study for the freshman and sophomore years, found in the Bulletin of the College of Agriculture*, obtainable without charge from the Dean of the College of Agriculture, University of California, Berkeley 4.

Freshman and Sophomore Years

The first two years of all curricula offered by the College of Agriculture may be undertaken on the Berkeley campus. As soon as the student has selected a curriculum, he obtains the name of his major adviser from the office of the Dean of the College of Agriculture, 101 Giannini Hall. Each semester the major adviser is consulted for guidance in following the requirements of the curriculum chosen. Students who are unable to meet the suggested programs of study during the first two years may take some of the requirements in their junior or senior years. It should be noted, however, that any great departure from the recommended programs may delay graduation beyond the normal four-year period.

Junior and Senior Years

The schedule for the junior and senior years is determined by the major subject requirements, supplemented by optional courses selected by the student, with the consent of the major adviser. Not all curricula may be completed on the Berkeley campus.

Approval of Study Lists

Before the study list is filed with the Registrar, it must be endorsed by the major subject adviser and approved by the Dean of the College of Agriculture. The student must also obtain from his adviser a second study-list form which will be filed in the office of the Dean at the time the study list is approved. Students will not be permitted to enroll for fewer than 12, nor more than 18 units a semester without special approval of the Dean of the College of Agriculture.

Honors

Honors are granted to the graduating student who has completed his major with distinction and whose general record is satisfactory to the Study-Lists and Courses of Instruction Committee. The student who has done work of unusual excellence may be recommended for highest honors.

* Also known as the Prospectus of the College of Agriculture.
The list of students to whom honors or highest honors in the College have been awarded is published in the COMMENCEMENT PROGRAM.

Requirements for the Degree of Bachelor of Science

The degree of Bachelor of Science is awarded to those candidates who:

1. Satisfy the general University requirements as follows:
   (a) Subject A.—The Subject A examination in English composition is required of every undergraduate student at the time of his first registration in the University (see page 34).
   (b) Air, Military, or Naval Science (for male students) (see pages 36, 37 and 59).
   (c) American History and American Institutions (see page 35).
   (d) Residence in the University during the senior or final year in the college in which the degree is to be taken (see page 39), and completion of at least the last 24 units of credit.
   (e) Attain at least twice as many grade points as units of credit in courses undertaken at this University
   (f) File notice for candidacy with the Registrar on scheduled dates (see page 39).

2. Satisfy the general requirements of the College of Agriculture as follows:
   (a) At least 124 units of University work. Not more than 4 units may be in lower division physical education courses.
   (b) Thirty-six units of the above total in upper division courses (courses numbered 100–199)
   (c) Nine units of mathematics. Matriculation work may be offered toward this requirement, counting each year of high school work as 3 units. Trigonometry taken in high school is recommended as partial satisfaction of this requirement. Normally this can be satisfied by the end of the sophomore year.

3. Satisfy the requirements of one of the curricula in the College of Agriculture.

For curricula offered by the College at Davis and Los Angeles, see the BULLETIN OF THE COLLEGE OF AGRICULTURE. The following curricula are the only ones with majors which can be completed on the Berkeley campus for the Bachelor of Science degree:

CURRICULUM IN AGRICULTURAL ECONOMICS

(Major: Agricultural Economics)

1. General University requirements (see 1 above).
2. College of Agriculture requirements (see 2 above).
3. Curriculum requirements:
   (a) General
      Accounting ................................................. 3
      Chemistry ............................................... 5
      Economics .............................................. 6
      English and/or speech ............................. 6
      Mathematics .......................................... 6
      Physics .................................................. 3
      Statistics .............................................. 3
   (b) Agriculture
      Agriculture, other than agricultural economics .... 8
      Upper division agricultural economics ............ 18
   (c) Electives (restricted)
      Anthropology, geography, history, mathematics (be-
**Curriculum in Agricultural Management**

(Major: Agricultural Management)

1. General University requirements (see page 77).
2. College of Agriculture requirements (see page 77).
3. Curriculum requirements:

   (a) General
   - Accounting ................................................. 3
   - Anthropology, geography, history, philosophy, political science, psychology, or sociology and social institutions ................................................. 12
   - Bacteriology, botany, geology, physiology, or zoology or additional chemistry or mathematics ................................................. 7
   - Business law ............................................. 3
   - Chemistry ................................................. 5
   - English and/or speech ................................. 6
   - Mathematics ............................................. 3
   - Principles of economics .............................. 6
   - Statistics ................................................ 3

   (b) Agriculture
   - Agriculture (other than agricultural economics and botany) ................................................. 12

   (c) Electives (restricted)
   - Additional upper division work in agricultural economics, economics or business administration ................................................. 24

4. Additional courses chosen by the student, with approval of major adviser. (These may be used to satisfy the requirements under 1 and 2 above.) ................................................. 40

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5. Certain courses or their equivalents are required for the curriculum and where applicable may be used toward satisfaction of 3 above. See the Bulletin of the College of Agriculture for details.

**Curriculum in Agricultural Engineering**

The curriculum in agricultural engineering is offered in the College of Engineering (see page 95).
## CURRICULUM IN ANIMAL SCIENCE
(Majors: Animal Husbandry, Animal Physiology, Genetics, Poultry Husbandry)

1. General University requirements (see page 77).
2. College of Agriculture requirements (see page 77).
3. Curriculum requirements:

   (a) General
   - Bacteriology ................................................. 4
   - Botany ............................................................ 4
   - Chemistry and/or biochemistry ......................... 16
   - Economics ....................................................... 3
   - English and/or speech ..................................... 6
   - Physics .......................................................... 4
   - Zoology .......................................................... 10

   (b) Agriculture
   - Animal nutrition ............................................. 3
   - Animal pathology, parasitology, or additional zoology .. 3
   - Animal physiology .............................................. 5
   - Genetics .......................................................... 4
   - Upper division courses in either the major or a closely
     related field, with approval of major adviser .......... 12

4. Additional courses chosen by the student, with approval of
   major adviser. (These may be used to satisfy the course
   requirements under 1 and 2 above.) ....................... 50

5. Certain courses are required for the four majors and where applicable
   may be used in partial satisfaction of 3 above. See the BULLETIN OF
   THE COLLEGE OF AGRICULTURE for details.

Only the genetics major can be completed on the Berkeley campus.

## CURRICULUM IN ENTOMOLOGY AND PARASITOLOGY
(Major: Entomology and Parasitology)

1. General University requirements (see page 77).
2. College of Agriculture requirements (see page 77).
3. Curriculum requirements:

   (a) General
   - Bacteriology ................................................. 4
   - Botany and zoology ........................................... 20
   - Chemistry ....................................................... 13
   - English and/or speech ..................................... 6
   - Geography, geology, or paleontology ................. 3
   - Physics .......................................................... 3

   (b) Agriculture
   - Agriculture (other than entomology and parasitology)
     and/or forestry ............................................... 6
   - Genetics .......................................................... 3
   - Plant or animal pathology ................................ 4 or 3
   - Plant or animal physiology, nutrition, or biochemistry .. 3
   - Entomology and parasitology courses for the major .... 23
   - Summer practice course .................................. 0

4. Additional courses chosen by the student, with approval of
   major adviser. (These may be used to satisfy the course
   requirements under 1 and 2 above.) ....................... 36 or 37

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5. Certain courses are required for the major and where applicable may be used in partial satisfaction of 3 above. See the BULLETIN OF THE COLLEGE OF AGRICULTURE for details.

CURRICULUM IN FOOD SCIENCE
(Majors: Dairy Industry, Enology, Food Technology)

1. General University requirements (see page 77).
2. College of Agriculture requirements (see page 77).
3. Curriculum requirements:
   (a) General
      Bacteriology ................................................. 4
      Biochemistry and/or physiology ...................... 6
      Botany or zoology ......................................... 5 or 3
      Chemistry .................................................... 16
      Economics ..................................................... 3
      English and/or speech .................................... 6
      Mathematics (including differential calculus) ...... 6
      Physics (including laboratory) ....................... 8
   (b) Agriculture
      Courses in either the major or closely related fields, with approval of major adviser ......................... 20
   (c) Electives (restricted)
      Anthropology, art, economics, English, foreign language, geography, geology, history*, music, political science*, philosophy, psychology, or sociology .......... 6

4. Additional courses chosen by the student, with approval of the major adviser. (These may be used to satisfy the course requirements under 1 and 2 above.) .............. 44 or 46

124

5. Certain courses are required for the three majors and where applicable may be used in partial satisfaction of 3 above. See the BULLETIN OF THE COLLEGE OF AGRICULTURE for details.

Only the food technology major can be completed on the Berkeley campus.

CURRICULUM IN PREFORESTRY

Until the student is admitted to the School of Forestry, he is enrolled in the College of Agriculture as a preforestry major. For details, see “School of Forestry,” page 122, or the ANNOUNCEMENT OF THE SCHOOL OF FORESTRY, which is available without charge from the School of Forestry, University of California, Berkeley 4.

CURRICULA IN HOME ECONOMICS

Majors in foods, nutrition, and dietetics are expected to continue as listed below. September, 1958, was the last date for admission of freshmen to curricula A and C in their present forms. This means that the last classes to graduate under these curricula will be those of 1962.

Curriculum A
(Major: Preteaching, Extension, and General Home Economics)

1. General University requirements (see page 77).
2. College of Agriculture requirements (see page 77).

* In addition to University requirements.
3. Curriculum requirements:

(a) General
Bacteriology or epidemiology ........................................... 3
Chemistry (general, organic) ............................................. 8
Economics .............................................................................. 6
English and/or speech ......................................................... 6
Physiology ............................................................................ 3
Psychology ............................................................................ 3
Statistics ................................................................................ 3

(b) Home Economics or related fields
Decorative art ...................................................................... 4
Lower division home economics ......................................... 6
Upper division home economics or allied subjects, selected with the approval of the major adviser ....... 27

(c) Electives (restricted)
Anthropology (cultural), political science and/or sociology ..................................................  6

4. Additional courses chosen by the student, with approval of major adviser. (These may be used to satisfy the course requirements under 1 and 2 above.) ....................................... 46

5. Certain courses are required for the major and where applicable may be used in partial satisfaction of 3 above. See the BULLETIN OF THE COLLEGE OF AGRICULTURE for details.

Curriculum B

(Majors: Nutrition, Dietetics, Foods, Textile Science)

1. General University requirements (see page 77).

2. College of Agriculture requirements (see page 77).

3. Curriculum requirements:

(a) General
Bacteriology ................................................................. 4
Chemistry .............................................................................. 13
Economics .............................................................................. 3
English and/or speech ......................................................... 6
Physics .................................................................................. 3
Psychology ............................................................................ 3

(b) Home Economics or related fields
Lower division home economics ......................................... 6
Upper division home economics or allied subjects, selected with the approval of the major adviser ....... 27

(c) Electives (restricted)
Art, foreign language, history, music, and/or philosophy 9
Botany, physiology, public health, and/or zoology .......... 4

4. Additional courses chosen by the student, with approval of major adviser. (These may be used to satisfy the course requirements under 1 and 2 above.) ....................................... 46

5. Certain courses are required for the majors and where applicable may be used in partial satisfaction of 3 above. See the BULLETIN OF THE COLLEGE OF AGRICULTURE for details.
### Curriculum C

(Majors: Child Development, Clothing Design, Family Economics, Family Sociology)

1. General University requirements (see page 77).
2. College of Agriculture requirements (see page 77).
3. Curriculum requirements:
   - **Units**
   - **(a) General**
     - English and/or speech .......................................................... 6
     - Statistics ................................................................................ 3
   - **(b) Home economics or related fields**
     - Upper division home economics or allied subjects, selected with approval of major adviser ........................... 27
   - **(c) Electives (restricted)**
     - Anthropology (cultural), economics, political science, psychology, and/or sociology ......................................... 12
     - Anthropology (physical), chemistry, physiology, and/or zoology (laboratory required in at least one course) 12
     - Art, foreign language, history, music, and/or philosophy 9

4. Additional courses chosen by the student, with approval of major adviser. (These may be used to satisfy the course requirements under 1 and 2 above) ..................................... 55

5. Certain courses are required for the majors and where applicable may be used in partial satisfaction of 3 above. See the BULLETIN OF THE COLLEGE OF AGRICULTURE for details.

### Curriculum in Landscape Architecture

(Major: Landscape Architecture)

1. General University requirements (see page 77).
2. College of Agriculture requirements (see page 77).
3. Curriculum requirements:
   - **Units**
   - **(a) General**
     - Botany .................................................................................... 5
     - Civil engineering (surveying) ............................................. 3
     - City and regional planning ................................................. 4
     - Economics .............................................................................. 3
     - English and/or speech .......................................................... 6
   - **(b) Agriculture**
     - Agriculture (other than landscape architecture), forestry, additional botany ................................................. 9
     - Landscape architecture ........................................................ 35
     - Summer practice course ...................................................... 0
   - **(c) Electives (restricted)**
     - Art, architecture, additional city and regional planning, decorative art .......................................................... 16
     - Engineering (other than surveying), geography, geology, mathematics, physics .............................................. 6
     - History, philosophy, political science, psychology, sociology .......................................................... 6

4. Additional courses chosen by the student, with approval of major adviser. (These may be used to satisfy the course requirements under 1 and 2 above) ..................................... 31

124
5. Certain courses are required for the major and where applicable may be used in partial satisfaction of 3 above. See the Bulletin of the College of Agriculture for details.

NUTRITION (See Curricula in Home Economics, page 80)

CURRICULUM IN PLANT SCIENCE

(Majors: Agronomy, Botany, Floriculture and Ornamental Horticulture, General Horticulture, Genetics, Landscape Management, Plant Pathology, Pomology, Subtropical Horticulture, Vegetable Crops, Viticulture)

1. General University requirements (see page 77).
2. College of Agriculture requirements (see page 77).
3. Curriculum requirements:

   (a) General
      Botany and plant physiology ............................................. 9
      Chemistry ............................................................................. 13
      Economics ............................................................................ 3
      English and/or speech ......................................................... 6
      Physics .................................................................................. 3

   (b) Agriculture
      Entomology and parasitology ........................................... 4
      Genetics .................................................................................. 4
      Irrigation, plant nutrition, or soils ................................... 3
      Plant pathology ...................................................................... 4
      Upper division courses in either the major or a closely related field, with approval of major adviser........ 12

   (c) Electives (restricted) selected from the two areas listed below: ................................................................................ 16
      Natural sciences: At least 9 units to be selected from animal physiology, bacteriology, biochemistry, botany or plant physiology, chemistry, entomology, geology, irrigation, mathematics*, physics, plant pathology, plant nutrition, soils, or zoology.
      Social sciences and foreign languages: At least 3 units to be selected from economics, English, foreign language, history or political science†, philosophy, psychology, sociology, or speech.

4. Additional courses chosen by the student, with approval of major adviser. (These may be used to satisfy the course requirements under 1 and 2 above.) ......................... 47

5. Certain courses are required for the major and where applicable may be used in partial satisfaction of 3 above. See the Bulletin of the College of Agriculture for details.

Only the genetics and plant pathology majors can be completed on the Berkeley campus.

CURRICULUM IN RANGE MANAGEMENT

(Major: Range Management)

1. General University requirements (see page 77).
2. College of Agriculture requirements (see page 77).

* Not including Mathematics C or D.
† In addition to University requirements.
3. Curriculum requirements:

(a) General

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botany</td>
<td>9</td>
</tr>
<tr>
<td>Chemistry</td>
<td>8</td>
</tr>
<tr>
<td>Economics or economics and agricultural economics</td>
<td>6</td>
</tr>
<tr>
<td>Engineering</td>
<td>3</td>
</tr>
<tr>
<td>English and/or speech</td>
<td>6</td>
</tr>
<tr>
<td>Physics</td>
<td>6</td>
</tr>
<tr>
<td>Zoology</td>
<td>8</td>
</tr>
</tbody>
</table>

(b) Agriculture

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agronomy</td>
<td>9</td>
</tr>
<tr>
<td>Animal husbandry</td>
<td>11</td>
</tr>
<tr>
<td>Plant ecology</td>
<td>3</td>
</tr>
<tr>
<td>Range management</td>
<td>9</td>
</tr>
<tr>
<td>Soil science and/or geology</td>
<td>6</td>
</tr>
<tr>
<td>Summer field practice course</td>
<td>0</td>
</tr>
</tbody>
</table>

(c) Electives (restricted) selected from the restricted electives listed under 5, with approval of the major adviser 15

4. Additional courses chosen by the student, with approval of major adviser. (These may be used to satisfy the course requirements under 1 and 2 above.) 25

124

5. Certain courses are required for the major and where applicable may be used in partial satisfaction of 3 above. See the BULLETIN OF THE COLLEGE OF AGRICULTURE for details.

Either the junior or senior year must be completed at Berkeley and the other at Davis.

CURRICULUM IN SOIL SCIENCE


1. General University requirements (see page 77).
2. College of Agriculture requirements (see page 77).
3. Curriculum requirements:

(a) General

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteriology</td>
<td>4</td>
</tr>
<tr>
<td>Botany (including plant physiology)</td>
<td>9</td>
</tr>
<tr>
<td>Chemistry</td>
<td>16</td>
</tr>
<tr>
<td>English and/or speech</td>
<td>6</td>
</tr>
<tr>
<td>Geology</td>
<td>3</td>
</tr>
<tr>
<td>Physics</td>
<td>8</td>
</tr>
</tbody>
</table>

(b) Agriculture

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop science (i.e., agronomy, horticulture, pomology, vegetable crops, viticulture) or plant ecology</td>
<td>3</td>
</tr>
<tr>
<td>Soil science courses required for major</td>
<td>20 to 27</td>
</tr>
</tbody>
</table>

(c) Electives (restricted)

At least 18 units selected from major requirements listed under 5 and with approval of major adviser 24 to 18

Anthropology, art, classics, decorative art, dramatic art, economics, English, foreign languages, geography, history*, music, philosophy, political science*, psychology, sociology or speech 6

* In addition to University requirements.
4. Additional courses chosen by the student, with approval of
major adviser. (These may be used to satisfy the course
requirements under 1 and 2 above.) .................................. 25 to 24

5. Certain courses are required for the majors and where applicable may be
used in partial satisfaction of 3 above. See the BULLETIN OF THE COLLEGE OF
AGRICULTURE for details.

CURRICULUM IN PREVETERINARY MEDICINE

Until the student is admitted to the School of Veterinary Medicine, he may
be enrolled in the College of Agriculture as a preveterinary medicine major
For details, see the BULLETIN OF THE COLLEGE OF AGRICULTURE or the ANNOUNCEMENT OF THE SCHOOL OF VETERINARY MEDICINE. Specific questions
should be directed to the School, which is located at the University of Cali­
fornia, Davis.

COLLEGE OF ARCHITECTURE

The College of Architecture offers a five-year curriculum leading to the pro­
fessional degree, Bachelor of Architecture. Returning students who had been
enrolled in the former School of Architecture previous to the fall semester of
1953 may continue in the four-year curriculum leading to the Bachelor of
Arts degree, and must consult an adviser for proper course requirements.
Undergraduate transfer students from other institutions may enroll for the
Bachelor of Architecture degree only.

New students requesting advanced standing in architectural design, descrip­
tive geometry, water color, pen and pencil drawing, and history of architec­
ture courses offered by the College must present a comprehensive, well­
organized exhibit of their work for evaluation by the faculty during registra­
tion week.

Advisers: undergraduate students—Mr. Czaja, Mr. Hassid, Mr. Kolbeck,
Mr. Lagorio, Mrs. Langhorst, Mr. Leefe, Mr. Olsen, Mr. Prestini, Mr.
Reay, Mr. Reichek, Mr. Simonds, Mr. Stoller, Mr. Thiel; foreign stu­
dents—Mr. Hassid, Mr. Lagorio, Mr. Stump; graduate students—Mr.
DeMars, Mr. Escherick, Mr. Stump, Mr. Wurster.

PRESCRIBED CURRICULUM FOR THE BACHELOR OF ARCHITECTURE DEGREE

<table>
<thead>
<tr>
<th>First Year</th>
<th>Fall Units</th>
<th>Spring Units</th>
<th>Second Year</th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject A (see page 34)</td>
<td>17</td>
<td>17</td>
<td>Military Science</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>American History and American Institutions</td>
<td>17</td>
<td>17</td>
<td>Architecture 3N, 4N</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>(see page 35)</td>
<td>17</td>
<td>17</td>
<td>Architecture 7, 11</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Military Science</td>
<td>17</td>
<td>17</td>
<td>Architecture 12</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Mathematics 3A-3B</td>
<td>17</td>
<td>17</td>
<td>Physics 2B</td>
<td>17</td>
<td>17</td>
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<tr>
<td>Physics 2A</td>
<td>17</td>
<td>17</td>
<td>Physics 3B</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Physics 3A</td>
<td>17</td>
<td>17</td>
<td>Engineering 18A-18B</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Architecture 1N, 2N</td>
<td>17</td>
<td>17</td>
<td>Engineering 21</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Architecture 5N, 6N</td>
<td>17</td>
<td>17</td>
<td>English 1A or Speech 1A</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Art 14A</td>
<td>17</td>
<td>17</td>
<td>Elective</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Art 2A</td>
<td>17</td>
<td>17</td>
<td></td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Elective</td>
<td>17</td>
<td>17</td>
<td></td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>
### Requirements of Colleges, Schools, and Curricula

#### Third Year

<table>
<thead>
<tr>
<th></th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture 101, 102</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Architecture 121, 122</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Architecture 12, 13</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Art 142</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Landscape Architecture 100, 3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Civil Engineering 125</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Civil Engineering 111</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>English 1B or Speech 1B</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Professional Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>17</td>
</tr>
</tbody>
</table>

#### Fourth Year

<table>
<thead>
<tr>
<th></th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture 11, 12 or 13; 103</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Professional Elective</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Architecture 126 or 127 (any one course)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>City and Regional Planning 100</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Civil Engineering 126, 127</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

#### Fifth Year

<table>
<thead>
<tr>
<th></th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture 104</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Architecture 105</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Architecture 106, 133</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Architecture 107, 108</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Architecture 153, 132</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>13</td>
</tr>
</tbody>
</table>

The Bachelor of Architecture degree will be recommended for students of the College who have successfully completed the prescribed undergraduate five-year curriculum in architecture as set forth above, and who have complied with the rules for candidacy for this degree.

The degree Master of Architecture will be recommended for students of the College who have been in residence for at least one year following the degree of Bachelor of Architecture taken at this University, or a comparable five-year degree from another institution, and who have completed the prescribed curriculum for the graduate year with an average grade of B or better, who have been duly advanced to candidacy, and who have presented a thesis acceptable to the faculty of the College or have successfully completed a comprehensive examination.

**Prescribed Curriculum for the Master of Architecture Degree**

<table>
<thead>
<tr>
<th></th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture 201N, 202N</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Architecture 203N, 204N</td>
<td>4-7</td>
<td>4-7</td>
</tr>
<tr>
<td>Electives</td>
<td>3-6</td>
<td>3-6</td>
</tr>
</tbody>
</table>

Students who have the Bachelor of Arts degree (old curriculum) and wish to follow architecture as a profession must have received the Master of Arts degree in order to be recommended to the licensing boards of the various states. Students who wish to pursue the Master of Arts degree (old curriculum) and who have been admitted to graduate standing, should consult a graduate adviser of the College of Architecture.

### COLLEGE OF CHEMISTRY

The College of Chemistry offers two majors, one in basic chemistry and one in chemical engineering. The preparation and most of the program for the first two college years is the same for both majors. A major in chemistry is also offered in the College of Letters and Science. (See Announcement of Courses, Berkeley).

**Preparation.**—Students who propose to enter the College of Chemistry must include in their high school programs physics (1 unit), chemistry (1 unit), mathematics, including trigonometry and two years of algebra (3½ units), and foreign language (2 units). German is to be preferred as the foreign language, with French second choice. It is strongly recommended that ana-
lytical geometry and calculus (if available) and mechanical drawing (1 unit) be included. Additional foreign language is also desirable. Students with serious deficiencies in this preparation will ordinarily not be allowed to enroll in the College of Chemistry.

Approval of Programs.—Students in the College of Chemistry are required to submit their proposed schedules to their advisers. A list of the advisers in the College of Chemistry is posted on the bulletin board in Gilman Hall. It is desirable that a complete schedule of courses, chosen with a definite purpose and free from conflicts, should be arranged at the earliest possible date.

Graduation.—The degree of Bachelor of Science is granted upon the completion of a curriculum approved by the Study-Lists Committee of the College of Chemistry. The equivalent of four years of residence and 124 units are minimum requirements. However, many students must complete additional units and in some cases an additional semester in order to fulfill the specific requirements stated below. The student must have obtained twice as many grade points as there are units of credit in all courses which he has taken in the University. The first two years may be completed in a junior college or in any college or university of approved standing. Any student who hopes to complete the requirements for graduation in the minimum time of eight semesters should plan to transfer to this University not later than the end of his fourth semester.

Minimum Scholarship Requirements. (See page 41.)

Study-List Limits.—Ordinarily, students will not be permitted to enroll for fewer than 12 or more than 18 units a semester.

Language Requirements.—Reasonable proficiency in the use of English is a requirement for graduation in the College of Chemistry. This requirement may be satisfied by a grade of C or better in English 1A or Speech 1A, or by special examination. The major in basic chemistry requires a reading knowledge of scientific German for the work of the senior year. A reading knowledge of French is recommended.

Honor Students in the Upper Division.—Students who in the first two years of their college work have attained an average of at least three grade points for each unit undertaken will receive honorable mention with junior standing. These students are entitled to register as candidates for honors. After the first semester of the junior year, the Committee on Honors of the College of Chemistry will determine which students shall remain in the honors group and which students shall be promoted thereto. Honor students will be given a larger share of personal instruction and a greater opportunity to choose courses and work within courses, in the manner best suited to individual needs and aims. Students not in the honors group will not, except in unusual circumstances and with the express permission of the instructor, be permitted to enroll for honors courses (marked H) or for undergraduate research. Students will not ordinarily be recommended for honors at graduation unless their work includes advanced courses approved by the committee. Normally these courses are Chemistry 114H and 180H for students in basic chemistry and either Chemical Engineering 149H or Chemical Engineering 180H for students in chemical engineering. Subject to the approval of the study-list adviser and of the instructor in the course concerned, students in honors status have the privilege of taking each semester one course not offered by them in satisfaction of subject requirements for the curricula of the College of Chemistry in which they shall be marked "passed" or "not passed." In calculating the grade-point standing, units gained in this way are not counted. Students in the honors group in basic chemistry should confer with Mr. Jura, 117 Lewis Hall, with respect to their plans for the last two years of college work. Those in the curriculum in chemical engineering should confer with Mr. Bromley, 220 Gilman Hall. The list of students upon whom honors and highest honors are conferred appears in the annual COMMENCEMENT PROGRAM.
Specific Requirements.—Before graduation, the following specific requirements must be satisfied:

(a) Mathematics 3A, 3B, 4A, 4B or 14A, 14B.
(b) Physics 4A, 4B, 4C.
(c) Chemistry 1A, 1B, 5, 12, 112*, 110A, 110B, 111, and at least 6 additional units of advanced quantitative analysis or advanced inorganic chemistry.
(d) Satisfactory proficiency in the use of English.
(e) The general University requirements in military science, American History and American Institutions.
(f) A program of 18 units of restricted electives in the humanities and social sciences (in addition to the foreign language requirement for students majoring in basic chemistry). Normally 12 of these units should be in English, speech and the social sciences.† The remaining units may be chosen from the fields of philosophy, the fine arts and literature.

Lower Division.—The following program is recommended for students with normal preparation:

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
<th>Spring</th>
<th>Sophomore Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 1A-1B</td>
<td>5</td>
<td>5</td>
<td>Chemistry 5, 12</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics 3A-3B</td>
<td>3</td>
<td>3</td>
<td>Mathematics 4A-4B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Physics 4A</td>
<td>4</td>
<td>4</td>
<td>Physics 4B, 4C</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Restricted elective†</td>
<td>3</td>
<td>3</td>
<td>Restricted elective</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Engineering 26§ or elective</td>
<td>2-3</td>
<td></td>
<td>Engineering 35§</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Military Science</td>
<td>2</td>
<td>2</td>
<td>Military Science</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>15-16</td>
<td>17</td>
<td></td>
<td>18</td>
<td>17</td>
</tr>
</tbody>
</table>

Upper Division.—The student must have completed that portion of the specific requirements (a) to (f) listed above, which are included in the normal curriculum for the first two years, or their equivalent, in order to obtain upper division standing.

Unless a student has a grade-point average of at least 2.5 in these specific lower division courses, he is seldom successful in the upper division. Admission to the upper division with a lower average will be allowed only with the special approval of the Dean, who may require a comprehensive examination.

In addition to completing the specific requirements (a) to (f), each student shall complete either the major in basic chemistry or the curriculum in chemical engineering.

Major in Basic Chemistry

This program offers a wide latitude of individual choice which will enable the student to prepare for graduate study or directly for industrial employment in laboratory syntheses, quality control, research on physical and chemical properties of materials, product development, chemical marketing, or for high school teaching of chemistry. Students receiving the degree of Bachelor of Science with Honors are in a position to continue graduate study in preparation for the highest type of fundamental research. A reading knowledge of German is prerequisite for the senior level work in the basic chemistry major.

* Students in the chemical engineering curriculum may elect 112C instead of 112 if they have received at least a C grade in course 12 in this University.
† Suitable courses in the social sciences are included in such subjects as anthropology, economics, geography, history, political science, psychology, sociology and social institutions.
‡ Normally English 1A or Speech 1A is taken the first semester.
§ The engineering courses are required only for chemical engineering students. Those majoring in basic chemistry may substitute electives. Students planning to take upper division biochemistry courses should include one of the following courses in the sophomore year: Bacteriology 1, Physiology 1, Zoology 1A.
Satisfactory completion of German 1 and 2 will be deemed to meet this requirement. Students should include German in the program for the junior year unless the requirement has already been satisfied.

A comprehensive program of advanced work in chemistry and related subjects should be planned for the junior and senior years, and each program must be approved by a study-list officer of the College of Chemistry. Such programs will normally include a group of upper division courses totaling 17 units, of which half may be taken in closely related departments. The 17 units are in addition to the specific courses required in (a) to (e) above. Thus a student preparing for research in the field of physical chemistry should include upper division courses in physics and mathematics. A course leading to research in organic chemistry should include work in biochemistry, bacteriology, or physiology. A course preparing for quality control may include work in electronics, optics, introductory chemical engineering, and practice in analytical techniques developed for various technological fields.

It is permissible to complete a biochemistry major (as outlined in the ANNOUNCEMENT OF COURSES) in the College of Chemistry within the major in basic chemistry. For such students, Biochemistry 100A–100B will be considered as a course in chemistry.

**Curriculum in Chemical Engineering**

This curriculum equips the student for professional work in the development, design, and operation of chemical processes and of process equipment. It includes the subjects common to all engineering curricula, together with thorough fundamental training in chemistry, and specialized advanced courses in chemical engineering. Restricted electives are provided during the senior year to orient each student toward particular types of work and particular industries. Additional training is offered at graduate level, leading to the M.S., Ph.D., and Doctor of Engineering degrees in chemical engineering. Although frequently it will not be possible to conform to the semester schedules shown below, completion of the listed subjects is required for graduation in the chemical engineering curriculum.

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Fall</th>
<th>Spring</th>
<th>Senior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 112</td>
<td>5</td>
<td></td>
<td>Chem. Eng. 144</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Chemistry 110B, 111</td>
<td>6</td>
<td>4</td>
<td>Chem. Eng. 145A, 145B</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Chem. Eng. 143, 146A</td>
<td>3</td>
<td>2</td>
<td>Chem. Eng. 145C or 148</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Civil Eng. 130</td>
<td>3</td>
<td>2</td>
<td>Chem. Eng. 146B, 149</td>
<td>4</td>
<td>2–3</td>
</tr>
<tr>
<td>Electrical Eng. 101 or Chemistry 104 (or 105)</td>
<td>3</td>
<td>3</td>
<td>Chem. Eng. 147</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Engineering 85 (or Chemistry 110A)</td>
<td>3</td>
<td>2</td>
<td>Chem. Eng. 152 (or Chemistry 104), or Elect. Eng.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Restricted elective</td>
<td>2</td>
<td>3</td>
<td>Mathematics, technical, business electives</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>Mech. Eng. 107</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>Restricted electives</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

16 16 18 14–15

Technical electives in this curriculum will normally be chosen from the following list:

- Bacteriology 1; Biochemistry 102; Ceramic Engineering 101, 102, 190; Chemical Engineering 145C, 148, 244; Chemistry 114H, 115, 120, 122, 123; Civil Engineering 144, 147; Electrical Engineering 102, 106; Engineering 160, 169, 230; Engineering Design 106A–106B; Food Technology 112, 113; Mechanical Engineering 102, 152, 161, 163, 164, 181; Metallurgy 101, 102, 103, 104; Physics 121; Process Engineering 100; Public Health 170.

Suitable business and mathematics electives are the following:

- Business Administration 100, 140; Mathematics 110A, 110B, 119, 122; Statistics 130E.
Since the four-year chemical engineering curriculum offers little opportunity for the student to explore additional areas of knowledge of his own choosing, a five-year curriculum in chemical engineering is recommended to students who can afford the extra time. The extra year makes it possible for the student to include electives in the humanities or social sciences in addition to some more advanced work in chemistry and chemical engineering.

In the fifth year there are two programs outlined. The honor student who can meet Graduate Division requirements may take the B.S. degree in basic chemistry at the end of the fourth year and then the M.S. degree in chemical engineering at the end of the fifth year. The non-honor student will not ordinarily be allowed to undertake the graduate courses or research, but may receive his degree in both chemical engineering and basic chemistry by postponing his B.S. degree until after all undergraduate requirements in chemical engineering have been completed. Recommended course schedules for the five-year curriculum are given in the Announcement of the College of Chemistry.

COLLEGE OF ENGINEERING

Admission to the College of Engineering.—As a general practice the College of Engineering will accept new students only from the following two categories of applicants:

1. Beginning freshmen—those who present satisfactory scholastic records from an approved high school and who also have obtained satisfactory scores on the University's Lower Division Engineering Examination. More freshmen will be admitted in fall semesters than in spring semesters.

2. Transfer students to junior or senior standing in engineering—those who present satisfactory scholastic records from a public junior college or other educational institution and who also have obtained satisfactory scores on the University's Upper Division Engineering Examination.

Attention is directed to the fact that the last days for filing applications for admission to the University by students desiring enrollment in the College of Engineering have been moved forward to November 17, 1959, for admission in the spring semester, 1960, and to April 12, 1960, for admission in the fall semester, 1960.

There are two engineering qualifying examinations: The Lower Division Engineering Examination is required of all applicants for admission prior to the junior year. This examination is an aptitude test and includes sections on technical vocabulary, mathematical reasoning, and scientific relationships. The Upper Division Engineering Examination is required of applicants for admission at and above the junior level, and must be passed satisfactorily by all continuing students prior to beginning the work of the upper division and by all upper division students prior to admission. This examination is an achievement test and includes sections on English, mathematics, chemistry, physics, and lower division engineering subjects. The same examinations are required for admission to the College of Engineering either at Berkeley or at Los Angeles. A list of the places and times for the examinations may be obtained from the Dean of the College of Engineering at either campus. Application blanks for these examinations should be obtained by the prospective student early in the semester previous to that in which he plans to enroll in the University.

Both examinations will be given in November, 1959, and April, 1960. For date of application for the examinations, see calendar on pages 3 and 4. A $5 fee will be charged for each examination if taken with a group of three or more persons at the regularly scheduled times; otherwise, the fee is $10.
Admission in Freshman Standing.—An applicant may qualify for admission to the University in freshman standing under any one of the several plans of admission described on pages 20–24. His eligibility for admission to the College of Engineering is determined on the basis of his score on the Lower Division Engineering Examination combined with a further detailed consideration of his high school grades and subjects. It is important for all applicants to include the following subjects in the list of high school courses taken to satisfy the University admission requirement, regardless of which of the plans of admission they choose:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algebra</td>
<td>2</td>
</tr>
<tr>
<td>Plane geometry</td>
<td>1</td>
</tr>
<tr>
<td>Trigonometry</td>
<td>1</td>
</tr>
<tr>
<td>Chemistry or physics</td>
<td>1</td>
</tr>
<tr>
<td>(both are desirable)</td>
<td></td>
</tr>
<tr>
<td>Mechanical drawing</td>
<td>1</td>
</tr>
</tbody>
</table>

Laboratory courses in the various curricula of the College of Engineering require manual skills in the operation and testing of machines and equipment. These courses are planned on the assumption that the student has had some previous work which will develop the skills. Unsatisfactory laboratory performance frequently results when such skills are absent, and this can usually be traced to the fact that the student has had no prior manual training. It is recommended, therefore, that students wishing to enter the College of Engineering elect shop courses in high school, preferably machine shop, for at least one semester.

Engineering, like other professional work, requires oral and written communication. Strong courses in English composition and in supporting skills such as typing greatly facilitate efficient college study, and should be elected, if possible, by students planning to enter the College of Engineering.

Admission to the lower division of the College of Engineering does not necessarily imply admission to the upper division at some future date.

Admission to the Upper Division.—The requirements for admission to the upper division of the College of Engineering are applied uniformly to resident students who complete the lower division at Berkeley, Davis, or Los Angeles, and to transfer students.

Admission to the upper division will be to the particular curriculum selected by the applicant and is contingent upon the grades earned and the score attained in the Upper Division Engineering Examination.

Students transferring from other colleges and universities to the University of California for the study of engineering should have adequate training in subjects basic to the level at which transfer is planned. The full senior year comprising a minimum of 30 units in all cases must be completed at the University of California.

The Colleges of Engineering on the Berkeley and Los Angeles campuses have adopted a policy of reciprocity whereby students who have completed all the requirements for upper division standing in one of the Colleges of Engineering will be admitted to upper division standing in the other College of Engineering.

Continuation in the College of Engineering and admission to upper division courses are based upon satisfactory completion of the Upper Division Engineering Examination (which is given to every engineering student during the second semester of the sophomore year), and a consideration of the student's grades in the freshman and sophomore required subjects.

The minimum lower division subject and unit requirements for admission to the upper division are (for details, see page 94):

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics (including differential and integral calculus, and elements of differential equations)</td>
<td>12</td>
</tr>
</tbody>
</table>

† Or equivalent integrated courses covering the same subject material.
## Requirements of Colleges, Schools, and Curricula

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>8</td>
</tr>
<tr>
<td>Physics</td>
<td>10</td>
</tr>
<tr>
<td>*Nontechnical subjects</td>
<td>6</td>
</tr>
<tr>
<td>†Engineering</td>
<td>10</td>
</tr>
<tr>
<td>(surveying or engineering measurements, graphics, properties of materials, statics)</td>
<td></td>
</tr>
<tr>
<td>Unspecified subjects</td>
<td>10</td>
</tr>
<tr>
<td>(Three units may be nontechnical; the remainder are to be in technical and scientific subjects. They may include units, in addition to the number listed, in mathematics, chemistry, physics, and engineering. The student should select these subjects to satisfy the added lower division requirements of the curriculum which he wishes to enter at the University of California. Failure to meet these added specific requirements will not prevent his entrance at the junior level. However, he may have to make up any deficiencies in these requirements during the junior year.)</td>
<td></td>
</tr>
</tbody>
</table>

**Total** ............... 56

### Transfer from Other Colleges

Students who wish to transfer from other colleges within the University to the College of Engineering must make application to the Dean of the College of Engineering for such transfer no later than November 17, 1959, for admission in the spring semester, 1960, and before April 12, 1960, for admission in the fall semester, 1960. Students on the Berkeley campus may secure petitions to change college from the Office of the Dean, 308 Engineering Building, or the Office of the Registrar, 120 Sproul Hall. Students from campuses other than Berkeley may secure petitions from the Office of Admissions, 127 Sproul Hall, Berkeley 4. Students who wish to transfer to the College of Engineering are required to take the appropriate examination noted on page 90.

### Scholarship Requirements

A student in the College of Engineering must meet the following scholastic requirements:

1. Obtain a satisfactory score in the Upper Division Engineering Examination, in order to qualify for enrollment in upper division work.
2. Satisfy the requirement in English. Each candidate for a degree must demonstrate reasonable proficiency in the use of English. Any student who does not receive a satisfactory score on the English portion of the Upper Division Engineering Examination, or whose use of English in subsequent course work is unsatisfactory, will be reported to the Dean of the College of Engineering. The Dean will then assign supplementary course work to be added to the normal program of study.
3. Maintain a grade C average each semester in all courses for which he is enrolled.
4. Maintain a grade C average in all courses undertaken in the University.
5. Attain for the B.S. degree a grade C average in all courses of upper division level offered in satisfaction of technical subject requirements and restricted electives of his program of study.

### Enrollment in Engineering Courses

Enrollment in lower division engineering courses is limited to students who are registered in the College of Engineering except as follows: Students registered in other colleges or schools on the campus and undertaking curricula in which engineering courses are prescribed will be admitted to these courses upon written approval of the adviser. Subject to space limitations nonengineering students may enroll in upper division courses for which they have prerequisites and upon approval of the adviser.

---

* Exclusive of military science, physical education, Subject A, or any course equivalent to matriculation subjects.
† Must include some units in each of the four subject areas indicated.
Curricula in Engineering.—A student in the College of Engineering must elect, at the time he applies for admission to the upper division, one of the following curricula: agricultural engineering, civil engineering, ceramic engineering, electrical engineering, engineering science (engineering physics), geological engineering, industrial engineering, mechanical engineering, metallurgy, mineral engineering (geological engineering, mining engineering, petroleum engineering), and process engineering. Each is a four-year curriculum leading to the Bachelor of Science degree upon completion of the program of study.

Each curriculum consists of a group of subjects, the study of which gives preparation for the beginning of professional engineering work in the designated field. The subjects and units common to all curricula are as follows:

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry ..........</td>
</tr>
<tr>
<td>Physics ...........</td>
</tr>
<tr>
<td>Mathematics (including differential and integral calculus and elements of differential equations)</td>
</tr>
<tr>
<td>Analytic mechanics and strength of materials</td>
</tr>
<tr>
<td>Applied thermodynamics and fluid mechanics</td>
</tr>
<tr>
<td>Applied electricity and magnetism</td>
</tr>
<tr>
<td>Properties of materials</td>
</tr>
<tr>
<td>Drawing and graphics</td>
</tr>
<tr>
<td>Engineering design</td>
</tr>
<tr>
<td>Engineering economy</td>
</tr>
<tr>
<td>Nontechnical electives</td>
</tr>
</tbody>
</table>

In addition, each curriculum includes scientific and professional courses characteristic of the particular field of engineering.

Requirements for the Degree of Bachelor of Science.—The degree of Bachelor of Science in the College of Engineering is awarded to those candidates who:

(1) Satisfy the general University requirements:
   (a) Military science. See page 37. Eight units of credit toward the degree will be allowed those students who are required to take military science.
   (b) Subject A. See page 34.
   (c) American History and American Institutions. See page 35.
   (d) Residence during the senior year. See page 39.
      Students in the College of Engineering are required to take the final 30 units of work in residence in the College of Engineering rather than the minimum required by the University.
   (e) Grade points. See page 40.

(2) Satisfactorily complete one of the engineering curricula, including the subjects and units common to all curricula.

(3) Satisfy the requirement in English. See page 92.

Honors with the Bachelor's Degree.—Upon the recommendation of the Executive Committee of the College of Engineering, a student may receive honors with the bachelor's degree for outstanding scholarship in all work undertaken after admission to the upper division.

A student who, in the judgment of the Executive Committee, displays marked superiority may be recommended for the special distinction of highest honors.

Pass or Fail Grades.—Subject to the approval of the Committee on Study Lists, students may choose elective courses from any department of the University. Students who have an average grade of B or better for all work undertaken in the University shall have (subject to the approval of the instructor concerned) the privilege of taking each semester one elective course
in which they shall be marked “passed” or “not passed.” In calculating grade-point standing, units gained in this way shall not be counted.

Programs of Study.—For the guidance of students, courses satisfying the subject requirements of each curriculum have been selected and are listed on the following pages. These have been so arranged in sequences that course prerequisites are satisfied. Other sequences are possible in some cases but should be carefully checked with the study-list counselor in order to avoid delay caused by the lack of prerequisites.

A student who gives full time to University responsibilities may enroll without special permission for the number of units required in his program of study (see pages 94–105). A student who engages in part-time employment should plan to spend more than four years by enrolling each semester for fewer than the required number of units. In such cases, course sequences must be carefully planned.

Upon admission to the College, engineering students are assigned to a faculty counselor, and are under the guidance of the Dean of the College of Engineering and the Committee on Study Lists. Study programs are arranged in conference with the counselor and must be approved by him. The student is held responsible for planning his program and for the satisfactory completion of graduation requirements. Questions regarding irregularities should be discussed with the counselor and settled at the earliest possible date.

Programs in Nontechnical Studies.—In each of the several curricula in engineering, provision is made for 18 units of study in the humanities and social sciences (exclusive of military science, physical education, Subject A, and any matriculation subjects). These studies are considered to be an integral part of each engineering curriculum and have as their essential purpose the development within the student of an understanding and appreciation of the importance of human values in our society. These nontechnical studies are to be undertaken concurrently with the technical studies in order to achieve a balanced program. The nontechnical units must be chosen from at least two of the following groups and at least 6 units must be completed while the student is enrolled in the lower division, and at least 9 units of upper division courses must be completed after admission to the upper division of the College of Engineering.

1. English, speech.
2. Foreign languages.
3. Business administration, economics, political science.
4. Anthropology, history, sociology and social institutions, psychology.
5. Life and natural sciences.
6. Fine arts and philosophy.

LOWER DIVISION PROGRAM

The program of study in the lower division is essentially the same in all curricula. Its purpose is to give to the beginning student the fundamentals in science, mathematics, and engineering which are essential as preparation for the professional studies of the upper division.

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 2A–3B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chemistry 1A–1B</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Physics 4A</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Engineering 25</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Engineering 10</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>*Nontechnical studies</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Military Science</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 14A–14B or 4A*-4B*</td>
<td>5 or 3*</td>
<td>5 or 3*</td>
</tr>
<tr>
<td>Physics 4B–4C</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Engineering 45</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Engineering 35</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social Science 1A–1B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>*Technical elective</td>
<td>0 or 3*</td>
<td>2</td>
</tr>
<tr>
<td>Military Science</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17 or 18</td>
<td>17 or 15</td>
</tr>
</tbody>
</table>

*, † See asterisk (*) and dagger (†) footnotes on the next page.
### Upper Division Programs

#### Agricultural Engineering

133 units

(For courses of the lower division, see above)

<table>
<thead>
<tr>
<th>Junior Year (Berkeley)</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Eng. 130</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Civil Eng. 111</td>
<td>1 or (1)</td>
<td>3</td>
</tr>
<tr>
<td>Electrical Eng. 100A-100B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Electrical Eng. 104A-104B</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Engineering 102</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Engineering 103</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mechanical Eng. 112</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>(or C.E. 121)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mechanical Eng. 105A-105B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>†Nontechnical studies</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Senior Year (Davis)</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Eng. 114</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Agricultural Eng. 115</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Agricultural Eng. 112</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Irrigation 120</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Soil Science 1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Agricultural Economics 140-4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>†Nontechnical studies</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>‡Technical elective</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Units</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-17</td>
<td>16-17</td>
</tr>
</tbody>
</table>

#### Fifth (Graduate) Year

Students who intend to engage in design, development, research, or teaching and who qualify for admission to the Graduate Divisions are encouraged to undertake a fifth-year program leading to the Master of Science or Master of Engineering degree which is offered at Davis. Advancement rate and initial salary are usually more satisfactory for those with the master's degree.

The student should consult the Announcement of the Graduate Division, Northern Section, for admission and program requirements.

### Civil Engineering

132 units

(For courses of the lower division, see above)

**Upper Division.**—The program of study in the upper division is set up to meet the general requirements of the College of Engineering and to provide a basic education in the field of civil engineering. Eleven units of technical electives are provided in the upper division program; an orderly sequence of technical elective courses should be planned by the student in consultation with his counselor. Within these 11 units a student may emphasize studies relating to one of the major branches of civil engineering; a student must take at least 6 of the 11 units in one of the groups listed under Elective Groups.

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Eng. 110</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Civil Eng. 130, 131</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Civil Eng. 140</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elec. Eng. 101, Civil Eng. 133</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Eng. 102, Civil Eng. 161</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Eng. 103, Mech. Eng. 105A</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>†Nontechnical studies</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Eng. 121, Eng. 120</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Civil Eng. 135</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Civil Eng. 141</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Civil Eng. 170</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Civil Eng. 191</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>†Technical electives</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>‡Nontechnical studies</td>
<td>3</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Units</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Units</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>15</td>
</tr>
</tbody>
</table>

* Students in agricultural, civil, geological, and mining engineering take Mathematics 4A-4B and surveying; all other students take Mathematics 14A-14B.
† For selection of nontechnical studies, see page 94. Students in civil engineering must elect a course in geology as part of their nontechnical studies. This course can be taken either in the lower or upper division. It is recommended, however, that it be taken in the lower division.
‡ Upper division course in chemistry, physics, mathematics, irrigation, soil science, or appropriate engineering course approved by the counselor.
§ To be selected from elective groups, see page 96.
‖ May be taken in the senior year.
¶ For selection of nontechnical studies, see page 94.
ELECTIVE GROUPS:

Six units, of the total of 11 units of technical electives in the senior year, are to be chosen from one of the particular specialty areas noted below. However, students may elect to take the whole total of 11 units of technical electives in their specialty.

Construction Engineering:
- Civil Engineering 181 required, plus approved selections in cost accounting, economics and/or industrial relations.

Hydraulic Engineering:
- Civil Engineering 156, 157, 158, 159, 160, 161; Mechanical Engineering 161, 162.

Sanitary Engineering:
- At least 3 units from Group A courses required: Group A—Civil Engineering 145, 146, 147; Public Health 111, 117, 170, 147A. Group B—Civil Engineering 158, 160, 166, 171; Chemistry 109, Biochemistry 102; Public Health 160A; Political Science 103A, 181; Soil Science 111, 114; City and Regional Planning 121.

Soil Mechanics:
- Civil Engineering 114, 118, 122 required, plus approved selections in engineering, chemistry, geology and/or soil science.

Structural Engineering:
- Civil Engineering 136 and/or 137; additional selections suggested are: Civil Engineering 138, 114, 118, 122; Mathematics 110B.

Structural Mechanics:
- Civil Engineering 136 and/or 137; additional selections suggested are: Civil Engineering 138; Mathematics 119, 122, 185; Mechanical Engineering 170, 175; Engineering 164.

Surveying, Geodesy, and Photogrammetry:
- Civil Engineering 101, 102, 103, 105, 107.

Transportation Engineering:
- Civil Engineering 171 required, plus 3 units from Civil Engineering 101, 102, 114, 118, 122; additional selections suggested are: Civil Engineering 136, 181; Statistics 130E; Business Administration 170; City and Regional Planning 110; Political Science 181.

Fifth (Graduate) Year

For students who intend to pursue professional careers, the fifth and graduate year, built upon the more general undergraduate education, offers opportunity for specialization in one of the major branches of civil engineering. A variety of programs of study can be arranged which include instruction related to the planning and design aspects of the major fields of specialization together with supporting courses in applied science, advanced analysis, and in areas such as economics, statistics, public administration, city planning, etc.; some experience in research and development may also be obtained. The major fields in which advanced professional study may readily be undertaken are: construction, foundation, hydraulic, irrigation, photogrammetric and geodetic, sanitary, structural and transportation engineering; combination programs may be arranged. A master's degree may be obtained on successful completion of a satisfactory fifth-year program.

For students who intend to proceed with studies beyond the fifth year, in preparation for careers in teaching and research, or for professional careers involving research and development, the fifth year should emphasize the applied sciences which support the areas of professional specialization. For example, studies concerned with biological sciences and chemistry, fluid mechanics and hydrology, soil mechanics, modern aspects of materials and structural mechanics, may be arranged to comprise a program which will give a basis for later studies for the doctoral degree.
Electrical Engineering

134 units

(For the courses of the lower division, see page 94)

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Fall Units</th>
<th>Spring Units</th>
<th>Senior Year</th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Eng. 109A-109B</td>
<td>7</td>
<td>7</td>
<td>Electrical Eng. 116A</td>
<td>3</td>
<td>or</td>
</tr>
<tr>
<td>Civil Eng. 132</td>
<td>2</td>
<td>3</td>
<td>Electrical Eng. 125, 198A, (3-3)</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Mechanical Eng. 105A, 109</td>
<td>3</td>
<td>Electrical Eng. 132A</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mechanical Eng. 100</td>
<td>2</td>
<td>Electrical Eng. 111A, 133A (3-2)</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 121</td>
<td>3</td>
<td>Electrical Eng. 112A-112B, (4)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Nontechnical studies</td>
<td>3</td>
<td>Engineering 113</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engineering 120</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Restricted electives</td>
<td>6 (or 3) 9 (or 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Nontechnical studies</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>16</td>
<td>16</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

Senior students will select a logical sequence of restricted electives from one of the groups suggested or from any other logical sequence of courses approved by counselors. These restricted elective units must be of senior level and are to be taken at the University of California. Students whose grade-point averages are below 2.5 must elect 6 units of electrical engineering courses. Suggested course groupings are:


Fifth (Graduate) Year

Professional work in many fields of electrical engineering is highly analytical and requires not only sound training in basic science and in engineering methods but ability to plan and carry out original attacks on new problems. The fifth-year program strongly emphasizes individual work on a research problem, culminating in an original thesis and recognized by the M.S. degree. In addition, each student will include at least two electrical engineering courses of graduate level, together with undergraduate courses in mathematics, physics, and engineering more advanced than the requirements for the B.S. degree. The program is chosen to make possible maximum progress in preparation for doctorate examinations for those students qualified for doctoral study, as well as to provide experience in practical engineering research for those who go directly into industry. A typical program would be:

* For selection of nontechnical studies, see page 94.
Graduate electrical engineering courses in field of specialization (Electrical Engineering 200 series) ................. 3 3
Individual study and research (Electrical Engineering 299) .................. 3 3
Advanced undergraduate engineering, mathematics or physics 4 4

No credit is given for the required thesis, but the research leading to its preparation is counted as individual study.

## Engineering Science

The curriculum in engineering science provides special students with the opportunity for obtaining a broad background in the principal areas of engineering science and the related fields of mathematics, and science. The general program of study in this curriculum is so designed as to allow the flexibility deemed necessary to give adequate emphasis in the area of the student's major interest. It is anticipated that many students entering this program will continue their education at the graduate level either in engineering science or in other programs (see engineering physics program). Students will be permitted to enroll in this curriculum if they have at least a 2.75 grade-point average; and they must maintain better than a 2.5 grade-point average throughout their upper division studies. Any student failing to maintain this requirement will be requested to transfer to another curriculum even though such a transfer may delay his graduation.

The general program of study in this curriculum will be administered by an Engineering Science Subcommittee of the Committee on Study Lists of the College of Engineering. This subcommittee will be composed of faculty members who are experts in the various areas of engineering science. Upon consultation with each student, the subcommittee will formulate individual programs of study so as to best achieve the student's major objectives.

### Curriculum in Engineering Science

128 Units

(For the courses of the lower division, see page 94)

#### Upper Division

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering 102 or equivalent</td>
<td>3</td>
<td>Civil Engineering 130</td>
</tr>
<tr>
<td>Nontechnical elective</td>
<td>3</td>
<td>Engineering 103 or equivalent</td>
</tr>
<tr>
<td>tEngineering elective</td>
<td>3</td>
<td>Mechanical Engineering 105A or equivalent</td>
</tr>
<tr>
<td>Engineering, science, and mathematics</td>
<td>6</td>
<td>Engineering, science, and mathematics</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Engineering 101 or equivalent</td>
<td>3</td>
<td>Engineering 120</td>
</tr>
<tr>
<td>tEngineering elective</td>
<td>3</td>
<td>tEngineering elective</td>
</tr>
<tr>
<td>Engineering, science, and mathematics</td>
<td>6</td>
<td>Engineering, science, and mathematics</td>
</tr>
<tr>
<td>♦Nontechnical studies</td>
<td>3</td>
<td>♦Nontechnical studies</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

* For selection of nontechnical studies, see page 94.

† Three units among the engineering electives must emphasize engineering design.
The following program of study in engineering physics, which was designed cooperatively by the departments of Engineering and Physics, is illustrative of the types of programs that can be formulated under the engineering science curriculum. Qualified students graduating from this program may enter graduate studies in either physics or engineering science.

**ENGINEERING PHYSICS**

130 units

(For the courses of the lower division, see page 94)

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Fall</th>
<th>Spring</th>
<th>Senior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units</td>
<td>Units</td>
<td></td>
<td>Units</td>
<td>Units</td>
</tr>
<tr>
<td>Physics 104, 112 (or Chemistry 110A)</td>
<td>3</td>
<td>3</td>
<td>Physics 110B, 108B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Physics 105A-105B</td>
<td>3</td>
<td>2</td>
<td>Engineering 120</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Physics 121, 110A</td>
<td>3</td>
<td>3</td>
<td>Aeronautical Sci. 162</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Civil Eng. 130</td>
<td>3</td>
<td>3</td>
<td>Mechanical Eng. 164</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>† Restricted electives</td>
<td>4</td>
<td>4</td>
<td>† Restricted electives</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>‡ Nontechnical studies</td>
<td>4</td>
<td>4</td>
<td>‡ Nontechnical studies</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
<td>16</td>
<td><strong>Total</strong></td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Students who fail to maintain a 2.5 grade-point average will be requested to transfer to some other curriculum.

**Fifth (Graduate) Year**

Although some positions in engineering physics will be open to engineers holding a B.S. degree, the requirements of a broad and intensive background in both physics and engineering suggest that the better students should plan to enter graduate fields of instruction. Students who complete this curriculum with an average grade of B or better and who have selected appropriate restricted electives will be prepared for graduate work in either engineering or physics.

**Industrial Engineering**

136 units

(For the courses of the lower division, see page 94)

The curriculum in industrial engineering provides for both a four-year and a five-year program of studies. Those students who, upon receipt of the Bachelor of Science degree, wish to prepare for high-level professional work in the field are urged to take the five-year program leading to either the Master of Science or Master of Engineering degree. The four-year program, leading to the Bachelor of Science degree, is designed to furnish an adequate foundation for graduate studies of the fifth year, either in industrial engineering or in some other field, or as a sound training in industrial engineering fundamentals for those who will receive further on-the-job training as offered by many companies or who do not wish to pursue graduate study.

* For selection of nontechnical studies, see page 94.
† In this program of study the equivalent of 8 units of work is required in French, German, or Russian. Up to 6 units of the 18 nontechnical studies may be used to satisfy the language requirement of this program. The first two years in high school French, German, or Russian will be counted in satisfaction of 4 units of this requirement and each year thereafter as 4 units.
‡ Restricted electives must be selected with the approval of the counselor to provide a consistent program of study in one of the areas in engineering physics. At least 9 of the 18 units of restricted electives must be selected from upper division courses in engineering; the remainder must be selected from upper division courses in mathematics, physics, chemistry, other physical sciences, and engineering.
### Fifth (Graduate) Year

Three fields of specialization are available in the fifth year: Administration, Metal Processing, and Industrial Systems Analysis. The general course requirements in each field are as shown below. It is desirable for each student to have a number of elective courses available in the graduate year so as to permit the program to be organized to fit his particular interests and needs. Proper selection of technical electives during the undergraduate years, as indicated, will make this possible.

**Administration**

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Administration 122</td>
</tr>
<tr>
<td>Psychology 185</td>
</tr>
<tr>
<td>Industrial Eng. 146</td>
</tr>
<tr>
<td>Industrial Eng. 243</td>
</tr>
<tr>
<td>Industrial Eng. 299</td>
</tr>
<tr>
<td>Electives</td>
</tr>
</tbody>
</table>

**Metal Processing**

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Administration 122</td>
</tr>
<tr>
<td>Engineering 164</td>
</tr>
<tr>
<td>Industrial Eng. 161</td>
</tr>
<tr>
<td>Industrial Eng. 261</td>
</tr>
<tr>
<td>Industrial Eng. 245</td>
</tr>
<tr>
<td>Industrial Eng. 290</td>
</tr>
<tr>
<td>Electives</td>
</tr>
</tbody>
</table>

**Industrial Systems Analysis**

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Eng. 161</td>
</tr>
<tr>
<td>Industrial Eng. 261</td>
</tr>
<tr>
<td>Industrial Eng. 243 or 245</td>
</tr>
<tr>
<td>Industrial Eng. 290</td>
</tr>
<tr>
<td>Statistics 264</td>
</tr>
<tr>
<td>Electives</td>
</tr>
</tbody>
</table>

For full details regarding the requirements for the Master of Science and Master of Engineering degrees, and admission requirements to the graduate program, the student should consult the Announcement of the Graduate Division, Northern Section.

### Mechanical Engineering

135 units

(For the courses of the lower division, see page 94)

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Eng. 105A-105B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Civil Eng. 130</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Civil Eng. 111</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Engineering 101</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Engineering 102, 103</td>
<td>3</td>
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<tr>
<td>Mechanical Eng. 112</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Electrical Eng. 100A-100B</td>
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</tr>
<tr>
<td>Electrical Eng. 104A-104B</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Mechanical Eng. 108</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Non-technical studies</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Eng. 124A-124B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Mechanical Eng. 131A-131B</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Engineering 120</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mechanical Eng. 110</td>
<td>3</td>
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<td>Technical electives</td>
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<td>5</td>
</tr>
<tr>
<td>Non-technical studies</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

* The 18 units of non-technical studies must include at least one course in each of the following: economics, psychology.
† Should be taken as technical electives in the senior year.
‡ May be taken as a non-technical elective in the undergraduate program.
§ For selection of non-technical studies, see page 94.
‖ Senior students will select 8 units of technical electives approved by the study-list.
Fifth (Graduate) Year

Students who qualify for admission to the Graduate Division and who plan to engage in design, development, research, or teaching, may wish to undertake a fifth-year program leading to the master's degree. Fifth-year programs in mechanical engineering, applied mechanics, and aeronautical sciences are offered.

To insure a well-integrated five-year sequence, the student should give careful consideration to his fifth-year program at the time he chooses his fourth-year technical electives. For full details regarding the requirements for the Master of Science and Master of Engineering degrees, and admission requirements to the graduate program, the student should consult the Announcement of the Graduate Division, Northern Section.

Ceramic Engineering  Metallurgy

132 units  132 units
(For the courses of the lower division, see page 94)

<table>
<thead>
<tr>
<th>Junior Year</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Units</td>
<td>Units</td>
</tr>
<tr>
<td>Ceramic Eng. 101</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Ceramic Eng. 190</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Chemistry 5, Metallurgy</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chemistry 110A-110B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Civil Eng. 130</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Engineering 160</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Physics 121</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>§Nontechnical studies</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Senior Year</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>Spring</td>
</tr>
<tr>
<td></td>
<td>Units</td>
<td>Units</td>
</tr>
<tr>
<td>Metallurgy 101, 103</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Metallurgy 102</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Ceramic Eng. 102 and 102L</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ceramic Eng. 190</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Electrical Eng. 101</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Electrical Eng. 102</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Eng. 164 or Met. 104</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mineral Engineering 101</td>
<td>3</td>
<td></td>
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<tr>
<td>§Restricted electives</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>§Nontechnical studies</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

|                      | Fall     | Spring   |
|                      | Units    | Units    |
| Ceramic Eng. 102 and 102L | 3    | 4        |
| Ceramic Eng. 190       | 1        |          |
| Electrical Eng. 101    | 3        |          |
| Electrical Eng. 102    | 3        |          |
| Mineral Engineering 101| 3    |          |
| §Restricted electives  | 3        |          |
| §Nontechnical studies  | 3        |          |

16 16

Fifth (Graduate) Year

Programs of study in ceramic engineering and metallurgy may involve either four or five years. B.S. degrees are awarded after four years but those qualified for advanced work may continue and receive a Master of Science or a Master of Engineering degree at the end of the fifth year. High-level scientific and professional programs are available; the undergraduate program prepares students to enter either field. In general, the demand for scientifically

counselors. These 8 units are to be taken at the University of California, and 5 units must be in senior courses in mechanical engineering, aeronautical sciences, naval architecture, or nuclear engineering. Elective courses are available which give emphasis to the following specialties in mechanical engineering: aeronautics, air conditioning and refrigeration, automotive engineering, automatic control, fluid mechanics, heat power, heat transfer and thermodynamics, hydraulics, naval architecture, mechanical design, applied mechanics, acoustical engineering, and nuclear engineering.

* Any upper division courses in science or engineering.
§ For selection of nontechnical studies, see page 94.
trained engineers exceeds the demand for professionally trained engineers in these fields. Graduates receiving master's degrees are in greater demand and receive substantially higher starting salaries than do the four-year graduates.

**Curriculum in Mineral Engineering**

(For the courses of the lower division, see page 94)

The curriculum in mineral engineering is designed to provide students with a background for future work in the broad field concerned with the discovery, extraction, and utilization of minerals, metals, and fuels. It also provides the training necessary to apply geological fundamentals to engineering problems that arise in the construction of dams, roads, tunnels, bridges, and so on.

The programs of study in mineral engineering (mining, geological engineering and petroleum engineering) are especially organized to provide preparation for advanced study at the graduate level in the three fields.

**Geological Engineering**

132 units

**Mining Engineering**

133 units

**Petroleum Engineering**

136 units

### Junior Year

<table>
<thead>
<tr>
<th>Units</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 110A</td>
<td>3</td>
<td>..</td>
</tr>
<tr>
<td>*Chemistry 110B or Mining 100</td>
<td>3</td>
<td>..</td>
</tr>
<tr>
<td>Civil Eng. 111</td>
<td>1</td>
<td>..</td>
</tr>
<tr>
<td>Civil Eng. 130</td>
<td>3</td>
<td>..</td>
</tr>
<tr>
<td>Electrical Eng. 101</td>
<td>3</td>
<td>..</td>
</tr>
<tr>
<td>Electrical Eng. 102</td>
<td>1</td>
<td>..</td>
</tr>
<tr>
<td>Engineering 102</td>
<td>3</td>
<td>..</td>
</tr>
<tr>
<td>Engineering 103</td>
<td>3</td>
<td>..</td>
</tr>
<tr>
<td>Geology 5, 150</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Mineral Eng. 100</td>
<td>3</td>
<td>..</td>
</tr>
<tr>
<td>†Petroleum Eng. 110 or Mechanical Eng. 105A</td>
<td>3</td>
<td>..</td>
</tr>
<tr>
<td>†Petroleum Eng. 110L</td>
<td>1</td>
<td>..</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>16-17</td>
</tr>
</tbody>
</table>

### Senior Year

<table>
<thead>
<tr>
<th>Units</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geology 103, 102B</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Mineral Eng. 101</td>
<td>3</td>
<td>..</td>
</tr>
<tr>
<td>†Nontechnical studies</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>‡Restricted electives</td>
<td>6-7</td>
<td>8</td>
</tr>
<tr>
<td>Geological Eng. 103</td>
<td>..</td>
<td>3</td>
</tr>
<tr>
<td>Mineral Eng. 101</td>
<td>..</td>
<td>3</td>
</tr>
<tr>
<td>Mineral Eng. 102, 102L</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Mining 103</td>
<td>..</td>
<td>3</td>
</tr>
<tr>
<td>Mining 104</td>
<td>..</td>
<td>3</td>
</tr>
<tr>
<td>Metallurgy 104</td>
<td>3</td>
<td>..</td>
</tr>
<tr>
<td>†Nontechnical studies</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16-17</td>
<td>15</td>
</tr>
<tr>
<td>†Petroleum Engineering 110 and 110L for petroleum engineering; Mechanical Engineering 105A for mining engineering. Geological engineers may take either Mechanical Engineering 105A or Petroleum Engineering 110 and 110L.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‡ For selection of nontechnical studies, see page 94.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| ‡ Students must take sufficient restricted electives to make 65 units during the Upper Division course of study. Suggested restricted electives for students interested in mineral exploration are: Geology 106A, 106B, Geological Engineering 102, 103, Mining 103, 105, 106. Students interested in geological engineering as applied to construction and other engineering problems should take Geological Engineering 100 and 101, Civil Engineering 198 (Soil and foundation engineering for geological engineers), plus 7 or 8
Fifth (Graduate) Year

Programs of study in mining, petroleum, and geological engineering may involve either four or five years. B.S. degrees are awarded after four years but those qualified for advanced work may continue and receive a Master of Science or Master of Engineering degree at the end of the fifth year. High-level scientific and professional programs are available, and the student should choose one of these areas before selecting technical electives in the senior year. In general, the demand for professionally trained engineers will exceed the demand for scientific engineers in these fields. Graduates receiving either master's degree are in greater demand and receive substantially higher starting salaries than do the four-year graduates.

Programs of study leading to doctoral degrees in engineering science in the fields of geological, mining, and petroleum engineering and in mineral exploration are also available. Properly qualified students with the bachelor degree in engineering, geology, physics, chemistry, or mathematics are eligible to work for such degrees.

Process Engineering

130 units

(For the courses of the lower division, see page 94)

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 110A–110B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Civil Eng. 130</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Electrical Eng. 101</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Electrical Eng. 102</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Engineering 102, 103</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Mechanical Eng. 112</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Mechanical Eng. 105A</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Nontechnical studies</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>†Restricted elective</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Eng. 100</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Eng. 120 or Mineral Eng.</td>
<td>101</td>
<td>2</td>
</tr>
<tr>
<td>Mechanical Eng. 151</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Mechanical Eng. 154</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Mechanical Eng. 164</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Nontechnical studies</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>†Restricted electives</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Fifth (Graduate) Year

Students who qualify for admission to the Graduate Division and who plan to engage in design, development, research, or teaching, may wish to undertake a fifth-year program leading to the master's degree. For advanced study in process metallurgy, the graduate program of study includes advanced units of restricted electives, such as Civil Engineering 181, Geology 111A, 111B, Geological Engineering 102, 103, and Mining 103, 104, 106. To be selected from such courses as the following: Geological Engineering 102, Metallurgy 101, Engineering 169; Civil Engineering 131, 181; Geology 101, 102B-102C, 106A, 106B, 111A, 116, 122A, 122B, and Industrial Engineering 161.

†† Any upper division course in physics, chemistry, chemical engineering, mathematics, geology, or engineering.
† Suitable upper division courses in civil, electrical, and mechanical engineering, chemical engineering, or metallurgy, approved by counselor, 3 units of which must be design.
§ For selection of nontechnical studies, see page 94.
courses in metal processing and basic courses in chemical engineering. For advanced study in the field of mechanical design of equipment, the graduate program includes courses in instrumentation and automatic controls, corrosion, selection of materials and other related fields.

**Naval Architecture**

*Fifth (Graduate) Year*

This graduate program is intended for students who may have majored in civil or mechanical engineering, or related fields, for the bachelor's degree as well as those who have majored in naval architecture. The following courses (or equivalent) are required. Those marked **, totaling 15 units must be taken as part of the graduate program at Berkeley, and at least 9 additional units must be taken to make up the minimum 24 units required for all programs leading to the Master of Engineering degree. The student may offer these 9 units from the required list if needed to make up undergraduate deficiencies.

Many mechanical or civil engineers will have completed all the required courses as part of their undergraduate programs except those undergraduate professional courses in naval architecture, marked *, which total 9 units. Such students will therefore be able to complete the requirements in two semesters of graduate work.

### Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Professional Upper Division Courses (9 units)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Naval Architecture 151. Statics of Naval Architecture ...............</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>* Naval Architecture 152. Dynamics of Naval Architecture .............</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>* Naval Architecture 154. Applied Naval Architecture ..................</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>2) Related Upper Division and Graduate Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aeronautical Sciences 162. Elementary Hydrodynamics ....................</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Civil Engineering 230B. Advanced Mechanics of Materials ................</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics 122. Advanced Calculus ......................................</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Engineering 230. Engineering Analysis ...................................</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>3) Professional Graduate Courses (15 units)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>** Naval Architecture 241A–241B. Hydrodynamics of Ships ...............</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>** Naval Architecture 299. Individual Study or Research ...............</td>
<td>-</td>
<td>3</td>
</tr>
</tbody>
</table>

Students whose undergraduate programs included the required undergraduate courses may take other work related to the major to make up the additional 9 units. Additional seminar courses are organized each year for graduate students in naval architecture. Examples of such seminars are:

<table>
<thead>
<tr>
<th>Seminar Course</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Surface Hydrodynamics</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Propeller Theory</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ship Vibrations</td>
<td>3</td>
<td>-</td>
</tr>
</tbody>
</table>

Students whose undergraduate preparation was primarily in physics or mathematics and who do not intend to become professional naval architects but who are interested in preparing for research in the hydrodynamics of ships, seaplanes, etc., may elect to follow a related program of study in Naval Hydrodynamics, leading to the degree of M.S. in engineering science. The specific selection of courses for such students will be based upon the individual's background.
Nuclear Engineering

Fifth (Graduate) Year

A program of study in nuclear engineering is directed primarily to graduate instruction and research. A bachelor's degree in engineering, physics, chemistry or mathematics is prerequisite. Required preparation in upper division work is differential equations, thermodynamics, mechanics, and electric circuits. Course work recommended as electives in various undergraduate curricula includes nuclear physics, heat transfer, fluid mechanics, advanced calculus, numerical analysis, automatic controls, analog and digital computing, advanced thermodynamics, and physical metallurgy.

Students who qualify for admission to the Graduate Division may undertake the following typical study program to complete requirements for a master's degree:

- Nuclear Reactor Theory .......................................................... (3–2) Yr.
- Nuclear Reactor Engineering ............................................... (3) II
- Nuclear Reactor Materials ...................................................... (2–2) Yr.
- Nuclear Engineering Laboratory ......................................... (1–1) Yr.
- Nuclear Reactor Design .......................................................... (2) II
- Automatic Controls .................................................................. (3) II
- Advanced Mathematical Analysis ....................................... (3) I
- Seminar on Power Cycles ...................................................... (2) I
- Nuclear Physics ........................................................................ (3) I or II

Students interested in a Ph.D. degree should consult the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION, for degree requirements, as well as discuss a program of study with the graduate adviser in nuclear engineering.

Graduate Study in Engineering

The principal objectives of graduate study in engineering are:

1. To provide the student with the scientific and professional knowledge in his field of interest.
2. To develop in the student the ability to formulate solutions to new and complex problems in his field.

These objectives are accomplished by flexible programs of study designed to meet individual student needs. These programs include formal courses, special group seminars, individual study and research under faculty supervision, and participation in group research projects.

Completion of appropriate programs of study leads to the degrees of Master of Science and Doctor of Philosophy for study in the engineering sciences and Master of Engineering and Doctor of Engineering for professional study.

Courses offered by the Department of Engineering and other departments of the University are described in the University bulletin entitled ANNOUNCEMENT OF COURSES, DEPARTMENTS AT BERKELEY.

For further details regarding graduate programs the student should consult the ANNOUNCEMENT OF THE COLLEGES OF ENGINEERING, and the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION.

† For students interested in research and advanced theoretical work, a thesis will be generally recommended.
‡ Physics 124 or Physics 129A–B or Chemistry 123 is required. It is recommended that students complete this requirement as part of senior electives.
The Institute of Transportation and Traffic Engineering

In conjunction with the Institute of Transportation and Traffic Engineering various offerings and research facilities are available in the fields of highway, railroad, and air transport engineering. The undergraduate work is formally offered in civil engineering in the form of a required course in highway engineering and elective courses in transportation engineering. The elective courses in transportation engineering include traffic engineering, route surveying, and highway materials. The graduate work offered through the Division of Transportation Engineering includes courses in highway planning, design and economics, airport planning, design and economics, traffic engineering, highway and airport pavements, materials and structures, seminars in urban transportation planning, bituminous materials, highway administration, financing highways and airports, and transportation statistics. Available in other departments of the University are courses pertinent to advanced study in the field, such as transportation economics, public administration, statistics, and city and regional planning.

The Cooperative Work-Study Program in Engineering

Under the cooperative work-study program an opportunity is provided for students to obtain work experience in industry while completing their undergraduate work. This program requires five years for completion of the program for the B.S. degree, as the students must complete three work periods of six months each prior to the beginning of the senior year.

Under the cooperative program the students complete their first year in the normal manner. During the following three years, they alternately work in industry six months and attend the University six months. In this three-year period the students complete the normal second- and third-year courses and obtain one and one-half years of work experience. Following the three-year cooperative period, the fourth year of study is completed without interruption.

Junior college transfer students may enter the program at the end of the first semester on the campus. These students work only two periods; the senior year is spent full time on the campus.

Students are selected upon the basis of their grades achieved in the first year and upon an interview. During the work periods they are not registered in the University but are under the guidance of the Dean of the College of Engineering. They are regular employees of the companies for which they are working. All jobs are regular ones, and normal compensation is received for the work being done. Students normally work all of the three periods at one company to which each has been assigned. Students start the first work period at jobs commensurate with their abilities, progressing to more advanced work later.

Students interested in the program should apply at the cooperative work study office to arrange for an interview.

SCHOOL OF BUSINESS ADMINISTRATION

The School of Business Administration offers undergraduate curricula leading to the degree of Bachelor of Science. (For graduate work, see statement of the Graduate School of Business Administration on page 109.)

Admission.—To be admitted to the School, students must have attained at least junior standing or equivalent and at least a C average in one of the colleges of the University of California, or the equivalent elsewhere. Curriculum as well as unit requirements must be fulfilled.

Preparation.—An organized program of work fulfilling the requirements...
for admission to junior standing in any of the colleges of the University (except the College of Letters and Science. See requirements listed below affecting students entering from the College of Letters and Science) will provide sound preparation for work in the School. Students may, if they prefer, elect to take their lower division work in the technical colleges. For instance, those looking forward to employment in the agricultural industries or in business based closely upon these industries, might well take their lower division work in the College of Agriculture. Likewise, those wishing to work in the technical aspects of manufacturing or in industrial management could profitably spend their first two years in the College of Engineering. In general, students should choose that lower division preparation which is most closely related to the particular field and division of business administration they wish to enter.

Students entering the School of Business Administration through the College of Letters and Science may offer, until September, 1960, in place of the full language requirement 12 units of not more than two languages and English 1A or Speech 1A; or 8 units of one language and English 1A–1B or Speech 1A–1B or a combination of English 1A and Speech 1A. Students using this plan may not offer the English or speech courses used in substitution for the foreign language in partial satisfaction of the group (e) requirement as set forth by the College of Letters and Science (see page 60).

Beginning September, 1960, students entering the School through the College of Letters and Science must meet the following entrance requirements for the School of Business Administration:

1. 57 or more units
2. 12 units in one foreign language
3. English 1A–1B
4. 12 units in each of the following: social science, natural science, humanities (see statement of College of Letters and Science for list of courses acceptable in each group)
5. Specific course requirements listed on page 108.

It is highly desirable for candidates for admission to the School to complete the lower division prerequisites prior to entrance (see below). However, it is permissible to postpone 6 units of this work until after admission to the School of Business Administration. In addition to the minimum specific requirements, introductory work in economic geography and economic history is highly recommended.

The Requirements for the Degree of Bachelor of Science

The requirements for the degree of Bachelor of Science are intended to provide for all students not only a broad knowledge of the background and chief functions of modern business enterprise, but also elementary training in the use of the professional tools of accounting, statistics, and economic analysis. Since many students are unable to decide upon the specific field or position for which they wish to train, and since some shift into positions other than those anticipated, it is highly important that all have the common basis of fundamental training. On this foundation they can readily build for specific types of needs. But students are normally expected to begin to specialize by electing a field of emphasis of 9 units beyond the introductory course in one field (see below). Under the advisory procedure of the School, fields of emphasis may be approved in departments other than those listed below if the total program of the student is soundly conceived in terms of his future interests and needs. It is hoped that some students will wish to propose programs integrating work in other fields of training, such as agricultural economics, public administration, and mechanical engineering (see below).

In order to qualify for the degree of Bachelor of Science in the School, the student must have received 120 units of credit with at least a C average.
All candidates for the degree of Bachelor of Science entering the School of Business Administration after attendance at other colleges or schools of this University or other institutions, with senior standing at the time of admission, are required to have been enrolled during the senior or final year in resident courses of instruction in the School of Business Administration (Berkeley). At least 24 units (12 units each semester) must be completed in this period. It is permissible to offer 12 units completed in two summer sessions of the same year as equivalent to one semester, but the student must complete in resident instruction at least one regular semester of his senior year. The candidate shall have maintained at least a C average in all upper division courses in business administration and economics taken in residence at the University of California in satisfaction of the requirements for the degree of Bachelor of Science in business administration.

Below are listed the specific requirements for the degree of Bachelor of Science. For further information see the Announcement of the School of Business Administration.

I. Prerequisite Courses:
A. Required:
   Economics 1A–1B (Elements of Economics) ......................... 6
   Economics 2 (Economic Statistics) ......................................... 4
   or Statistics 2 (Introduction to Statistical Methods) ... 3
   One course chosen from the following:
      Mathematics 3A (Analytic Geometry and Calculus)
      Mathematics 3R (Analytic Geometry and Calculus)
      Mathematics 16A (Analytic Geometry and Calculus) ... 3
B. Recommended:
   Geography 5A–5B (Economic Geography) ............................. 6
   (Required of all those specializing in foreign trade)
   Economics 10 (Economic History) ........................................... 3

II. Basic Courses:
A. Required of all:
   American History and American Institutions ......................... 0
   Business Administration 1A–1B (Principles of Accounting) ................. 6
   Business Administration 18 (Business Law) ......................... 3
   Business Administration 100 (Economics of Enterprise) ... 3
   Business Administration 101 (Business Fluctuations and Forecasting) ... 3
   Business Administration 105 (Law of Business Organization and Regulation) or 109 (Law of Negotiable Instruments and Security Devices) ................. 3
   Business Administration 131 (Corporation Finance) ............ 3
   Business Administration 140 (Production Organization and Management) ........................................... 3
   Business Administration 150 (Industrial Relations) ....... 3
   Business Administration 160 (Marketing) ................................. 3

   Basic Courses: Total.... 30

B. A semester course from one of the following courses:
   Business Administration 135 (Economics of Insurance)
   Business Administration 170 (Transport Economics)
   Business Administration 180 (Introduction to Real Estate and Urban Land Economics)
   Economics 135 (Money and Banking)
   Economics 190A (International Economic Relations) .... 3
III. Field of Emphasis:

Nine units beyond the basic course or courses in one field...  9

The following fields of study are approved: accounting, administration and policy, banking and finance, business statistics, foreign trade, industrial management, insurance, actuarial science, marketing (including retailing, wholesaling, sales management, industrial purchasing, advertising, and cooperative marketing), industrial relations and personnel management, production management, real estate and urban land economics, transportation and traffic management, and public utilities.

Students who do not wish to elect one of the above fields of emphasis may receive permission to (1) fulfill the requirements of the major in the Department of Economics, (2) elect special programs with the permission of the Dean (such programs may be in other fields; for example, agricultural economics, civil engineering, electrical engineering, forestry, geography, nutrition and home economics, journalism, mathematics, mechanical engineering, political science, psychology, and public administration).

It will be noted that the courses listed above under II and III total 42 units. In cases where some requirements are fulfilled by 2-unit courses (e.g., by summer session courses), thus reducing the total number of units in the basic courses and field of emphasis, additional upper division courses must be completed in business administration or economics or, with the permission of the Dean of the School, in closely related subjects, to raise the total to at least 41 units.

Honors

Honors at Graduation.—Students whose work has been of marked excellence receive honors at graduation.

GRADUATE SCHOOL OF BUSINESS ADMINISTRATION

The Graduate School of Business Administration, established in August, 1955, offers curricula leading to the degree of Master of Business Administration. The programs of work for this degree afford opportunity for advanced and specialized training based either upon the fundamental curriculum for the degree of Bachelor of Science or upon the broader background of the Bachelor of Arts degree.

Admission to the Graduate School requires evidence of superior scholarship and an acceptable bachelor's degree. In evaluating applications from mature persons, demonstrated capacity for leadership and for intellectual activity of a high order will be taken into account.

The master's degree will require a minimum residence of two full semesters for those with a Bachelor of Science degree in business administration from the University of California, or its equivalent from some other institution. A minimum of four semesters is necessary for those with no previous work of any kind in business administration. In addition, a B average in all work undertaken since receipt of the bachelor's degree is required, as well as a comprehensive examination at the end of the program of study.

A special group of core courses is available, restricted to graduate students, for those with little or no background in business administration. This special group covers the first two semesters of work and includes the subject matter of the basic work in quantitative methods in business (economic analysis, statistics, accounting), in business law, in finance, in marketing, in production, and in industrial relations.

Those students who wish to prepare for high-level research positions in business and government, or for academic careers in schools of business or commerce, may pursue a program leading to the degree of Doctor of Philosophy in business administration.
For detailed information concerning the requirements, see the Announcement of the Graduate School of Business Administration and the Announcement of the Graduate Division, Northern Section.

**SCHOOL OF CRIMINOLOGY**

The School of Criminology offers undergraduate and graduate curricula leading to the degrees of Bachelor of Arts, Bachelor of Science, and Master of Criminology.

**Three Programs of Study.**—Three distinct fields of study are provided. Two of them deal with the application of the social sciences to (a) law enforcement and (b) correctional work. They lead to the degree of Bachelor of Arts. The third is concerned primarily with the application of the natural sciences to law enforcement and crime investigation and leads to the degree of Bachelor of Science. Completeness of training in either field requires a combination of social and natural sciences with emphasis on one or the other.

All students in law enforcement and correctional work are required to complete the basic courses listed below, and students in criminalistics over half of them. These courses provide a common basis of fundamental training on which the student may build to meet their specific interests and needs. At the time of entrance, students are expected to elect as their major field of interest either law enforcement, correctional work, or criminalistics. Students are urged to take first aid, wrestling, boxing, and judo.

**Admission.**—To be admitted to the School, students must have attained upper division standing and at least a grade C average in the College of Letters and Science or the equivalent elsewhere. This work shall have been directed toward the completion of the first requirement listed below for the bachelor's degrees. Evidence of superior scholarship and an acceptable bachelor's degree are required for admission to the School of Criminology in graduate standing.

**Requirements for the Bachelor's Degree**

The bachelor's degrees in the School of Criminology are granted upon the following conditions:

1. The student shall have satisfied the following requirements, which are normally completed before admission to the School:
   
   (a) **General University Requirements.**
       *American History and Institutions requirement.*
       *Subject C requirement.*
       Military science and tactics requirement.
   
   (b) **English Reading and Composition.** A year course, normally completed in the freshman year, to develop facility in English reading and composition.
   
   (c) **Foreign Language.** The equivalent of 8 units in one modern foreign language, or 12 units in either Latin or two modern foreign languages.
   
   (d) **Humanities.** Twelve units of work in the Humanities, in courses acceptable for this purpose to the College of Letters and Science, are required of all criminology students except that those who major in criminalistics are required to complete only 3 units of such work.
   
   (e) **Social Science.** Political Science 1 and 2; Psychology 1A and 1B or 3 or 33; and Social Science 1A–1B. Students who major in criminalistics may meet this requirement by completing Psychology 1A and Social Science 1A–1B.

* Subject C requirement shall become effective for students admitted fall semester, 1960.
School of Criminology

(f) A total of 12 units of Natural Science courses acceptable for this purpose to the College of Letters and Science, and including Physiology 1 and a minimum of 3 units in the physical sciences. One course must include 2 units of laboratory work. Criminalistics majors shall have completed Chemistry 1A-1B, 5, 12, 112C; Physics 2A-2B, 3A-3B; and Physiology 1 and 1L.

(g) Statistics 2 or 12, 12 being required of criminalistics majors.

2. The student shall have received at least 120 units of credit with at least a C average and shall have maintained at least a C average in the upper division courses required for his major. At least the final 24 units shall have been completed in the School of Criminology. No credit will be allowed toward the bachelor’s degree for work completed at a junior college after the student has completed 66 units toward the degree.

3. The student shall have been enrolled during the senior or final year of residence in the School of Criminology. It is permissible to offer two Summer Sessions as equivalent to one semester; but in any event the student shall have completed in residence instruction either the fall or spring semester of his senior year.

4. The student who is admitted to senior standing in the School of Criminology on the basis of credit from other institutions, or on the basis of credit from University Extension, University of California, shall have completed in residence in the School of Criminology, subsequent to such admission, at least 18 units of work in upper division courses, including at least 12 units in his major program.

5. The student shall have completed the course of study outlined below.

I. BASIC COURSES (required of all students in law enforcement and correctional work) Units

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criminology 100A-100B (Crime Causation, Prevention, and Correction)</td>
<td>6</td>
</tr>
<tr>
<td>Criminology 101 (Crime Investigation)</td>
<td>2</td>
</tr>
<tr>
<td>†Criminology 103 (Psychological Aspects of Criminology)</td>
<td>3</td>
</tr>
<tr>
<td>†Criminology 105A-105B (Police Administration)</td>
<td>6</td>
</tr>
<tr>
<td>Criminology 115A-115B (Legal Relations Involved in Criminology)</td>
<td>6</td>
</tr>
<tr>
<td>Criminology 161 (Psychiatric Aspects of Criminology)</td>
<td>3</td>
</tr>
<tr>
<td>Criminology 162 (Therapeutic Theories in Preventive Criminology)</td>
<td>3</td>
</tr>
<tr>
<td>Criminology 163 (Interrogation and Detection of Deception).</td>
<td>4</td>
</tr>
</tbody>
</table>

II. MAJORS (Students must complete the courses in one major)

Law Enforcement: Adviser: Mr. O’Neill.

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>†Criminology 107 (Personal Identification)</td>
<td>3</td>
</tr>
<tr>
<td>†Criminology 111 (Physical Evidence)</td>
<td>2</td>
</tr>
<tr>
<td>Criminology 113 (Legal Medicine)</td>
<td>3</td>
</tr>
<tr>
<td>Criminology 171 (Police Planning)</td>
<td>2</td>
</tr>
<tr>
<td>Civil Engineering 179 (Traffic Engineering for Police)</td>
<td>2</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
</tr>
</tbody>
</table>


† Should be taken in the junior year to avoid conflict in senior year.
**Correctional Work:** Adviser: Mr. MacCormick.

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>3</td>
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<tr>
<td>8</td>
</tr>
</tbody>
</table>

- Criminology 182 (Institutional Treatment of the Criminal and Delinquent)
- Criminology 184A–184B (Noninstitutional Treatment of the Criminal and Delinquent)
- Social Welfare 100 (The Field of Social Welfare)
- Electives

**Electives:***
- Agricultural Economics 112A–112B; Anthropology 118, 125A–125B; Business Administration 140; Economics 106A–106B, 113, 121A–121B; Education 100A, 160, 164, 181; Home Economics 142; Nutrition 121A; Political Science 102, 103A, 104A, 105A, 181, 183; Psychology 112, 113N, 141, 145, 165A–165B, 185; Public Health 125, 131, 135; Social Welfare 102, 201; Sociology and Social Institutions 115, 130, 160.

**Criminalistics:** Adviser: Mr. Kirk.

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
<tr>
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<tr>
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<tr>
<td>4</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

- Criminology 100A (Crime Causation, Prevention, and Correction)
- Criminology 101 (Crime Investigation)
- Criminology 103 (Psychological Aspects of Criminology)
- Criminology 105B (Police Administration)
- Criminology 107 (Personal Identification)
- Criminology 111 (Physical Evidence)
- Criminology 113 (Legal Medicine)
- Criminology 115A–115B (Legal Relations Involved in Criminology)
- Criminology 151A–151B (Microscopy and Microchemistry of Physical Evidence)
- Criminology 153A–153B (Quantitative and Instrumental Techniques)
- Criminology 155 (Comparative Microscopy)
- Biochemistry 102 (A Brief Survey of the Principles of Biochemistry)
- Forestry 114 (Wood Technology)
- Public Health 172 (Industrial Toxicology)
- Zoology 119A–119B (Optics and Metrology in Biology)

**Recommended:** Botany 108; Chemistry 105, 109, 115, 125; Criminology 157, 161 and 163; Geology 103, 104A–104B; Mathematics 3A–3B, 3R; Physiology 100A–100B; Speech 110A–110B; Statistics 113; Zoology 114.

**Precriminology Curricula.**

The following programs of study are suggested to students preparing to enter the School of Criminology. Some of these courses may be completed after admission to the school.

**Social Science Program Counselor:** Mr. O'Neill.

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units</td>
<td>Units</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
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<td>4</td>
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<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

1 See first footnote (1) on next page.
The following programs of study are suggested to criminology students.

**LAW ENFORCEMENT***

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Senior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criminology 100A–100B</td>
<td>Criminology 115A–115B</td>
</tr>
<tr>
<td>Criminology 101</td>
<td>Criminology 113</td>
</tr>
<tr>
<td>Criminology 103</td>
<td>Criminology 163</td>
</tr>
<tr>
<td>Criminology 105A–105B</td>
<td>Criminology 171</td>
</tr>
<tr>
<td>Criminology 107</td>
<td>Civil Engineering 179</td>
</tr>
<tr>
<td>Criminology 111</td>
<td></td>
</tr>
<tr>
<td>Criminology 161</td>
<td></td>
</tr>
<tr>
<td>Criminology 162</td>
<td></td>
</tr>
</tbody>
</table>

**CORRECTIONAL WORK***

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Senior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criminology 100A–100B</td>
<td>Criminology 115A–115B</td>
</tr>
<tr>
<td>Criminology 101</td>
<td>Criminology 163</td>
</tr>
<tr>
<td>Criminology 103</td>
<td>Criminology 182</td>
</tr>
<tr>
<td>Criminology 105A–105B</td>
<td>Criminology 184A–184B</td>
</tr>
<tr>
<td>Criminology 161</td>
<td>Social Welfare 100</td>
</tr>
<tr>
<td>Criminology 162</td>
<td></td>
</tr>
</tbody>
</table>

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1. Foreign language: the School of Criminology requirement is 8 units of credit in one modern foreign language.
2. Uncompleted required courses in the humanities, natural sciences, and electives may be taken in the junior and senior years.
### Requirements of Colleges, Schools, and Curricula

#### Criminalistics

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Senior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criminology 100A</td>
<td>Criminology 103</td>
</tr>
<tr>
<td>Criminology 101</td>
<td>Criminology 105B</td>
</tr>
<tr>
<td>Criminology 107</td>
<td>Criminology 115A-115B</td>
</tr>
<tr>
<td>Criminology 111</td>
<td>Criminology 153A-153B</td>
</tr>
<tr>
<td>Criminology 113</td>
<td>Forestry 114</td>
</tr>
<tr>
<td>Criminology 151A-151B</td>
<td>Public Health 172</td>
</tr>
<tr>
<td>Biochemistry 102</td>
<td></td>
</tr>
<tr>
<td>Zoology 119A-119B</td>
<td></td>
</tr>
</tbody>
</table>

**Honors at Graduation.**—Students whose work has been of marked excellence receive honors at graduation.

#### The Degree of Master of Criminology

Opportunity is offered for graduate study in criminology leading to the degree of Master of Criminology. Advancement to candidacy presupposes the completion of undergraduate requirements in criminology equivalent to those prescribed at the University of California. Except for making up deficiencies in the undergraduate requirements, the graduate student's program may be planned largely to meet his individual needs and interests. Students who have completed the work for the bachelor's degree in the School of Criminology should be able to complete the requirements for the degree of Master of Criminology in one year.

#### SCHOOL OF DENTISTRY

The School of Dentistry offers two curricula, leading to the degree of Bachelor of Science and to the degree of Doctor of Dental Surgery. The dental program is taught in a period of eight semesters. The student has the option, at the close of the second semester in the dental school, of registering in either one of two major curricula: (1) restorative dentistry, or (2) orthodontics. At the end of the sophomore year (fourth semester), a selected small group of students may enter the honors curriculum, which is designed to train outstanding students in the fields of dental research and teaching. In addition to these, there is a curriculum for the training of dental hygienists, leading to the degree of Bachelor of Science.

Classes are admitted to the School of Dentistry once a year, in September. Applications for admission in September, 1960, may be filed between January 1, 1959, and December 31, 1959. All transcripts of record must be filed by the deadline date. For further information, write to the office of the Dean of the School of Dentistry. Freshman students who plan to apply for admission in 1961 may file preapplication declaration forms as soon as they have completed their first semester of college work, provided they have a B average or better, but not later than March 1, 1960.

Upon the satisfactory completion of six semesters, the dental student will be eligible for the Bachelor of Science degree, and for the Doctor of Dental Surgery degree upon the completion of two additional semesters. The Bachelor of Science degree will be granted the student in the dental hygiene curriculum at the end of the fourth semester.

The dental student who wishes to qualify for the degree of Bachelor of Science in addition to the degree of Doctor of Dental Surgery must complete satisfactorily a special project and thesis in the field of his major interest under the supervision of a faculty committee, and receive passing grades in 4 units of special instruction selected by the committee.
The School of Dentistry also offers a graduate program leading to the degree of Master of Science in Dentistry, and Master of Dental Surgery.

**Admission to Dental Curricula**

All applicants for admission to the dental curricula must have completed at least 60 units of college work with a scholarship average satisfactory to the Admissions Committee, including the requirements (2) to (5) (listed below). Students who have attended the University of California must have a C average or better in work undertaken in the University. In addition, all applicants must take a performance test, designed to test manual dexterity. This test must be taken on the San Francisco campus, and is given during the Christmas recess and during the period between the fall and spring semesters. A third test is given during the month of June but is limited to preapplicants for admission in 1961, applicants for admission in advanced standing, and in special cases to persons taking the test for predictive purposes. The dental aptitude test of the American Dental Association is also a requirement for admission. This test is usually given in October, January, and April. Applicants for admission to the School of Dentistry must take one of the two first tests. For further information regarding this test, write the Dean's Office, School of Dentistry, 630 Medical Sciences Building, University of California Medical Center, San Francisco 22. The School of Dentistry reserves the right to limit enrollment on the basis of scholarship, results of the performance and aptitude tests or other tests and recommendations. At the present time, because of limited facilities and the large number of applications, it is not possible for the School of Dentistry to act favorably upon applications from persons who have not had the major portion of their high school and preprofessional education and residence in California or in one of the far western states. Exception to this is made only in the cases of persons who have been residents of the State of California for one year prior to the date on which they file application. Students from the far western states without dental schools who are interested in certification for education benefits under the Western Interstate Commission for Higher Education program may write to the Dean of the School of Dentistry for a pamphlet describing the program. The student will find himself more adequately prepared for the dental curricula if he has taken in high school the following subjects: English, 3 units; history, 1 unit; mathematics, 3 units (algebra, plane geometry, and trigonometry); chemistry, 1 unit; physics, 1 unit; foreign language, 4 units in one foreign language.

**Requirements for First and Second Years**

(1) General University requirements*

Subject A (see page 34). .......................................................... Units
Military Science† ........................................................................ 8
(2) English or Speech† (1A–1B) .................................................... 6
(3) Science
   (a) Chemistry
      Inorganic (1A–1B) ............................................................ 10
      Organic lecture (8) ......................................................... 3
      Organic laboratory (9) or quantitative analysis (5) ........... 3
   (b) Physics with laboratory (2A–2B and 3A–3B or 4A–4B) 6–8

* The requirement of American History and American Institutions is also prerequisite to the bachelor's degree, page 35. Although this requirement may be satisfied while enrolled in the School of Dentistry, it is preferable that it be completed in the preclinical program.
† Course numbers in parentheses refer to courses given in the departments at Berkeley.
‡ Applies only to students who complete the first two years of college work in the University of California.
Requirements of Colleges, Schools, and Curricula

Units

(c) Biology, including one full semester of vertebrate zoology, with laboratory (Zoology 1A-1B) ................................... 8

(4) Trigonometry (Mathematics C) ........................................................ 3
It is strongly recommended that this requirement be completed in high school.

(5) Twelve units in one foreign language (may be satisfied from high school as follows: 4 units for the first two years, 4 units for each year thereafter) ...................................................................... 12

(6) Twelve units in social sciences and humanities ................................ 12

Admission to the Dental Hygiene Curriculum
(Open to Women Only)

Applicants for admission to the dental hygiene curriculum must have completed at least 60 units of college work with a scholarship average satisfactory to the Admissions Committee, including the requirements (2) to (9) listed below. Students who have attended the University of California must have a C average or better in work undertaken in the University. The School of Dentistry reserves the right to limit enrollment if applications exceed the available facilities and to require interviews and aptitude tests if they are necessary in the selection of a class. All applicants will be required to take the American Dental Hygiene Association Aptitude Test. The student will find herself more adequately prepared if she has taken in high school the following subjects: English, 3 units; history, 1 unit; mathematics, 2 units (algebra and plane geometry); chemistry, 1 unit; physics, 1 unit; foreign language, 4 units in one foreign language.

(1) General University requirements:
Subject A (Examination in English composition, see page 34).
American History and American Institutions (required for the bachelor's degree). The examination in American History and American Institutions may be taken in the School of Dentistry, but it is preferable to satisfy the requirement in the predental hygiene program. See page 35).

Units

(2) English or speech† (1A–1B) .......................................................... 6
(3) Chemistry (1A, 8) .......................................................................... 8
(4) Biology (Zoology 1A–1B) .............................................................. 6–8
(5) Twelve units in one foreign language (may be satisfied from high school as follows: 4 units for the first two years, 4 units for each year thereafter) ............................................. 12
(6) Psychology (1A–33) ....................................................................... 6
(7) Humanities ......................................................................................... 12
(8) Social Science .............................................................................. 12
(9) Electives ............................................................................................. 10–0

SCHOOL OF EDUCATION

The School of Education offers professional courses intended for students preparing for educational service in elementary, junior, and senior high schools, and colleges; for graduate students who are fitting themselves for supervisory or administrative positions in public schools; and for students who propose to engage in school administration, to teach in state colleges or in university departments of education, or to carry on research work in the field of education.

† Course numbers in parentheses are courses given in the departments at Berkeley.
GENERAL REQUIREMENTS IN TEACHER PLACEMENT

The student must satisfy the following general requirements to complete a curriculum leading to a recommendation for a teaching credential.

Scholarship.—The School of Education will admit to candidacy for recommendation only those students who have maintained a grade-point average of not lower than 2.5 in all studies undertaken since reaching junior standing. Students with grade-point shortages may apply to the Associate Director of Supervised Teaching for consideration and advice.

Oral English.—The student must prove that he has a command of spoken English adequate to the purposes of instruction. He may satisfy this requirement by examination, by completing suitable courses in the Department of Speech, or by any other test satisfactory to the Committee on Oral English.

Health Certificate.—The student must take a medical examination and obtain a satisfactory certificate from the University Physician.

Citizenship.—Each applicant for a credential is required by the State Department of Education to be a citizen of the United States. Noncitizens who have filed their first papers are eligible to apply for short-term credentials. Failure to complete the naturalization process within six months of the date of eligibility will result in the revocation of the credential. After a foreign student has become naturalized he may apply for a long-term credential.

Oath of Allegiance.—The State Department of Education also requires each applicant for a credential to take an oath of allegiance to the United States and to submit identification cards showing fingerprints.

The Constitution of the United States.—The State Department of Education requires the completion of a course on the provisions and principles of the Constitution of the United States. This requirement may be satisfied by completing one of the following sequences: History 17A-17B, 171A-171B, 172A-172B; Political Science 157A-157B; or one of the following courses: Political Science 1, 100A, 113.

Approval of Schedules.—For information concerning credential requirements, the student should consult a counselor in the Student Personnel Service, 103 Haviland Hall, as early as possible in his academic career.

Each prospective candidate for a teaching credential must file an application for admission to graduate standing with the Dean of the Graduate Division, 102 Sproul Hall, at least eight weeks before the opening of the semester in which he plans to enroll as a graduate student. This application must be accompanied by a bank draft or money order for the $5 application fee, which is payable to The Regents of the University of California. The transferred graduate student must furnish a transcript of his college or university work both to the Dean of the Graduate Division and to the Dean of the School of Education when he files his office record card. On the basis of transferred records, the Dean of the Graduate Division issues a statement of the student’s official status. The student must present this statement when he files his office record card. His study list cannot be approved until the latter has been filed.

Application for Credential and for Supervised Teaching.—Detailed schedules of procedures may be obtained in 103 Haviland Hall. Applications for supervised teaching (Education 320A, 320C, 323, 324, 330A, and 330C) must be made in 103 Haviland Hall not later than November 2, 1959, for the spring semester, 1960, and not later than April 4, 1960, for the fall semester, 1960. Enrollment is limited to available facilities.

Students planning to enroll in supervised teaching (Education 320A, 320C, 320E, 323, 324, and 330C) should note that these are extra-session courses, in which instruction begins with the beginning of the semester in the public

* These requirements may be satisfied by passing the examination in American History and American Institutions. See statement on page 35 concerning this requirement.
schools and ends at the close of the semester in the public schools. In the fall semester, 1959, instruction in these courses in most cases will begin on September 8, 1959, and end on January 29, 1960; in the spring semester in most cases, it begins on February 1, 1960, and ends on June 10, 1960.

Application to the State Department of Education.—The application to the State Department of Education for a teaching credential must be accompanied by a health certificate; duplicate personal identification (fingerprint) cards; and money order, certified check, or cashier's check for $4, the application fee, made payable to the State Department of Education.

Renewal of Provisional Teaching Credentials.—Teachers who hold provisional credentials in California may wish to use credit obtained in Summer Session or University Extension classes in applying for the renewal of their credentials through the University of California. To do this they must not only enroll in Summer Session or University Extension classes, but must also be declared eligible for admission as regular students. This applies only to undergraduates. Application should be made to the Director of Admissions, 127 Sproul Hall.

Teachers who plan to renew provisional credentials should consult the Student Personnel Service of the Department of Education, 103 Haviland Hall, in planning programs to meet credential requirements.

The General Secondary Credential

SPECIFIC REQUIREMENTS

Counselors.—Students may consult one of the following counselors: Mr. Squire, 304 Haviland Hall; Mr. Hoge, 304 Haviland Hall; Mr. Loban, 108 Haviland Hall; Mr. Lund, 110 Haviland Hall; Mr. Schevill, 304 Haviland Hall; Mr. Webster, 304 Haviland Hall.

Requirements.—The candidate for the recommendation for this credential must satisfy the following specific requirements, in addition to the general requirements described beginning on page 117.

1. He must spend two graduate semesters at this University during which he completes a minimum of 24 units of upper division and graduate work with a grade-point average of not lower than 2.75. At least 6 of these units must be in graduate courses, or in upper division courses accepted by the School of Education as substitutes for graduate courses, in the fields of the teaching major or minor, or both. (In order to maintain graduate residence for higher degrees, the student must take at least 4 units in upper division or graduate courses in the semester in which he is enrolled in Education 320A or 320C.)

2. He must complete with a scholarship average of at least two grade points the following 22 units in education (the State Department of Education requires that at least 6 units in education courses be completed in the graduate year):

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education 100A (Learning and the Learner)</td>
<td>4</td>
</tr>
<tr>
<td>Education 100B (The School in American Society)</td>
<td>3</td>
</tr>
<tr>
<td>Education 320A (Supervised Teaching)</td>
<td>3</td>
</tr>
<tr>
<td>Education 320B (Audio-Visual Instruction: Materials and Techniques)</td>
<td>2</td>
</tr>
<tr>
<td>Education 320C (Supervised Teaching)</td>
<td>3</td>
</tr>
<tr>
<td>Education 320E (Professional Methods)</td>
<td>2-4</td>
</tr>
<tr>
<td>Electives in Education</td>
<td>3-5</td>
</tr>
</tbody>
</table>

Total ........................................... 22

The candidate should note the following:

(a) Students are advised to distribute these courses over the junior, senior, and graduate years as follows: Education 100A in the junior or senior
year; Education 100B, and 320B concurrently in the senior year; Education 320A, 320C, and 320E in the graduate year.

(b) Psychology 1A or its equivalent is prerequisite to these courses.

(c) Credit in courses offered in the Department of Education for a teacher's credential may not be obtained by examination.

3. He must complete a teaching major and a teaching minor selected from at least two of the following fields of University studies:

1) Agriculture
2) Art or decorative art
3) Business education
4) English or speech
5) Foreign language (French or German or Italian or Latin or Spanish)
6) Homemaking
7) Librarianship
8) Life science
9) Mathematics
10) Music
11) Physical education
12) Physical science
13) Social studies*

The Teaching Major.—There are two kinds of teaching majors. The first consists of 36 units, of which 18 to 24 units are completed in upper division and/or graduate work, the precise amount to be agreed upon by the School of Education in consultation with the subject representative in the department or departments concerned (ordinarily, 18 units of the teaching major shall be selected from the departmental major for the bachelor's degree). The second consists of a minimum of 36 units of upper division and/or graduate work in two or more related subjects (e.g., social studies), this major being fixed by the School of Education in consultation with the subject representatives of the departments concerned. In addition to the foregoing minimum requirements, the School of Education will prescribe such graduate courses designed for teachers as may be organized by the various departments; and, in agreement with the subject representative, such other courses, either graduate or undergraduate, as may be found necessary, provided the total number of units required for any subject does not exceed 36.

The Teaching Minor.—The teaching minor in any subject consists of not less than 20 units, ordinarily in a department or field of studies other than the teaching major. Not less than 9 units of this total shall consist of upper division and/or graduate courses (except as recommended by the department or departments concerned to the School of Education).

4. He must maintain the following scholarship ratings in the various classifications of this work:

Upper division work: a grade-point average of at least 2.50
Postgraduate work: a grade-point average of at least 2.75
Education courses: a grade-point average of at least 2.00
Work for the major: a grade-point average of at least 2.75
Work for the minor: a grade-point average of at least 2.00

* There is no "social studies" major for the A.B. degree in the College of Letters and Science. An applicant wishing to offer a teaching major in the "social studies" ordinarily would have as his A.B. major some aspect of the social studies, such as history, economics, political science, etc., or a group major which is accepted by a subject representative.

† A combination teaching major and minor may be worked out in certain fields utilizing the basic courses as fundamental to both the teaching major and teaching minor.

‡ For requirements for the teaching majors and teaching minors, consult the Announcement of the School of Education.
The Junior College Credential

Counselor.—Mr. Squire, 304 Haviland Hall.

Requirements.—The candidate for the recommendation for this credential must fulfill the specific requirements listed below, in addition to the general requirements described on page 117.

1. He must complete two semesters of work in residence at this University.
2. He must hold a master's or doctor's degree from this University, or from another institution recognized as equivalent by the Graduate Division, in one of the following fields of study: agriculture, anatomy, anthropology, architecture, art, astronomy, bacteriology, botany, business administration, chemistry, child development, comparative literature, decorative art, economics, engineering, English, forestry, French, geography, geology, German, Greek, history, journalism, nutrition and home economics, Italian, Latin, librarianship, mathematics, mining and metallurgy, music, paleontology, philosophy, physical education, physics, physiology, political science, psychology, sociology and social institutions, Spanish, zoology. The major for the master's or doctor's degree is recognized as the teaching major if it is in one of the above fields.
3. He must complete an approved teaching minor in one of the above fields or in a field chosen from the list of teaching majors for the general secondary credential (page 119).
4. He must complete with a scholarship average not lower than one grade point at least 12 units in education courses, including:

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning and the Learner—Education 100A ......................... 4</td>
</tr>
<tr>
<td>The Junior College—Education 279 ................................. 2</td>
</tr>
<tr>
<td>Supervised Teaching and Professional Methods:</td>
</tr>
<tr>
<td>Education 320B, 324, and 320E, Section 16....................... 8</td>
</tr>
<tr>
<td>Total ............................................................................ 14</td>
</tr>
</tbody>
</table>

5. He must maintain the following scholarship ratings in the various classifications of his work:
   - Upper division work: a grade-point average of at least 2.50
   - Postgraduate work: a grade-point average of at least 2.75
   - Education courses: a grade-point average of at least 2.00
   - Work for the major: a grade-point average of at least 2.75
   - Work for the minor: a grade-point average of at least 2.00

The General Elementary Credential

Counselors.—Mr. Dumas, 106 Haviland Hall; Miss Durkin, 309 Haviland Hall; Mr. Kittell, 314 Haviland Hall; Mr. Bussell, 315 Haviland Hall; Mr. Scott, 314 Haviland Hall.

Requirements.—The candidate for the recommendation for this credential must satisfy the following specific requirements, in addition to the general requirements described on page 117.

1. He must hold a bachelor's degree from one of the academic colleges of this University or its equivalent.
2. He must take one semester of graduate work.
3. He must maintain the following scholarship ratings in the various classifications of his work:
   - Upper division work: a grade-point average of at least 2.50
   - Postgraduate work: a grade-point average of at least 2.50
   - Education courses: a grade-point average of at least 2.00
   - Work for the major: a grade-point average of at least 2.00
   - Work for the minor: a grade-point average of at least 2.00
4. He must complete with a scholarship average of not lower than two grade points the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning and the Learner—Education 100A</td>
<td>4</td>
</tr>
<tr>
<td>The School in American Society—Education 100B</td>
<td>3</td>
</tr>
<tr>
<td>The Elementary School Curriculum—Education 130</td>
<td></td>
</tr>
<tr>
<td>130A. Arithmetic</td>
<td>2</td>
</tr>
<tr>
<td>130B. Art and Music</td>
<td>2</td>
</tr>
<tr>
<td>130C. Reading and the Other Language Arts</td>
<td>3</td>
</tr>
<tr>
<td>130D. Social Studies and Science</td>
<td>3</td>
</tr>
<tr>
<td>Introduction to Elementary Teaching—Education 330A*</td>
<td>2</td>
</tr>
<tr>
<td>Elementary Supervised Teaching—Education 330C*</td>
<td>8</td>
</tr>
<tr>
<td>Methods of Teaching in Elementary School or Junior High School—</td>
<td></td>
</tr>
<tr>
<td>Education 330E</td>
<td>2</td>
</tr>
</tbody>
</table>

5. Recommended Sequence of Courses:

A. Plan I.

Low junior semester: Education 100A. This course is prerequisite to Education 100B, 130A-B-C-D, and 330A.

High junior semester: Education 100B and one of the following—Education 130A-B-C-D.

Low senior semester: two of the following—Education 130A-B-C-D.

High senior semester: one of the following—Education 130A-B-C-D, and Education 330A*, which is prerequisite to Education 330C, 330E.

Graduate semester: Education 330C*, 330E. (One additional course may be added on consent of the adviser.)

B. Plan II.

Students who wish a more extensive liberal arts program may be interested in the following one-year graduate sequence listed below. Prerequisites: A.B. degree including (1) group or department major and minor from approved list (see section 6), and (2) the following courses or their equivalents: Psychology 1A, Decorative Art 6A, Music 10, Education 100A, Education 100B, and one course chosen from the following: Geography 131, History 187A, 187B, 189A, 189B, 181B.

First graduate semester: Physical Education 26 (Games and Dance), Education 130A, B, C, D, Education 330A.

Second graduate semester: Education 330C, Education 330E.

6. He must complete, with a scholarship average of at least 2.00, a major and a minor selected from the following fields of university studies:

(a) Art or decorative art
(b) English and/or speech
(c) Foreign language
(d) Home economics
(e) Mathematics
(f) Music
(g) Natural science
(h) Physical education
(i) Social studies
(j) Psychology, with emphasis on child and clinical psychology.
(k) Group majors chosen from: American civilization, American literature, child development, communications and public policy, East Asiatic studies, international relations, labor and industrial relations, physical education, recreation, sociology, social welfare, wild-

* Application for enrollment in Education 330A and 330C must be filed in 103 Haviland Hall not later than November 2, 1959, for the spring semester, 1960, and not later than April 4, 1960, for the fall semester, 1960.
life conservation. In each case, the major must be approved by the Director of Supervised Teaching.

(1) Regional group majors chosen from: China, Hispanic America, Russia, and Eastern Europe. In each case, the major must be approved by the Director of Supervised Teaching.

(m) Any other major for the A.B. degree in the College of Letters and Science, the content of which is primarily related to the elementary school curriculum, may be accepted, provided that application for acceptance be made to the Committee on Admission to Supervised Teaching and be approved by the committee.

Courses taken in fulfillment of a major cannot be used to satisfy the minor requirement.

7. Other courses required for this credential:
   Psychology 1A, General Psychology (3).
   Decorative Art 6A, Theory of Design and Color (2).
   Physical Education 26, Physical Education Activities (section on Games for Elementary Schools and section on Rhythmical Activities for Elementary Schools) (½ each).
   Music 10, Basic Musicianship (2); Music 27A, Introduction to Musical Literature (2) is strongly recommended.
   History 189A or 189B, History of California (2); both are recommended.

The General Junior High School Credential

Counselors.—Mr. Dumas, 106 Haviland Hall; Miss Durkin, 309 Haviland Hall; Mr. Kittell, 314 Haviland Hall; Mr. Russell, 315 Haviland Hall; Mr. Scott, 314 Haviland Hall.

The student must complete the courses specified above for the General Elementary Credential and in addition complete the following course:

   Junior High School Education—Education 172 .............. 2 units

The candidate for this credential must present a major and a minor in fields commonly taught in junior high schools and must complete an assignment in supervised teaching on the junior high school level.

SCHOOL OF FORESTRY

The School of Forestry offers undergraduate and graduate curricula leading to the degrees of Bachelor of Science, Master of Forestry, and Master of Science.

Admission to the School of Forestry

Candidates for admission to the School of Forestry must qualify in the following ways:

A. Completion of at least 60 units of work in one of the colleges of the University of California, preferably the preforestry curriculum of the College of Agriculture; or admission to the University in junior standing.

In all cases, junior standing requires the completion of 60 units of work acceptable to the Board of Admissions of the University.

B. The candidate must have the following preparation for courses in the curriculum of the School of Forestry:

   * If applicants are otherwise qualified, they may be admitted to the summer field practice course, Forestry 49, and the School of Forestry with certain subject shortages in this list. No listing of specific permissible shortages can be made, as they depend upon the practicability of the student's carrying a full program of required forestry courses concurrently with the removal of shortages in preforestry requirements. This must be determined for each individual case. Nevertheless, shortages of over 12 units in the subjects listed, or a shortage of either general botany or plane surveying, will make it impossible for a student to take Forestry 49 or to be admitted to the School of Forestry. Students desiring further information should communicate with the School of Forestry, University of California, Berkeley 4.
School of Forestry

1. Botany (general botany) ........................................................ 5
   (This requirement is based on Botany 1 as given at Berkeley.)
2. Chemistry (general inorganic, and organic) ....................... 8
3. Engineering (plane surveying) ........................................... 3
4. Economics (elements of economics) ................................... 6
5. Geology (structural) .............................................................. 3
6. Mathematics (beyond trigonometry) ................................. 3
7. Physics (general physics) ...................................................... 6
8. Statistical methods .................................................................. 3
9. Zoology (general biology) ...................................................... 3
10. English or speech ............................................................. 6

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
</tr>
</tbody>
</table>

C. No student with a grade-point average of less than 2.00 (C average) will be admitted.

Requirements for the Degree of Bachelor of Science

Undergraduate students must complete the following requirements for a bachelor's degree:

1. The equivalent of eight semesters' residence, the senior year of which must be spent at this University.
2. One hundred twenty-four units of study with 248 grade points, exclusive of the field practice course, Forestry 49. Thirty-six of the 124 units must be in upper division courses, and at least 60 units must be completed in the School of Forestry. This total of 60 units, however, may be reduced in the case of students admitted to the School with advanced standing.
3. The removal of any deficiencies in the following courses usually taken in high school: mathematics, 3 years, including plane geometry, algebra, and trigonometry; mechanical drawing, one-half year
4. An examination in English composition known as Subject A. Students who fail in this examination are required to take the course in Subject A, which yields no unit credit toward the degree and for which a fee of $35 is charged.
5. The University requirement of American History and American Institutions by examination.
6. The University requirement of 8 units of military science and tactics.
7. The field practice course, Forestry 49, in camp at Meadow Valley, near Quincy, in the Plumas National Forest.
8. In addition to requirements 3 and 5 above, University preforestry courses as listed above for admission to the School, and courses in the School of Forestry as follows:

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
</tr>
</tbody>
</table>

Note: The restricted technical elective requirement may be fulfilled by completion of 15 units of study selected from one of the following options:

I. Forest management option: Business Administration 140; Entomology 114; Plant Pathology 100; Range Management 101; Zoology 116; Forestry 106, 112, 118, 125, 126, 130, 132

II. Range management option: Botany 108; Forestry 125, 132; Range Management 101, 102, 123, 133; Zoology 116
III. Wood utilization option: Business Administration 1A, 122, 140; Engineering 18A, 18B; Forestry 112, 115, 126.

A student who has a specific educational objective which is not attainable through one of these options may, with the permission of the Study-Lists Committee, satisfy the restricted technical elective requirement by election of other courses which define a relevant area of specialization.

The nontechnical elective requirement must be completed while in the upper division. At least 9 units must be drawn from two of the following nontechnical fields: (a) English or speech; (b) foreign language; (c) economics, political science, psychology, or sociology; (d) anthropology or history; (e) fine arts or philosophy; (f) military, naval, or air science (upper division).

Plan of Study

The Curriculum of the School of Forestry

A single curriculum is offered in the School of Forestry, arranged to give a solid broad training, with some opportunity for electives. The broad forestry education provided by this curriculum lays the foundations which students need for later more specialized professional or academic work in this field.

Preforestry

The schedule of study offers a broad basic training in the first four semesters. To complete his work for the degree of Bachelor of Science in the normal eight-semester period, the student should adhere closely to the recommended program, which follows. It enables him to complete the maximum number of lower division courses in an orderly manner and without conflicts. Much of this work is prerequisite to necessary courses in the School of Forestry, and thus the student is prepared to make an advantageous selection of electives and a logical arrangement of requirements in the School of Forestry.

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall Units</th>
<th>Spring Units</th>
<th>Sophomore Year</th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics 1A-1B</td>
<td>3</td>
<td>3</td>
<td>Physics 2A-2B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Speech 1A-1B or English 1A-1B</td>
<td>3</td>
<td>3</td>
<td>Geology 1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mathematics 1A</td>
<td>3</td>
<td>3</td>
<td>*Botany 1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Zoology 10</td>
<td>3</td>
<td>3</td>
<td>Military Science</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Chemistry 1A</td>
<td>5</td>
<td>3</td>
<td>Statistics 1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Military Science</td>
<td>2</td>
<td>2</td>
<td>*Engineering 21</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>14</th>
<th>16</th>
</tr>
</thead>
</table>

Forestry

The two-year foundation of courses outlined in the preforestry program above is followed by a sequence of required professional courses.

In the summer following his sophomore work, the student must attend the field practice course, Forestry 49. This course is prerequisite to all required courses in the School of Forestry. The camp experience gives the student a better knowledge of forest practices and activities. Often, too, it enables him to find out whether his choice of forestry as a profession is a wise one.

* Students who prepare for forestry at other institutions which do not offer a one-semester course in botany (equivalent to Botany 1) should take a general botany course. This does not take the place of 4 units of plant physiology with laboratory (Botany 111).

† One-half year of mechanical drawing and one-half year of trigonometry are necessary for forestry courses. Trigonometry is also prerequisite to engineering. They should be taken in high school. The University does not offer a course in mechanical drawing.

‡ Students interested in wood utilization or logging engineering should elect a year course in calculus.
School of Forestry

Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry 103</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Forestry 108</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Forestry 128</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Forestry 110</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Botany 111</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Soils 10</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Technical electives</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Nontechnical electives</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

= 16

Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry 104</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Forestry 121</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Forestry 114</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Forestry 120</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Forestry 122</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Technical electives</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Nontechnical electives</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

= 16

Restricted Technical Electives.—Fifteen units of technical electives must consist of courses drawn from one of the three options listed on pages 123, 124.

Nontechnical Electives.—Twelve units of nontechnical electives must include at least 9 units drawn from two of the nontechnical fields listed on page 124.

The subject matter of forestry is such that the courses follow a normal sequence as shown above. Therefore, students should adhere as closely as possible to this suggested program.

Enrollment in Upper Division Forestry Courses.—Enrollment in upper division forestry courses is open only to students registered in the School of Forestry and to those registered in other colleges or schools who have both a C average and preparation satisfactory to the instructor in charge.

Graduate Study

The School of Forestry offers varied opportunities for graduate study. The diversity of climate, vegetation, and soil in California provides a wide choice of subjects for investigation. The faculty of the School of Forestry and of related departments is active in research and has developed facilities and equipment which permit graduate students to attack a wide variety of research problems.

The University of California offers a Master of Forestry degree program for those wishing to obtain preparation in the professional aspects of forestry and a Master of Science degree program for those desiring to specialize in a particular phase of forestry, such as timber management, wood technology, or range management. The Ph.D. degree program is available for those wishing to specialize in some phase of basic research related to forestry. Complete information regarding graduate instruction on the Berkeley campus is contained in the Announcement of the Graduate Division, Northern Section.

The Master's Degree

Broad advanced professional education in forestry can best be accomplished by working toward the degree of Master of Forestry, which requires completion of 24 units of upper division and graduate courses. At least 12 of these units must be in strictly graduate courses in the major subject. In addition, the student must present an acceptable professional paper and must pass a comprehensive final examination to demonstrate mastery of the essentials of professional forestry.

Specialization in some phase of forestry can best be approached by working toward the degree of Master of Science, which requires completion of 20 units of courses, of which at least 8 units must be strictly graduate courses in the major subject. In addition, the student must prepare a satisfactory thesis based upon his own research.

To be admitted to the Graduate Division for either the Master of Forestry or Master of Science degrees, the student must have had a high scholastic record in his undergraduate years. He will be expected to have completed an
undergraduate curriculum essentially equivalent to that required for a bachelor's degree at the University. The graduate student's program is usually planned largely to meet his individual needs and interests. The arrangement is flexible enough so that the student may either include a broad preparation for professional work or specialize and give a greater part of his time to a specific problem.

The Doctor's Degree

For many research and teaching positions in the field of forestry, the Doctor of Philosophy degree is highly desirable. The specialized work required under these circumstances involves a far more thorough basic education than can otherwise be secured. At the University of California, it is assumed that the doctor's degree involves thorough study in basic scientific fields; therefore, the student has his choice of a series of fields of basic science which in some cases cross departmental lines and are handled by faculty advisers and committees under the administration of the Graduate Division. Some of the groups which are closely allied to forestry are plant physiology, genetics, agricultural economics, botany, geography, and soil science. A forester ordinarily would specialize in one of these fields. Since the work toward the doctorate is based upon these fundamental basic sciences, the forester, with his training in the applied scientific field, generally must take certain required basic science courses when he embarks upon a program leading to the Ph.D. degree in any of these subjects. Foresters, therefore, may have to include in their programs courses in chemistry, biochemistry, plant physiology, economic theory; and other similar basic work.

As a result, it often takes three years to satisfy the requirements for the doctorate. The training, however, is extremely thorough and basically valuable, so that the student who earns this higher degree at the University of California is well equipped for highly specialized work in his chosen field of study. The research for the thesis should be on a problem which involves forestry, under the supervision of faculty members concerned with his own special line of work within the School of Forestry.

Wood Technology

A graduate program in wood technology leading to the degree of Master of Science is offered at Berkeley under guidance of a staff group drawn from chemistry, engineering, forestry, and other related departments. Work leading to the degree of Doctor of Philosophy may be pursued in some basic science field to which wood technology is closely allied. The Forest Products Laboratory provides exceptional facilities for graduate research and study in this field.

Range Management

A graduate program in range management leading to the degree of Master of Science is available at Berkeley and Davis. Work leading to the degree of Doctor of Philosophy may be pursued in some basic science field to which range management is closely allied.

SCHOOL OF LAW

Preparation for the Study of Law

For the guidance of students who may become applicants for admission to the School, the essentials of a satisfactory prelegal education are summarized as follows:

In the first place, the prelegal student should follow a plan of study which will assure adequate foundations for broad culture. Such a plan should in-
clude among its objectives: (1) a well-grounded facility in the use of English, written and spoken, and a wide acquaintance with the best of English literature; (2) a familiarity with at least the outlines of history and a thorough knowledge of the history of our own country and people; (3) an acquaintance with the great philosophers and an understanding of the progress and significance of philosophic thought; (4) a mastery of elementary logic and mathematics and some acquaintance with their application in contemporary life; (5) an introduction to science and an appreciation of its tremendous importance in the modern world; and (6) a thorough knowledge of the elements of social science, including the essentials of economics, government, psychology, and other important social studies. Foundations must be laid in high school for the study of English, history, mathematics, and natural science. The prelegal student normally will be well advised to defer philosophy and the social studies until he has entered college. If prelegal study is planned effectively, the foundations for a broad culture may be laid in high school and in the first two years of college.

In the second place, the prelegal student should acquire the intellectual discipline and experience which are to be derived from intensive work for a substantial period of time in a selected field of study. This work should be carefully planned, and a special competence should be achieved in the selected field. It has often been found that a well-chosen group of courses in economics may be related effectively to later professional study in law. An effective preprofessional training may also be planned with emphasis upon political science, history, business administration, psychology, English, philosophy, or similar fields. Applicants who are interested in courses stressing international, historical or comparative aspects of the law, or in the School’s postgraduate program in International Legal Studies will find reading knowledge of a foreign language beneficial.

In the third place, the prelegal student should begin the cultivation of professional standards of study as early as possible. Few ideas are more fallacious or harmful than the notion that it is possible to dawdle through high school and college and then make the adjustment to high standards promptly upon entering the professional school. Essential habits of concentration and effective methods of study must be acquired and developed during the prelegal years. Careful reading and constant exercise of practice in writing should be cultivated assiduously. Intelligently selected private reading should supplement the work of the classroom at all times. The law as a process of social adjustment is reflected in all aspects of life, and the student who carelessly wastes the opportunities of his prelegal years cannot possibly present himself well prepared for professional training. A large proportion of failures in the professional school may be traced directly to the neglect of opportunities in high school and college. Distinguished achievement in high school and college is usually followed by distinction in the professional school and in later law practice.

The satisfactory completion of a basic course in accounting is a prerequisite for entry into the second year of law school. This prerequisite may be met by satisfactory completion: (1) of a basic undergraduate course in accounting of six semester hours, or its equivalent; or (2) of a course in legal accounting which will be offered as a part of the School of Law summer session program. Students at the University of California, Berkeley, may meet this requirement by completing Business Administration 1A–1B or 120A–120B. It is suggested that every prelegal student learn to use a typewriter.

Copies of a memorandum (designed primarily for prelegal students at the University of California, Berkeley) entitled “Recommended Courses for Prelegal Students” may be obtained from the office of the Dean, School of Law, Berkeley 4. The offices of the prelegal advisers are located in the School of Law Building. Prelegal students are not required to discuss their programs
with a prelegal adviser, but those who have special problems should not hesitate to seek advice.

**Law School Admission Test**

The School of Law cooperates with other law schools in requiring that applicants for admission take the Law School Admission Test, administered by the Educational Testing Service. The test is designed to measure aptitude for professional study, rather than knowledge of subject matter, and no special preparation is necessary. Centers where the test may be taken have been established for the convenience of applicants in all parts of the country. The test is required of all applicants for admission to this School and should be taken during the academic year preceding the one for which admission is sought. Students who plan to apply for scholarships are urged to take the Law School Admission Test in the fall preceding entrance. For application procedures, see Admission Procedure, page 129.

The Educational Testing Service will supply each applicant with a bulletin of information giving details with respect to administration and including practice questions. All questions concerning the test should be addressed directly to the Law School Admission Test, Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.

**Admission to the Professional Curriculum**

Applicants for admission to the professional curriculum of the School of Law, leading to the degree of Bachelor of Laws, must have received the degree of Bachelor of Arts or Bachelor of Science from the University of California, or an equivalent degree from a college or university of approved standing. The program of study leading to the degree should be in substantial conformity with the essentials of a satisfactory prelegal education (see page 126).

Applicants who have achieved a B (3.0) average in the work of the last two prelegal years may be admitted unless their scores on the Law School Admission Test are so low as to demonstrate a lack of capacity for the work of the professional curriculum.

Applicants having less than a B average, but at least a C+ (2.5) average, may be admitted if they give sufficient evidence through their scores on the Law School Admission Test, or otherwise, of capacity for the work of the professional curriculum. Such applicants may be asked to present themselves at the School for personal interviews before admission is granted.

Applicants must also submit satisfactory references as to character, including the names and addresses of not fewer than four disinterested and responsible persons to whom the applicant is well known and to whom the faculty may appropriately address inquiries with respect to the applicant's character. Two of the four references must include professors at the colleges from which applicants graduated with whom the faculty may also make inquiries with respect to academic work. Wherever possible, the character references should include a member of the Bar who is a graduate of the School of Law or of another law school approved by the American Bar Association.

Students beginning their professional work are admitted only in September.

Attention is called to the accounting prerequisite for entry to the second year of law study described in the section on Preparation for the Study of Law, on page 126.

**Admission to Advanced Standing**

Applicants who have completed at least one year of work in another law school may be admitted to the second year of the professional curriculum with credit for not more than one year of such work if (1) the applicant would
have been eligible for admission to the first year in this School, (2) the work has been completed in a school which is a member of the Association of American Law Schools, and (3) the work for which credit is sought has been of superior grade. The faculty reserves the privilege of prescribing further conditions for the granting of such credit and may, in its discretion, require examinations in subjects for which credit is sought. To be assured of satisfactory programs, students transferring from other law schools should plan to enter at the opening of the fall semester.

Students who have been disqualified at another law school will not be admitted to this School.

**Admission Procedure**

1. The initial 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 the School of Law, University of California, Berkeley 4. It should be accompanied by transcripts of all college, university, or professional school records other than the records of work completed at the University of California, Berkeley. Where the applicant is currently in a college or university, the transcripts should cover all work completed to date and should be accompanied by a statement indicating the time when it is expected that the work pending will be completed and the necessary supplemental transcripts supplied. To insure consideration of an application for admission in September, 1960, the initial application should be received by the School not later than July 15. Actual receipt of the initial application by the School is the applicant's responsibility. In no circumstances should the initial application be addressed to another department or office of the University.

2. Applicants are also required to apply for admission to the Graduate Division. This application must be made prior to mid-July on forms which will be supplied by the Graduate Division and should be addressed to the Graduate Division, University of California, Berkeley 4, accompanied by a remittance in the sum of $5 payable to The Regents of the University of California. The remittance of $5 is not required of veteran applicants who expect to enroll under the provisions of Public Law 16 or Public Law 894. Persons governed by Public Law 550 must pay this fee at the time of application. This application must also be accompanied by official transcripts of records other than the record of work completed at the University of California, Berkeley. Such transcripts are in addition to those accompanying the initial application to the School of Law. Since applicants cannot be admitted to the School until they have been admitted to graduate standing, the application should be filed at the earliest possible date.

3. For permission to take the Admission Test, applicants will write directly to Law School Admission Test, Educational Testing Service, 20 Nassau Street, Princeton, New Jersey, requesting an application blank and bulletin of information listing places where the test may be taken and the dates on which the test will be given. If the applicant so requests on the test application form, his score will be reported not only to this law school but also to other law schools where he may be applying for admission. He will also receive an individual score report directly from the Educational Testing Service.

**Admission to the Graduate Curriculum**

The student who desires (1) to broaden his professional education by study of legal history, international and comparative jurisprudence, or the relations of law and other social sciences, or (2) to supplement his professional education by study of special subjects (e.g., taxation, labor law, international law, marital property, procedure, corporations), or (3) special training in prepa-
ration for law teaching, legal research, government service, or legislative drafting, may become a candidate for the degree of Master of Laws (LL.M.) or the degree of Doctor of the Science of Law (J.S.D.).

Admission to the graduate curriculum, as a candidate for either the LL.M. or the J.S.D. degree, may be granted to any applicant who has had at least six years of resident study at approved colleges and law schools, who holds a professional degree from a law school approved by the American Bar Association, and who, in the opinion of the faculty, gives evidence of capacity to complete the requirements for the degree; except that an applicant who has not received the A.B., B.S., or equivalent degree may be admitted only if the faculty concludes that his preparation in social sciences other than law has not been unreasonably limited.

Admission to the graduate curriculum though not as a candidate for a degree, may also be granted to any applicant who holds a professional degree from a law school approved by the American Bar Association and who, in the opinion of the faculty, gives evidence of capacity to continue advanced legal study successfully. An applicant so admitted may, after completion of one academic year of resident study, depending on his achievement and proved ability, be admitted as a candidate for the LL.M. or J.S.D. degree.

If the previous training of an applicant for admission to the graduate curriculum has been received in foreign educational institutions he must present evidence that his preparation is substantially equivalent to that required for graduates of an American college or university.

SCHOOL OF LIBRARIANSHIP

The School of Librarianship offers curricula leading to the degrees of Master of Library Science, Doctor of Library Science, and Doctor of Philosophy. The Master of Library Science degree is awarded to students completing the first-year program of 28 units with an average grade of at least B (3.0 grade-point average).

The A.B. degree of the University of California or its equivalent, a grade-point average of at least 2.5 (C+) in the last two years of academic work, graduate standing, without deficiencies, in the University, and a college year of each of two modern languages—preferably French and German—are required for admission. Ability to use the typewriter with accuracy and a fair degree of speed is expected of all students. Applicants are required to take the Aptitude Test of the Graduate Record Examination and to have their scores sent to the School in time for evaluation before final action is taken on their applications. Applications for admission to the first-year curriculum will ordinarily not be considered from persons over 35; exceptions may be made for those holding advanced degrees or for those who have had successful library experience. Applicants must submit to the Dean of the School complete transcripts of their academic records so that their qualifications for admission to the School may be determined. New first-year students will not be admitted at the beginning of the spring semester.

Any course in the advanced curriculum is open to any graduate student who satisfies the instructor of his ability and preparation to undertake the work, even though he is not a candidate for a degree in this School and does not qualify for it.

Candidates for advanced degrees are subject to all general University regulations governing those degrees (see ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION).

Curriculum for the First-Year Master's Degree.—The School's basic curriculum is designed to prepare municipal, county, college, university, school, children's, and special librarians. To ensure adequate opportunity for students who enroll in the School, only a limited number will be accepted for the first-year curriculum. No one should come to Berkeley without having made
application to the School and having received notice of acceptance. Early application is desirable and after the class has been selected, opportunity to enter is dependent on withdrawal of someone previously accepted.

**Curricula for Advanced Degrees.**—Candidates for advanced degrees, before being admitted to the School, must be accepted in graduate standing, without deficiencies, in the University of California; must have been graduated with at least a grade B average from the basic professional curriculum in a graduate library school which is accredited by the American Library Association, and approved by the University of California; must have had at least a college year, not less than 8 units, of each of two modern foreign languages; and must take the Graduate Record Examination Aptitude Test. Professional library experience before undertaking advanced work is recommended.

Candidates for the second-year master's degree, ordinarily the Master of Library Science, but in certain cases the Master of Arts, must take 24 units of upper division and graduate courses. Twelve of these units must be selected from the advanced curriculum of the School of Librarianship. The remaining 12 units may be selected from this same curriculum, from second-semester first-year courses not previously taken, or from upper division or graduate courses in subjects related to the particular interests of the student. Each student's program is subject to the approval of the Dean. Comprehensive final examinations and a special study are required of every candidate. An average of at least grade B must be maintained throughout the program for the master's degree. Students must complete their work for the degree within five years from the date of first enrollment.

**The degree of Doctor of Library Science** is a professional degree conferred in recognition of the candidate's command of a comprehensive body of professional knowledge and of his ability to initiate, organize, and pursue the investigation of significant problems in the field of librarianship. The candidate for the Doctor of Library Science degree must have had professional experience. The foreign language requirement, other than that required for admission, not general for this degree, depends upon the needs of each candidate. He may specialize in college and university libraries or public libraries. Although most dissertations written for the Doctor of Library Science degree will fall within one or another of these two fields, the designation of fields of specialization does not preclude the writing of a dissertation which does not obviously fall in one field or the other.

**Advancement to Candidacy.**—A student is advanced to candidacy for the Doctor of Library Science degree by the Graduate Council on the recommendation of the School of Librarianship after he has completed the following requirements: (1) He must have completed a minimum of two semesters in residence, after fulfilling all the requirements for admission to the School of Librarianship noted above. (2) He must have passed a comprehensive examination in general librarianship, as represented by the first-year curriculum at the University of California. (3) He must have passed an intensive written and oral examination in one of the two fields noted above in which he plans to write his dissertation. (4) His complete program, including a detailed outline of his proposed dissertation as candidate for the degree of Doctor of Library Science, must have been approved by the faculty of the School of Librarianship. (5) He must have passed a reading knowledge examination in one or more foreign languages if, in the judgment of the faculty, such reading knowledge is essential to the successful completion of the proposed dissertation. (6) He must have shown evidence of having had a significant amount of successful professional experience.

**Degree Requirements.**—(1) The candidate must complete at least four semesters of graduate study, beyond his first professional degree, in residence at the University of California, two before and two after being advanced to candidacy. (2) He must have completed at least 36 units of graduate and
upper division courses in librarianship and other departments related to his field of study, in addition to those taken for the first professional degree, and in addition to the thesis course (299). (3) He must submit a dissertation which demonstrates his ability to conduct independent investigation and which contributes to knowledge, or organizes known facts to produce a result of importance and value, in the field of librarianship. (4) He must successfully defend his dissertation in an oral examination, and show his mastery of the field in which the dissertation is written.

The degree of Doctor of Philosophy is conferred upon the qualified candidate in recognition of his command of a comprehensive body of academic and professional knowledge and upon his demonstration of a general grasp of the subject matter of a large field of study. He must also show his critical ability and power to analyze problems, as well as to coordinate and correlate data from a number of cognate disciplines. The student must, furthermore, show through his dissertation the power to make an original contribution to the knowledge of his chosen field of study and, throughout all his career as a graduate student, give evidence of his ability to work independently. He may specialize in the following fields of librarianship: bibliography, history of books and printing, history of libraries, or the library as a social institution. Although most dissertations written for the Ph.D. degree will fall within one or another of these four fields, the designation of fields of specialization does not preclude the writing of a dissertation which does not obviously fall in one field or another.

Degree Requirements.—(1) General requirements concerning residence, foreign languages, program of study, candidacy, qualifying examinations, dissertation, and final examination (Plan A) are in the Announcement of the Graduate Division, Northern Section. (2) School of Librarianship requirements for admission, set forth above, must have been met. (3) The qualifying examinations (in addition to tests of a reading knowledge of foreign languages) will include (a) a comprehensive examination in general librarianship, as represented by the first-year curriculum at the University of California; (b) an examination in the field in which the dissertation will be written, including the closely related subject field or fields outside the School of Librarianship; (c) an examination in one of the fields in which the Ph.D. degree is offered in librarianship; and (d) an oral examination given after the written examinations have been passed.

For further information, see the Announcement of the School of Librarianship.

SCHOOL OF MEDICINE (San Francisco)

Matriculation.—For matriculation in the School of Medicine—the four-year curriculum leading to the degree of Doctor of Medicine—the student must meet the admission requirements of the School. For further information, consult the Announcement of the School of Medicine, San Francisco.

Applicants for admission to the School of Medicine are required to take the Medical College Admission Test, administered for the Association of American Medical Colleges by the Educational Testing Service of Princeton, New Jersey. The test is given at various colleges and universities, including the University of California.

Applications for admission to the School of Medicine should be filed with the Office of the Director of Admissions, The University of California Medical Center, San Francisco 22, California. Applications for the September, 1960, first-year class must be filed between June 1, 1959, and September 30, 1959, but no application blanks will be issued by the Office of the Director of Admissions after September 15, 1959. It will not be possible to give a statement of tentative acceptance to any applicant.

Enrollment in the School of Medicine is limited. Candidates for admission
to the first-year class are accepted primarily on the basis of scholarship, particular emphasis being placed on the required subjects. Two personal interviews are held. Each applicant must take the Medical College Admission Test. Applicants for the September, 1960, class are advised most strongly to take the Medical College Admission Test in May, 1959, unless it had been taken in 1958 (the test should be repeated if at the time of application more than two years have elapsed since the last test). While the fall test (October or November, 1959) will be acceptable, the results are not usually available before December, which delays consideration of the application.

Normally, the student must apply to take the Medical College Admission Test at least three weeks but not more than three months prior to the scheduled date. Further information is obtainable from the Educational Testing Service, Princeton, New Jersey.

The student must complete all premedical requirements, including American History and American Institutions, not later than the spring semester preceding his admission.

Eight units of credit in a modern foreign language will be accepted by the School of Medicine as a "reading knowledge."

The procedure for making interview appointments is as follows:

1. The application and all transcripts of record are in duplicate filed with the Office of the Director of Admissions.

2. Qualified applicants are then requested by the Dean's Office to make appointments for two interviews.

Certain applicants may be rejected, without interview, because of low premedical scholarship, and/or a low score in the Medical College Admissions Test, and, occasionally, for other reasons. Attention is called to the fact that no personal interview appointments are given until the applicant's record has been evaluated.

An accepted applicant who finds it impossible to begin his work in the School of Medicine in September, 1960, or a student who actually enters at that time and begins his work, but finds it necessary to withdraw in his first year, loses his place and is required, in the event he desires to begin his work later, to reapply with a subsequent group of applicants. Applicants for admission to the School of Medicine are required to pass a satisfactory medical examination for physical and mental fitness prior to the time of first registration in the School. Students in attendance in San Francisco are examined annually.

California Applicants.—The majority of places in each class are given to students from California. Applications are screened carefully by the Committee on Admissions. In reaching a decision, the committee takes into consideration the applicant's legal residence, the location of his high school and of the institution in which he has taken premedical work, the legal residence of his parents, and occasionally, other factors.

Approximately 10 per cent of the places may be filled with applicants in the following categories:

1. From other states: Preference will be given to applicants from the following western states not having medical schools: Alaska, Arizona, Hawaii, Idaho, Montana, Nevada, New Mexico, and Wyoming.

2. From foreign countries: Ordinarily, not more than one applicant will be accepted from outside the United States. This applicant must have completed at least one year of premedical or academic work at the University of California, or at an equivalent institution in the United States, one semester of which must have been completed previous to February 15 of the year of admission. For this place, the committee will select an individual from a foreign country who is in the United States for the purpose of pursuing his medical education and who intends to return to his own country following graduation, preferably for teaching in a school of medicine, for public health, or for re-
lated work. The attention of applicants for this place is called to the fact that completion of the premedical program in the University of California, or in some other institution, does not necessarily guarantee acceptance by a school of medicine.

All of the above is subject to change by such emergencies as may arise.

For further information see the annual Announcement of the School of Medicine, and the leaflet for the 1960 class, both of which may be obtained from the Dean's Office, University of California School of Medicine, San Francisco 22, California.

### Training Courses

Under the auspices of the School of Medicine, various training courses are offered at the Medical Center, San Francisco.

#### EXFOLIATIVE CYTOLOGY

A training course for medical laboratory technicians in the technical methods of exfoliative cytology.

**Admission.**—A degree of Bachelor of Arts or Bachelor of Science is medical sciences and a certificate in medical laboratory technique or the equivalent of these qualifications.

**Curriculum.**—Students complete a course in exfoliative cytology, designed primarily for the training of medical laboratory technicians in the technical methods of exfoliative cytology, including collection, preparation, staining and screening of specimens for detection of abnormal or malignant cells. The course extends over a period of sixteen weeks, and has a credit value of 12 units.

**Certificate.**—A certificate of completion will be given upon satisfactory completion of the course.

**Fees.**—Fees are as follows:

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<td>Residents</td>
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<tr>
<td>Incidental Fee</td>
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<td>Tuition Fee</td>
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<td>Student Union Membership Fee</td>
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For further information, write to the Medical Director, Curriculum in Exfoliate Cytology, University of California School of Medicine, San Francisco 22, California.

#### MEDICAL ILLUSTRATION

A training course for medical illustrators.

**Admission.**—Applicants for admission must meet the following conditions: In addition to meeting the general University admission requirements to freshman status, the applicant must have had two years of art training satisfactory to the faculty of the department and be able to demonstrate his ability in the field of art.

When possible, a personal interview is prerequisite to acceptance in the course. Due to space limitations, enrollment is limited and is subject to review by the faculty of the department. By arrangement, qualified students may enroll in certain courses offered.
Curriculum.—The course is given as professional training and extends over two forty-eight-week periods of full-time work, and covers the following subjects: pencil sketching of bones; principles of halftone and pen and ink drawings; anatomy lecture and dissection; lettering of charts and graphs; sketching at surgery, autopsy, and of specimens; water-color drawing; microscopic technique for drawing of colored slides; exhibit and display work; training in the eye clinic for slit-lamp and eye-ground drawings; medical photography.

Certificate.—Subject to the approval of the faculty, a certificate is given upon completion of the course.

Fees.—Fees are as follows:

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For further information and detailed announcement of courses, write to the Supervisor, Curriculum in Medical Illustration, University of California School of Medicine, San Francisco 22, California.

MEDICAL TECHNOLOGY

A training course for medical technicians.

Admission.—Applicants must satisfy one of the following requirements:

1. Bachelor's degree:
   Applicants for admission on this basis must hold a bachelor's degree with a major in one of the biological sciences. Courses taken in preparation for the major must have included Bacteriology 101 and Biochemistry 102 or 100A–100B, and 102L or 101A–101B, or their equivalent.

2. Three years of college training:
   Applicants for admission on this basis must have completed three years of a regulation curriculum in medical or clinical laboratory technic. This curriculum must have included courses in biochemistry and advanced bacteriology. Applicants will not be considered unless the college they attended shall grant a bachelor's degree to them upon satisfactory completion of the four-year curriculum.

Curriculum.—The course consists of one year (forty-eight weeks) of full-time work, and covers training in biochemistry, medical bacteriology, parasitology, mycology, histological technic, clinical pathology, serology, blood bank procedures, basal metabolism, and electrocardiography. Upon satisfactory completion of the course, the student is eligible for the State Examination and the National Registry Examination.

Certificate.—A certificate is given upon satisfactory completion of the course.

* The entire matter of incidental and tuition fees during the third semester is awaiting decision by proper University authorities. An announcement will be made later.
† Awaiting decision by proper University authorities as to whether or not the $100 or $200 fee should be charged to the students in the Medical Illustration course. An announcement will be made later.
Requirements of Colleges, Schools, and Curricula

**Fees.**—Fees are as follows:

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For further information and detailed announcement of courses, write to the Supervisor, Curriculum in Medical Technology, University of California School of Medicine, San Francisco 22, California.

**ORTHOPTIC TECHNOLOGY**

A training program for orthoptic technicians is offered at the School of Medicine. This course extends through a full calendar year.

**Admission.**—Applicants should be twenty years of age or over and should have at least two years of college training or its equivalent. Previous medical and/or teaching experience is preferred but this is not essential. A personal interview with the Medical Director, Curriculum for Orthoptic Technique, Department of Ophthalmology, will precede acceptance.

**Curriculum.**—A course in Orthoptic Technology (400A–400B–400C). Clinical practice in the Florence C. Noble Orthoptic Laboratory. Practical training devised to supplement the eight-week basic course given by the American Orthoptic Council. Practical training is offered in the Orthoptic Laboratory to give the student knowledge of terminology and office practice. Lectures, seminars, and conferences supplement clinical practice.

**Certificate.**—A certificate is given upon satisfactory completion of the course.

**Fees.**—Fees are as follows:

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The entire course is designed so that upon completion the student will have the necessary knowledge and experience to qualify for the examination given by the American Orthoptic Council. For further information please write to the Medical Director, Curriculum for Orthoptic Technique, University of California School of Medicine, San Francisco 22, California.

**PHYSICAL THERAPY**

A training course for physical therapists.

The requirements for admission to the curriculum in physical therapy offered by the School of Medicine, meet and exceed those set by the Council on Medical Education and Hospitals of the American Medical Association.

*The entire matter of incidental and tuition fees during the third semester is awaiting decision by proper University authorities. An announcement will be made later.*
Admission.—Applicants for admission must satisfy one of the following requirements:

1. Bachelor's degree from an accredited institution.

Candidates for admission on this basis must have completed 26 semester units of biological and physical science. They must have also included in their undergraduate studies all of the specific requirements of the curriculum in physical therapy. Upon satisfactory completion of the course, the student is awarded a certificate.

2. Three years of college or university training.

Candidates for admission on this basis must have completed courses that qualify them for senior standing in the College of Letters and Science of the University of California (Berkeley or Los Angeles), or in the College of Applied Arts, and the requirements in the basic sciences in the curriculum in physical therapy. The student may matriculate into the curriculum in physical therapy in his fourth year of college and obtain the degree of Bachelor of Science and a Certificate of Completion in physical therapy.

Applicants for admission must present transcripts from their colleges or universities. Such records must show the satisfactory completion of the following courses, or their equivalent.

Chemistry 1A—
5 units or 5 semester hours—(general inorganic chemistry)

Physics 10—
3 units or 3 semester hours—(general physics)

Anatomy 102—
3 units or 3 semester hours—(general human anatomy)

Physiology 1 and 1L
5 units or 5 semester hours—(introductory physiology)

Psychology 168—
3 units or 3 semester hours—(abnormal psychology)

The student must complete all prerequisites before beginning the course, although these requirements need not be completed at the time the application is filed.

Curriculum.—Two semesters will include all theory, seminars, and demonstration. The final twelve weeks will be devoted to practical training and can be completed in approved hospitals. The curriculum includes anatomy, physiology, physics, pathology, psychology, surgery, orthopaedic surgery, medicine, neurology, pediatrics, nursing, ethics and administration, electrotherapy, radiation, hydrotherapy, massage, kinesiology, therapeutic exercise, and clinical practice.

Graduates of the curriculum in physical therapy are eligible for the State Registration Examination and the American Registry Examination.

Expenses.—The student must supply his own books and uniforms. The approximate cost is as follows: fall semester, $70; spring semester, $25; clinical practice period, $40.

Fees.—Fees for the first and second semesters are as follows (there being no fees at present for the Summer Sessions):

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* The entire matter of incidental and tuition fees during the third semester is awaiting decision by proper University authorities. An announcement will be made later.
X-RAY TECHNOLOGY

A training course for X-ray technicians. This course extends through a full calendar year, beginning with the fall semester.

Prerequisites.—Anatomy and physics, whether they are given at the City College of San Francisco or the University of California, Berkeley, or equivalent courses at other colleges. Courses recommended at both City College of San Francisco and the University of California, Berkeley, are listed as:

- Anatomy 102
- Physics 2A, 2B, 3A, 3B—preferred
- Physics 10 acceptable

Admission.—The student may be admitted after satisfactory completion of prerequisites and a personal interview.

Curriculum.—Practical training for X-ray technicians is offered in the Department of Radiology. The curriculum rotates the student through all areas of the X-ray department and is designed to give the student knowledge of the various procedures used in making X-ray examinations, the techniques used in developing films in the darkroom, the services required of a technician in the fluoroscopy room, and in assisting the radiologist in therapy. The student is taught the routine procedures of handling patients in the reception areas, the filing of films, and other matters concerned with the running of an X-ray department. Practical instruction is supplemented by lectures in anatomy, physics, and other subjects related to radiology.

Certificate.—A Certificate of Completion will be given to the student upon satisfactory completion of the course. The student, upon completion of the course and with one year of experience as an X-ray technician, serving under the direction of a qualified radiologist, is eligible for the American Registry Examination.

Expenses.—The student must supply his or her own maintenance and uniforms.

Fees.—Fees are as follows:

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For further information concerning the program, write to the Medical Director, X-ray Technician’s Course, University of California School of Medicine, San Francisco 22, California.
School of Nursing

2. Curriculum for graduate nurses leading to the Bachelor of Science degree in nursing. (See page 140.)
3. Curriculum for graduate nurses leading to the Master of Science degree. (See page 142.)

BASIC CURRICULUM

The University of California School of Nursing believes that nursing is a process in which the nurse works constructively with others for the promotion and restoration of physical, emotional, spiritual, and social health in the individual, the family and the community. Therefore, it provides through its curricula an academic and professional education which will enable the student to:

1. Give competent care in hospitals, homes, and community agencies.
2. Accept responsibility for self-directed activity toward her own established personal and professional goals.
3. Understand that goals in nursing have to be continuously adapted to meet the changing needs of the individual and society.
4. Participate cooperatively as an effective professional worker within her own profession, with members of other professions, and with members of citizens groups for the improvement of the total health service.
5. Contribute through creative activities to the improvement of nursing.
6. Recognize need for continuing cultural and professional growth.
7. Recognize and assume the responsibilities of intelligent citizenship.
8. Acquire the foundations for advanced preparation in special fields of nursing.

The basic nursing curriculum requires four semesters of general arts and science courses to be taken at the University of California, Berkeley, or at other universities, state colleges, or junior colleges where comparable courses are offered. The professional program in the School of Nursing, San Francisco, at present, is five semesters and two summer terms in length.

Upon satisfactory completion of this curriculum the student receives the degree of Bachelor of Science. She is prepared to take the California State Board examination for a license as a registered nurse and to apply for the California Public Health Nurse Certificate and also for the Health and Development Credential for School Nursing. An applicant for the California State Board examination must be either a citizen of the United States or have declared her intention to become a citizen of the United States.

Requirements for Admission

Two years of academic work in an accredited university or college are prerequisite to admission to the basic curriculum. Such work, if taken on the Berkeley campus of the University of California, must include fulfillment of the following breadth requirements of the College of Letters and Science:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>English reading and composition</td>
<td>6</td>
</tr>
<tr>
<td>Foreign language</td>
<td>12</td>
</tr>
<tr>
<td>Humanities</td>
<td>12</td>
</tr>
<tr>
<td>Natural sciences</td>
<td>12</td>
</tr>
<tr>
<td>Social sciences</td>
<td>12</td>
</tr>
</tbody>
</table>

If the work is taken on another campus of this University, or in a junior or state college or other university, it must include fulfillment of these requirements, or of the requirements of the College of Applied Arts, University of California, Los Angeles. Under either plan, the equivalent of the following courses offered on the Berkeley campus must be included:
Students are recommended to choose electives from psychology, sociology or anthropology.

**Enrollment Limitation**

The Committee on Admissions to the School of Nursing is authorized to refuse admission to a student with less than a 2.2 grade-point average. A 2.4 grade-point average is required of those transfer students who were ineligible for admission to the University as freshmen upon graduation from high school. Preference will be given to students with a 2.5 grade-point average or above. Students must also satisfy the Committee on Admissions that they possess the personal characteristics essential for professional nursing education and practice. Each prospective student will be required to make an appointment for an interview after she files application for admission to the school. The day of the interview, the student should plan to spend approximately the whole day at the School of Nursing in San Francisco.

**CURRICULUM FOR GRADUATE NURSES**

The courses comprising the curriculum for graduate nurses are selected from offerings of the School of Nursing, Berkeley and San Francisco, and other schools and colleges of the University. This undergraduate curriculum leads to the Bachelor of Science degree and its aim is to prepare the registered nurse for professional nursing service in hospitals and public health agencies.

**Requirements for Admission**

A. Academic requirements.
   1. Fulfillment of matriculation requirements for admission to the University of California, Berkeley.
   2. Satisfactory completion of a minimum of 60 units of academic work in an accredited college or university in courses selected in accordance with Plan I or Plan II (see the Announcement of the School of Nursing, Berkeley and San Francisco). "Satisfactory completion" is defined as a 2.2 grade-point average for University of California work or its equivalent in quality for work taken elsewhere.

B. Professional requirements.
   1. Graduation from an accredited school of nursing.
   2. Registration as a professional nurse.
   3. Completion of Plan A of the National League for Nursing Graduate Nurse Qualifying Examination.
   4. Evidence of personal qualifications and capacity for the work of the professional curriculum.
Procedure for Admission

Application for admission to this program must be made to the Director of Admissions, and to the School of Nursing, as follows:

A. Director of Admissions, 127 Sproul Hall, University of California, Berkeley 4.

1. Obtain application form from the Director of Admissions and return completed form together with a money order or bank draft for $5 payable to The Regents of the University of California.

2. Request the registrar of each school attended, including nursing school, to send an official transcript to the Director of Admissions. The application and transcripts should be on file not later than June 1 for the fall semester or November 1 for the spring semester.

B. School of Nursing, Room 210, Building T-8, University of California, Berkeley 4.

1. Obtain application forms from the School of Nursing office for:
   (a) Admission to the School of Nursing.
   (b) The National League for Nursing Graduate Nurse Qualifying Examination.

2. Return completed forms directly to the School of Nursing office. Include fee for the graduate Nurse Qualifying Examination in the form of a check or money order payable to the Director of Evaluation Service, National League for Nursing.

The applicant will be informed by the Director of Admissions and by the Dean of the School of Nursing of her acceptance and status.

Nurses are urged to write or come to the School of Nursing office, Room 210, T-8 for consultation after a statement of entrance status has been received from the Director of Admissions.

Program in the School of Nursing

A variable number of units of professional credit is granted for courses taken during basic nursing preparation. The maximum amount of such credit is 30 units. Students will be required to take a sufficient number of 100 and 400 series courses to bring the total number of acceptable units to 120. A minimum of 24 units of credit must be earned at the University of California, Berkeley, while enrolled in this School of Nursing. This minimum program of final work must not be interrupted by attendance at another institution.

A graduate of a basic collegiate program in nursing desiring to complete preparation in public health nursing will be required to meet requirements for admission to the School. Her program in the School of Nursing will be determined by an evaluation of her credentials.

An over-all grade-point average of 2.0 must be maintained. A grade of at least C is required for each nursing course undertaken.

GENERAL REQUIREMENTS

All students who have not completed an approved program in public health and/or psychiatric nursing must enroll for experiences in these areas. The program leading to the Bachelor of Science degree in the School of Nursing should include, in addition to the courses in nursing, at least 15 units selected with the approval of the adviser from courses in the 100-numbered series offered by education, public health, psychology, and sociology.

During field experiences in public health nursing, students are required to have the use of a car and provide for its maintenance at their own expense.
THE MASTER OF SCIENCE PROGRAM

The program of study leading to the Master of Science degree offers fields of emphasis in medical-surgical nursing, maternal-child nursing, psychiatric nursing, and public health nursing. The aim of this program is to provide an opportunity for graduate nurses to prepare for the following:

1. Clinical specialization.
2. Teaching in schools of nursing.
3. Teaching and supervision in hospitals.
4. Teaching and supervision in public health agencies.

The applicant for admission to the Master of Science program must satisfy the admission requirements of the Graduate Division, Northern Section, of the University of California.

Requirements for Admission

A. Academic requirements.
   1. The applicant must have a baccalaureate degree from an institution of acceptable standing and have completed a minimum of 36 units of junior or senior level courses with an average grade of B.
   2. At least 15 of the above units must be taken in the fields of education, public health, psychology, and sociology with a grade average of at least B.

B. Professional requirements.
   1. Graduation from an accredited school of nursing.
   2. Registration as a professional nurse.
   3. Completion of the undergraduate major in nursing at the University of California School of Nursing, Berkeley–San Francisco, or its equivalent. The major must include preparation in public health and psychiatric nursing.
   5. Evidence of personal qualifications and capacity for graduate study.

Program in the School of Nursing

After admission to the program, the candidate will follow Plan I or Plan II as outlined by the Graduate Division, Northern Section.

Plan I.

The student must present 20 units and, in addition, a thesis. The courses must be graduate courses or junior and senior undergraduate courses. At least half of the 20 units must be in graduate courses in nursing; no unit credit is allowed for the thesis. It is expected that the work of the graduate courses, together with the thesis, will ordinarily amount to not less than half of the entire work presented for the degree. Provided the foregoing general and special requirements be met, the work may be distributed among any courses in the 100 or 200 series.

Plan II.

The student must present 24 units of upper division and graduate courses; at least half of the 24 units must be in graduate courses in nursing. A comprehensive final examination is required of every candidate.

Under either plan the student is subject to guidance by a graduate adviser in the School of Nursing with regard to the distribution of her work.
Students should consult the Announcement of the Graduate Division, Northern Section, for study-list limits. Students must maintain at least a grade average of B for all upper division and graduate courses taken during residence at the University of California as a graduate student.

Expenses of Students

Information concerning expenses that students enrolled in the University of California, Berkeley, will be required to meet, may be found in this bulletin. Advice and information about all types of living accommodations may be obtained from the Housing Office, 2620 Bancroft way, University of California, Berkeley 4, California.

During field experiences in public health nursing, students are required to have the use of a car and provide for its maintenance at their own expense.

SCHOOL OF OPTOMETRY

The School of Optometry offers a curriculum of three years based upon the completion of two years of study in the College of Letters and Science, or its equivalent, leading to the degree of Bachelor of Science at the end of two years, and the Certificate of Completion in optometry and the Master of Optometry degree at the end of an additional graduate year. Candidates for admission to the first-year (junior) class are accepted primarily on the basis of scholarship, with particular emphasis placed on the required subjects.

Applications for admission should be filed with the Director of Admissions. For students who are not already resident at the University of California, the application for admission must be accompanied by a certificate from a physician which states in detail the physical condition of the applicant based upon a thorough medical examination; any physical or mental handicap of the applicant should be indicated. The School of Optometry reserves the right to refuse admission to an applicant on the basis of obvious disability which in the opinion of the Executive Committee of the School would interfere with successful completion of the curriculum.

For admission to the School of Optometry the applicant is required to show completion of two years of study in the College of Letters and Science, or the equivalent. The courses taken should include the following specific subjects required by the School of Optometry: anatomy*, bacteriology, chemistry, physics, plane analytic geometry, psychology, speech or English, and zoology. *

<table>
<thead>
<tr>
<th>Preprofessional Curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freshman Year</strong></td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Subject A (see page 34)</td>
</tr>
<tr>
<td>Military Science</td>
</tr>
<tr>
<td>Chemistry 1A, 8</td>
</tr>
<tr>
<td>Mathematics 3A</td>
</tr>
<tr>
<td>Speech 1A-1B (or English 1A-1B)</td>
</tr>
<tr>
<td>Foreign language</td>
</tr>
<tr>
<td>Elective</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td><strong>Sophomore Year</strong></td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Military Science</td>
</tr>
<tr>
<td>Anatomy 102</td>
</tr>
<tr>
<td>Bacteriology 1</td>
</tr>
<tr>
<td>Physics 2A-2B</td>
</tr>
<tr>
<td>Physics 3A-3B</td>
</tr>
<tr>
<td>Psychology 1A, 33</td>
</tr>
<tr>
<td>Zoology 1A</td>
</tr>
<tr>
<td>Elective</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

* While Zoology 1A and Anatomy 102 constitute the usual biological science sequence in the preoptometry program, this requirement may be satisfied for admission purposes by one of the following alternative sequences:
  - Zoology 1A-Zoology 1B
  - Zoology 1A-Comparative Anatomy
  - Zoology 1A-Human Anatomy
  - Physiology 1, 1L-Human Anatomy

Unless a course in human anatomy which is the full equivalent of Anatomy 102 at the University of California is offered in one of the above sequences, Anatomy 102 must be included in the junior year program of the School of Optometry.

† Students must have had two years of a foreign language in high school.
Requirements of Colleges, Schools, and Curricula

The foregoing program if satisfactorily completed will meet the requirements for the prerequisite subjects for the study of optometry, provided the following high school subjects have been offered for matriculation: algebra, chemistry, physics, plane geometry, trigonometry, and two years of a foreign language.

The following required curriculum taken in the School of Optometry leads to the degree of Bachelor of Science at the end of the senior year and the Certificate of Completion in optometry and the degree of Master of Optometry at the end of the graduate year. For further information and detailed degree requirements, see the ANNOUNCEMENT OF THE SCHOOL OF OPTOMETRY.

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Fall Units</th>
<th>Spring Units</th>
<th>Senior Year</th>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>American History and American Institutions (see page 35)</td>
<td>3</td>
<td>4</td>
<td>Optometry 101</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Optometry 102A–102B</td>
<td>3</td>
<td>4</td>
<td>Optometry 103A–103B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Optometry 401A–401B</td>
<td>2</td>
<td>3</td>
<td>Optometry 404A–404B</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Physics 106A, 106B</td>
<td>3</td>
<td>3</td>
<td>Physiology 105A–105B</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Physiology 110A–110B</td>
<td>3</td>
<td>3</td>
<td>Physiology 115</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Physiology 116</td>
<td>1</td>
<td>3</td>
<td>Physiology 118A–118B</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>§Elective</td>
<td>1</td>
<td>3</td>
<td>§Electives</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>15</strong></td>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

Graduate Year

<table>
<thead>
<tr>
<th>Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optometry 209A–209B</td>
<td>6</td>
</tr>
<tr>
<td>Optometry 212A–212B</td>
<td>3</td>
</tr>
<tr>
<td>Optometry 214A–214B</td>
<td>2</td>
</tr>
<tr>
<td>Optometry 216A–216B</td>
<td>2</td>
</tr>
<tr>
<td>Optometry 217</td>
<td>1</td>
</tr>
<tr>
<td>Physiological Optics 203</td>
<td>2</td>
</tr>
<tr>
<td>Physiological Optics 205</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

SCHOOL OF PHARMACY

The School of Pharmacy offers a four-year curriculum leading to the degree of Doctor of Pharmacy. To gain admission to the curriculum, students must, in addition to meeting other requirements, have satisfactorily completed the two years of preprofessional study outlined on page 145. Details of the admission requirements and of the curriculum are given in the ANNOUNCEMENT OF THE SCHOOL OF PHARMACY, which may be obtained from the office of the Dean, School of Pharmacy, University of California Medical Center, San Francisco 22, California.

In addition to the above curriculum, graduate courses leading to the degrees of Master of Science and Doctor of Philosophy in pharmaceutical chemistry are open to qualified students. These programs are under the jurisdiction of the Graduate Division of the University. For details, consult the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION, and the Graduate Division bulletin entitled ANNOUNCEMENT IN THE BIOLOGICAL SCIENCES, both of which may be obtained from the Graduate Division, University of California, Berkeley 4.

Requirements for Admission.—To be admitted to the Doctor of Pharmacy curriculum in the School of Pharmacy on the San Francisco campus, a student must have completed, with an average grade of C or better in the University of California or in another institution of approved standing, at least 60 units of the program set forth below under the heading “Prepharmacy.” Students taking the prepharmacy years at the University of California normally will be enrolled in the College of Letters and Science. If the work is

§ Students must meet the requirements of the School of Optometry.
not taken at the University of California, the courses selected must be equivalent to those offered at the University of California. In order to complete the prepharmacy studies in the minimum time, students should complete a full year of intermediate algebra, a course in trigonometry, and courses in elementary chemistry in high school.

Students who plan to take their preprofessional work in the College of Letters and Science, University of California, Berkeley, are advised to see the new requirements of the College. Detailed information may be obtained at the Office of the Dean, College of Letters and Science, 210 Sproul Hall, University of California, Berkeley 4.

Students who have completed the prepharmacy studies, whether in the University of California or elsewhere, cannot be assured of admission to the Doctor of Pharmacy curriculum on the San Francisco campus. When the number of qualified applicants exceeds the available facilities, selection will be made on the basis of scholarship, as determined from the college record, and the results of an aptitude examination. A personal interview is normally required. Application blanks for admission to the School of Pharmacy on the San Francisco campus may be obtained from the Office of the Director of Admissions, University of California Medical Center, San Francisco 22, California. Application for admission to the School of Pharmacy, University of California, San Francisco, must be filed between October 1 and March 1 preceding the September of proposed admission.

Mr. Walter Singer of the School of Pharmacy faculty will be available for consultation during the registration periods. (See the CIRCULAR FOR NEW UNDERGRADUATES, BERKELEY, concerning time and place.)

At other times, Mr. Eric C. Bellquist, Office of the Dean of Students, 201 Sproul Hall, Berkeley campus, is adviser to the prepharmacy students on the Berkeley campus. Applications for admission, late registration and all student petitions may be submitted to him for approval.

The adviser to prepharmacy students on the Los Angeles campus is Mr. J. S. Heard, A4-209 Medical Center Building, University of California, Los Angeles 24.

Residence Requirements.—To qualify for the California State Board of Pharmacy examinations, and to satisfy the requirements for the degrees of Bachelor of Science in Pharmacy or Doctor of Pharmacy, a student must have completed four years in residence in the College and/or School of Pharmacy.

Graduation.—Candidates for the Doctor of Pharmacy degree must have completed at least four years of residence in an accredited school or college of pharmacy and must have completed the curriculum of the School of Pharmacy, University of California, including at least 129 units of work, with an average grade of C or better.

### Prepharmacy Curriculum

<table>
<thead>
<tr>
<th></th>
<th>Fall Units</th>
<th>Spring Units</th>
<th>Second Year Fall Units</th>
<th>Spring Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 1A-1B</td>
<td>5</td>
<td>5</td>
<td>Zoology 1A-1B</td>
<td>4</td>
</tr>
<tr>
<td>Botany 12</td>
<td>4</td>
<td></td>
<td>Physics 2A-2B</td>
<td>3</td>
</tr>
<tr>
<td>English 1A-1B or Speech 1A-1B</td>
<td>3</td>
<td>3</td>
<td>Physics 3A-3B</td>
<td>1</td>
</tr>
<tr>
<td><em>Elective</em> 1A-1B</td>
<td>3</td>
<td>3</td>
<td>Mathematics 16A-16B</td>
<td>3</td>
</tr>
<tr>
<td><em>History 17A</em></td>
<td>3</td>
<td>3</td>
<td>Physical Science 1</td>
<td>3</td>
</tr>
<tr>
<td>Military Science</td>
<td>2</td>
<td>2</td>
<td>Military Science</td>
<td>2</td>
</tr>
</tbody>
</table>

1 Trigonometry and intermediate algebra are prerequisite to Mathematics 16A.
2 A year course chosen from foreign language, mathematics, social science, philosophy, or the fine arts and selected from the courses offered in satisfaction of the (e) requirement of the College of Letters and Science (see page 60).
3 If the University requirements in American History and American Institutions have been satisfied, electives may be taken.
The School of Public Health offers five undergraduate major curricula. Each provides basic scientific knowledge which prepares the student for service in a variety of fields related to medicine and public health as well as for graduate study in his specialty area.

The major curricula are: biostatistics, laboratory, preadministration, pre-public health education, sanitary science.

Undergraduate students who have satisfactorily completed at least 60 units of work in one of the colleges of the University, or transfer credit evaluated as equivalent, may apply for admission to a major in public health leading to the Bachelor of Science degree. Students are urged to report to the Dean's Office, School of Public Health, as early in their academic career as possible. Formal application for admission to the School of Public Health should be made by the beginning of the fourth semester (last semester of the sophomore year). Provisional admission will be made promptly pending satisfactory completion of the fourth semester.

**Degree of Bachelor of Science**

Candidates for the degree of Bachelor of Science must have completed at least 120 units of college work, including the specific requirements of one of the majors. A minimum of 24 units must be completed after admission into the School of Public Health. The student must have obtained at least a 2.0 grade-point average for all courses undertaken by him in the University of California. He must have satisfied the general University requirements for Subject A (see page 34), Military Science (see page 37), and American History and American Institutions (see page 35).

**Courses Required for All Majors**

The School of Public Health has adopted the general breadth requirements of the College of Letters and Science. Exceptions are indicated in footnotes.

- Subject C (by examination)
- English and composition (6 units)
- *Foreign language (12 units or equivalent)*
- *Humanities (12 units)*
- Social sciences (including Psychology 1A) (12 units)
- Natural sciences (including Chemistry 1A and Bacteriology 1) (12–17 units)
- Public Health 100, 147A
- Public Health 5A or 35, and 5B, while not required, are recommended as general background for students majoring in Public Health.

**Additional Requirements for Each Major**

**BIOSTATISTICS**

- Mathematics 3A–3B, 4A–4B
- Public Health 111, 147B, 161A–161B, 163, 164
- Other public health courses (3 units)
- Statistics 130A–130B–130C–130D, 166
- Zoology 1A, 115
- At least 7 units from:
  - Population
  - Migration

* For laboratory and sanitary science majors certain exceptions may be made upon the advice of the major adviser.
School of Public Health

Social psychology
Cultural anthropology
Human genetics
General and managerial accounting
Advanced calculus or algebra, theory of functions
General human anatomy
Public administration
Other courses chosen with the approval of the adviser

LABORATORY (MEDICAL TECHNOLOGY AND PUBLIC HEALTH MICROBIOLOGY)
Bacteriology 101
Chemistry 1B, 5, 8
Entomology 117
Physics 10 (if physics not taken in high school)
Public Health 111, 147B, 150A-150B, 162
Zoology 1A, 111

PREADMINISTRATION

Business Administration 1A
Economics 1A or 10
Political Science 1
Public Health 101, 106, 111, 134, 162

One of the following:
  Physiology 1-1L
  Zoology 1A or 10

At least one course from each of the following subject areas:
  Administrative management
  Advanced cultural anthropology
  Governmental relationships
  Personnel administration
  Social insurance
  Social or industrial psychology

Either (a) or (b), below:
(a) For public health and medical care administration
  Mathematics 3A or 16A
  Public Health 109, 170
  Political Science 102
(b) For hospital administration, at least one course from each of the following subject areas:
  Industrial relations
  Managerial accounting
  Principles of Accounting (Business Administration 1B)

PUBLIC HEALTH EDUCATION

Psychology 33
Public Health 111, 131, 133, 134, 135, 136, 162, and other public health courses (6 units)

One of the following:
  Physiology 1-1L
  Zoology 1A

At least 15 units from:
  Adult education
  Cultural anthropology
  Elementary or secondary education
  Nutrition
Requirements of Colleges, Schools, and Curricula

Personality development
Principles of education
Social psychology
Sociology and social institutions
Social welfare

SANITARY SCIENCE

Bacteriology 101
Chemistry 1B, 8
Civil Engineering 144, 146
Entomology 126
Food Technology 112
Physics 2A–2B, 3A–3B
Public Health 112, 113, 114, 115, 117, 118, 119, 134, 147B, 162, 170
One of the following:
  Physiology 1–1L
  Zoology 1A

Honors

Students whose work has been of marked excellence may receive the award of Honors or Highest Honors at graduation.

GRADUATE CURRICULA

DEGREE OF MASTER OF PUBLIC HEALTH

Admission.—To be admitted to the curriculum leading to the degree of Master of Public Health, the student must have graduated from an approved medical school, college of dentistry, or college of engineering, or have received an acceptable bachelor's degree with adequate training in mathematics and the natural sciences, including chemistry and biology, and in the social sciences; he must be qualified in some professional capacity for postgraduate education in public health; and must have, in addition, either

1. Professional academic qualification in engineering, nursing, education, or postgraduate work in other fields of public health; or
2. Three years of experience in responsible public health practice.

An applicant for the M.P.H. degree who does not have a doctoral degree must have completed the requirements of the major in his respective fields of emphasis at the University of California or the equivalent elsewhere. For fields of emphasis and requirements therein, see the ANNOUNCEMENT OF THE SCHOOL OF PUBLIC HEALTH. A student who has undergraduate deficiencies must remove them before he may complete the requirements of his curriculum.

General Requirements for the Degree

1. At least one academic year of graduate residence at the University of California and a program including not less than 24 units of acceptable course work in the major subject, of which at least 12 units must be graduate courses. An average of not less than three grade points per unit must be maintained in all work completed in graduate standing. By special permission, a candidate may be authorized to present an acceptable thesis in lieu of 4 of the 24 units required.

2. A comprehensive final examination either in the student's field of specialization or in the general field of public health, as determined by the faculty committee.

3. At least twelve weeks of approved field service in a public health agency. This may be waived for those presenting evidence of previous qualifying experience*.

* Upon completion of the academic requirements, students of hospital administration spend an additional year in an administrative residency in an institution approved by the School.
DEGREE OF DOCTOR OF PUBLIC HEALTH

The doctorate in public health is offered primarily as an advanced study and research degree, in the attainment of which students who already are well advanced in a related fundamental field will carry on intensive work in the application of their particular knowledge to a public health problem. The areas of specialization follow the pattern of the Master of Public Health degree.

General Requirements for the Degree

(1) The candidate must have completed, with a grade B average or better, basic courses equivalent to those required for the degree of Master of Public Health at the University of California and such additional courses as may be prescribed by an examining board appointed by the Dean of the School of Public Health to appraise the candidate's academic and professional background.

(2) The candidate must have passed a qualifying examination conducted by a committee appointed by the Dean of the Graduate Division.

(3) In addition to requirements (1) and (2) above, the candidate must have completed, in residence at the University of California, at least one academic year of work involving advanced specialization in the particular field of public health for which he is preparing.

(4) The candidate must have indicated his capacity to make a substantial contribution to the advancement of the science and art of public health by submitting a dissertation on a subject chosen by himself and bearing on his principal subject of study, and of such character as to show power to prosecute independent investigation. In respect to the program of research and dissertation the candidate will follow Plan A as outlined in the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION, in its discussion of the Degree of Doctor of Philosophy.

(5) The candidate must have demonstrated ability either
   (a) by leadership in his field as evidenced by successful professional experience in a post involving the exercise of substantial initiative and responsibility, or
   (b) by such other means as the faculty of the School of Public Health may prescribe.

DEGREE OF MASTER OF ARTS

Graduate work in biostatistics leading to the degree of Master of Arts is offered under the joint direction of the faculty of the School of Public Health and members of the Mathematics–Statistical Laboratory of the Department of Statistics.

Admission.—Entrance requirements are the holding of at least a bachelor’s degree in a field subject to integration in biostatistics.

Requirements for the Degree.—Specific course requirements, details of program and standards may be obtained from the School of Public Health and the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION.

DEGREE OF DOCTOR OF PHILOSOPHY

Graduate work is offered in epidemiology leading to the degree of Doctor of Philosophy. Work in biostatistics leading to the degree of Doctor of Philosophy is directed jointly by the faculty of the School of Public Health and members of the Mathematics–Statistical Laboratory of the Department of Statistics.
Admission.—Entrance requirements include an acceptable bachelor's degree in a field subject to integration in and more extensive application to one of the above areas. Applicants for admission must meet the standards of the Graduate Division and must have the approval of the staff in epidemiology or biostatistics.

Requirements for the Degree.—Specific course requirements, details of program and standards may be obtained from the School of Public Health and the Announcement of the Graduate Division, Northern Section.

SCHOOL OF SOCIAL WELFARE

The School of Social Welfare offers a graduate curriculum leading to the professional degree of Master of Social Welfare (M.S.W.). The graduate program consists of two academic years (four semesters). The work of the first year is designed to give all students a knowledge of the social services and related problems, and an opportunity to develop skill in professional practice. In the second year of study, students extend and develop the knowledge and skills acquired in the first year and concentrate on practice in casework or group work in a variety of settings such as corrections, family and child welfare, medical, psychiatric, or school; and in individual instances, in which a suitable program can be worked out, in social welfare administration and social welfare research. These areas are selected in accordance with the student's interests and aptitudes.

Students who are unable to continue immediately to the second year are qualified for some professional positions in social work and are eligible to take the official State of California examination for Registered Social Workers.

Requirements for Admission.—Admission to the School of Social Welfare is limited to students who:

I. Hold the degree of Bachelor of Arts or Bachelor of Science from the University of California or an equivalent degree from a college or university of recognized standing, and who have established their eligibility for admission in graduate standing at the University of California.

II. Are in good health, as indicated by a thorough medical and physical examination conducted by the University of California Student Health Service at time of registration.

III. Comply with the following requirements:
   A. Completion of the group major in social welfare offered at the University of California, Berkeley, or an equivalent major.
   or
   Completion of undergraduate study of psychology and the social sciences at the upper division level sufficient, in the judgment of the Admissions Committee of the School of Social Welfare, to permit graduate study in the School.
   B. Completion of an introductory course in statistics.

IV. Satisfy the Admissions Committee of the School that they are suitable in other respects, such as age and personal qualifications, for the profession of social work.

Undergraduate Preparation.—The group major in social welfare, described on page 71, is strongly recommended, but not required, for students preparing for admission to the School of Social Welfare. Students may major in psychology, one of the social sciences, a group major in social science, or some other subject, provided always that a substantial background in psychology and the social sciences is acquired. An introductory course in statistics is a prerequisite to admission. Students looking forward to working in the social
welfare field are cordially invited to consult the Department of Social Welfare for advice as early as possible in their college careers.

Requirements for the Master’s Degree.—The degree of Master of Social Welfare (M.S.W.) will be granted to students who:

I. Have been admitted to the School of Social Welfare in accordance with the regulations of the Academic Senate.

II. Have spent two years of graduate study in social welfare, including at least one year in residence at the University of California, Berkeley.

III. Have completed a program of study approved by the School, according to one of the following plans:

Plan 1. There are required (a) at least 40 units in upper division, graduate, and professional courses completed subsequent to receipt of the bachelor’s degree, including a minimum of 20 units of upper division and graduate courses completed with an average grade not lower than grade B; (b) the completion of a satisfactory thesis; and (c) the passing of a comprehensive final examination in the field of social welfare.

Plan 2. There are required (a) at least 44 units in upper division, graduate, and professional courses completed subsequent to receipt of the bachelor’s degree, including a minimum of 24 units of upper division and graduate courses, of which at least 6 units must be graduate research courses, completed with an average grade not lower than grade B; and (b) the passing of a comprehensive final examination in the field of social welfare.

IV. Students who have completed courses which are part of the social welfare curriculum in an accredited school of social welfare elsewhere than at the University of California, may be granted credit for such courses to the value of not more than 24 units. Not more than 4 such units will be accepted, however, toward satisfaction of the required 20 or 24 units in upper division and graduate courses. Such students must have maintained an average grade not lower than B in all those upper division and graduate courses undertaken in graduate residence at the University of California.

Dates of Filing Applications.—Admission to the School of Social Welfare as a full-time student is possible only in the fall of each year. Applications should be submitted as early as possible after the first day of January for the following academic year. The deadline for fall applications is July 15. Students may be admitted in either the fall or spring semester to take courses only in the part-time degree program. The deadlines for these applications are July 15 for the fall semester and December 15 for the spring semester. Application forms may be obtained at the School of Social Welfare, Building T-1, Berkeley 4, California.

For further information, see the Announcement of the School of Social Welfare.

CURRICULUM IN HOSPITAL DIETETICS

The Department of Nutrition and Home Economics of the College of Agriculture, with the approval of the Graduate Council, is authorized to issue a Certificate of Completion in hospital dietetics to students who complete with an average grade of at least B the curriculum described below, and an internship of four months approved by the curriculum adviser.

Requirements for Admission.—Applicants must qualify for admission to the Graduate Division, must meet the requirements of an undergraduate major in nutrition or dietetics, must present satisfactory certificates of health, and,
in addition, must have the approval of the committee concerned with the training in hospital dietetics.

Course of Study.—The curriculum extends over a period of at least one calendar year, including one semester of residence at the University of California Hospital in San Francisco, one semester of residence at the University of California in Berkeley, and a four-month period of internship assigned by the curriculum adviser. During the residence in San Francisco, the student must complete 8 units of instruction and supervised practice in hospital dietetics, and during the residence in Berkeley, 10 to 15 units of work, partly in graduate courses, and ordinarily including courses in human nutrition or diet in disease, laboratory methods in metabolism or advanced biochemistry, marketing or business administration, and hospital dietetics.

Students accepted for the dietetic internship under the academic program are permitted to register for certain courses credited toward a graduate degree in nutrition during the semester in which they are in residence at Cowell Hospital. It should be noted that a student may not be a candidate for a degree and a certificate at the same time.

All inquiries should be addressed to the Chairman of the Department of Nutrition and Home Economics, University of California, Berkeley 4.
INSTITUTE OF INDUSTRIAL RELATIONS

The Institute of Industrial Relations, authorized by the Legislature of the State of California in 1945, began operations in 1946. It is concerned with two principal types of activity: (1) pursuing an integrated interdisciplinary research program currently directed primarily toward the study of labor-management relations; wages and related problems; economic security programs; the labor market and labor mobility; the labor movement, social groups, and industrialization; social and industrial psychology; and the management sciences. Research staff members of the institute are usually drawn from the regular faculties of the Business Administration, Economics, Political Science, Sociology and Social Institutions, and Psychology departments. A number of half-time graduate research assistantships are available to qualified graduate students each year in connection with this program. (2) conducting, in cooperation with University Extension, a community relations program serving management, unions, and other groups interested in industrial relations. The program consists of public lectures, conferences, institutes of varying duration, and evening courses. The institute has no curriculum and offers no courses of its own, but it does issue a Curriculum Handbook which outlines the industrial relations courses offered by teaching departments on the Berkeley campus. This handbook, the institute's latest annual report, a list of its reprints and publications, and information about graduate research assistantships, may be obtained from the Institute of Industrial Relations, 201 Old California Hall, University of California, Berkeley 4.

THE INSTITUTE OF INTERNATIONAL STUDIES

The Institute of International Studies at Berkeley was established in 1955, to support faculty research interests in international studies and to facilitate coordinated approaches to research and training. The institute serves to coordinate the administrative aspects of research, to respond to the changing interests of individual scholars and of groups, and to act as a clearinghouse for information on international studies at Berkeley.

Among the component parts of the Institute of International Studies is the previously established Bureau of International Relations. The work of the former Institute of East Asiatic Studies has also been incorporated. The Center for Latin American Studies and the International Urban Research project became part of the institute in 1956, and the Center for South Asia Studies, the Center for Slavic Studies (formerly the Institute of Slavic Studies) and the Center for Chinese Studies in 1957. The Center for Japanese Studies was established in the summer of 1958. The School of Law through its International Legal Studies program works closely with the Institute of International Studies.

The institute helps initiate, gain support for, and coordinate either individual or group research projects. It also works toward the development and improvement of teaching and training programs, in cooperation with regular teaching departments.

Asia Studies.—The Center for Chinese Studies established in 1957, is primarily concerned with the development of social science research on contemporary China. The central emphasis of the program is assisting graduate students in the fields of economics, history, political science, and sociology to apply their basic disciplines to the study of contemporary China. For this purpose, a limited number of grants are awarded to students each year for language study, so that they may acquire a proficiency in Chinese which will enable them to engage in independent research. During the initial period of

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the center, the sponsorship of research projects by faculty members is being undertaken as a subsidiary aspect of the program. During 1959–1960 separate studies of Chinese Communist terminology and the agriculture of Communist China will be in process. Other center activities include the maintenance of a reading room and regular research colloquia. For further information, inquire at 2168 Shattuck Avenue, Berkeley 4.

Activities in East Asia Studies (formerly The Institute of East Asiatic Studies) represent faculty research interests. Each program is sponsored by a faculty committee. The East Asia Studies office assists in the administration of the entire program, which is comprised of Southeast Asia Studies, the Chinese Dynastic Histories Translations project, Korean Studies, the Mongolian Dictionary project, the Thai Dictionary project, and the East Asia Teacher Training Program.

The Center for Japanese Studies was established in 1958 to develop the facilities for research by faculty members and graduate students whose primary interests are in Japanese studies. The center provides opportunities for the faculty and students of various departments to hold seminars and sponsor public lectures.

Administered within the Center for South Asia Studies are several formal research programs, including the Indian Press Digests Project, the South Asia Village Studies Project, and the South Asia Languages Project. The center coordinates a wide range of other activities relating to South Asia Studies. These extend from the conducting of a colloquium to performing services for individual faculty members engaged in research on South Asia; from advising graduate students and student activities to sponsoring lectures by distinguished visiting South Asians.

For further information concerning Asia Studies, see the current Report on Courses and Research on Asia, or inquire at 220 Building T-8, University of California, Berkeley 4.

Slavic Studies.—The Institute of Slavic Studies was established in 1948, with the assistance of the Rockefeller Foundation, for the purpose of encouraging graduate teaching and research on the Slavic nations, both Russian and non-Russian. Its work has been continued by grants from outside sources and with University funds.

In 1957 the work was divided between Berkeley and Los Angeles, and the Center for Slavic Studies was established at Berkeley for the purpose of offering facilities for the conduct of interdisciplinary research on all the Slavic nations. The center serves to coordinate the resources of the University for developing personnel qualified to do research in Slavic studies and to train graduate students seeking careers in this field, particularly in the social sciences and humanities. Courses in the fields of Slavic studies in the departments of Economics, Geography, History, Political Science and Slavic Languages and Literatures may be selected for inclusion in the curricula for the master's degree, which is administered by the Group in Slavic Studies. These courses are also available to students taking their Ph.D. degrees in the various departments.

For further information, see Bulletin of the Center for Slavic Studies, or inquire at the office of the Chairman, 1227 Dwinelle Hall, University of California, Berkeley 4.

Latin American Studies.—The Center for Latin American Studies was established in 1956 on the request of faculty members, primarily in the humanities and social sciences, who had been meeting as an informal Latin American Colloquium since 1950.

The primary function of the Center for Latin American Studies is to encourage and to facilitate research. It seeks to accomplish this by stimulating interchange among scholars in various disciplines, exploring means to support individual and group research, and sponsoring occasional conferences.
Institute of International Studies

and guiding the acquisition of research materials. The center has an interest in teaching reflected in the participation of its members in both graduate and undergraduate instruction.

For further information inquire at 492 Library Building, University of California, Berkeley 4.

International Urban Research.—In its effort to enlarge our knowledge of urban phenomena International Urban Research undertakes, as one of its functions, the collection and standardization of basic data, particularly as they pertain to large cities. To this end the office systematically gathers and files information about all the earth’s cities and metropolitan areas of 100,000 or more inhabitants. In this way it is able to provide individual scholars with useful data not otherwise readily available to them. The monograph, *The World’s Metropolitan Areas*, for example, represents the most comprehensive attempt to date to delimit metropolitan areas throughout the world using a common frame of reference.

In the analytical part of its work I.U.R. gives strong emphasis to the comparative approach in the study of particular features of urbanization. Individual topics such as urban growth, population density, the internal structure of metropolitan areas, demographic characteristics of urban populations, the hierarchy of cities within countries, are investigated. The purpose is primarily that of scientific understanding, but it is hoped that some of the knowledge will be put to practical use by governmental and other agencies concerned with cities.

Some of the research involves the intensive examination of particular countries or regions. Japan, one of the few non-Western countries with a high degree of urbanization, is currently being analyzed by a member of the I.U.R. staff from the standpoint of the history and character of its urban pattern.

The office not only seeks to do urban research itself but also to improve and diffuse the methods and techniques of investigation. This continuous methodological effort is illustrated by a volume now in preparation, *A Handbook of Urban Research Methods*, which is meant primarily to serve as a guide for those with little prior experience in urban research.

Graduate students wishing financial assistance and clerical aid in completing research for the Ph.D. in the urban field (regardless of discipline) can qualify for research training positions, if their projects are approved by the staff. Applications are received, and work may begin, at any time during the year. For detailed information, inquire at B-38 Dwinelle Hall, University of California, Berkeley 4.

Bureau of International Relations.—The bureau was established in 1919 in answer to the need following World War I for a means of bringing together studies in international relations.

The bureau is the administrative office for the Institute of International Studies. It is responsible for an International Relations Library which provides students and faculty members with facilities and materials for study and research in international law, economics, and politics. In addition, the bureau administers certain other University activities such as conferences of an international nature. It acquaints foreign visitors with the resources of the University, and works closely with such community agencies as the World Affairs Council of Northern California. The bureau assists students seeking knowledge of the forces and influences affecting present-day world politics, and provides information concerning careers in international relations or in the Foreign Service of the United States.

Hundreds of foreign visitors come annually to the University of California where the Bureau of International Relations arranges introductions between University faculty members and foreign visitors, meetings of various kinds, and participation in campus events of interest to the visitors. Students are
encouraged to meet and act as hosts to foreign guests while they are at the University.

Assistance in negotiating international contracts has been part of the work of the Bureau of International Relations since 1952 when the San Francisco Medical School initiated its participation in a program of technical aid in Indonesia through the University of Indonesia.

In connection with international contracts the bureau arranges an orientation program for participant specialists and their families going abroad under University of California auspices.

For further information concerning the services furnished by the Bureau of International Relations, inquire at 376 Library Building, University of California, Berkeley 4.

THE GRADUATE DIVISION

For information concerning all matters pertaining to the Graduate Division, including the list of available fellowships and graduate scholarships, and the requirements for higher degrees, see the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION, to be obtained from the Dean of the Graduate Division.

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Announcement
of Courses

DEPARTMENTS AT
BERKELEY

Fall and Spring Semesters
1959–1960

AUGUST 15, 1959

UNIVERSITY OF CALIFORNIA, BERKELEY
CALENDAR*
Referring Primarily to the Departments of the University at Berkeley

1959 FALL SEMESTER, 1959–1960

July 15, Wednesday  Last day for filing credentials and applications for admission to graduate standing with the Dean of the Graduate Division.

Aug. 17, Monday  Final date for applications for admission to undergraduate status for the fall semester and credentials to be filed with the Director of Admissions. Credentials received as late as this may not be evaluated in time for the enrollment of the student during the regular registration period.

Sept. 1, Tuesday  Last day for filing applications for readmission to graduate status with the Registrar.

Sept. 7, Monday  Labor Day—an academic and administrative holiday.

Sept. 11, Friday, or Sept. 14, Monday  Examination in English for foreign students, 1 to 4 p.m., 101 California Hall.

Sept. 12, Saturday  Subject A Examination, 9 a.m. to 12 m.

Sept. 14, Monday  Fall semester begins.

Sept. 15, Tuesday  Mathematics 3, 3A, and 3C qualifying examination, 4:15 to 6:15 p.m.

Sept. 15, Tuesday  Chemistry 1A Aptitude Test, 4:15 to 5:45 p.m.

Sept. 16, Wednesday  Registration of students, graduate and undergraduate, in the departments at Berkeley for courses of the fall semester.

Sept. 17, Thursday  Advance enrollment. Assignment to sections.

Sept. 18, Friday  Instruction begins.

Sept. 21, Monday  Last day for filing applications in candidacy for all master’s degrees to be conferred in January, 1960; office of the Dean of the Graduate Division, 102 Sproul Hall. All signatures required upon these applications must be obtained in advance.

Oct. 2, Friday  Last day for filing applications and programs in candidacy for the certificates of completion of teacher-training curricula to be received in January, 1960; office of the Faculty Counseling Committee of the School of Education, 103 Haviland Hall.

Oct. 5, Monday  Last day for filing announcement of candidacy for a bachelor’s degree to be conferred in January, 1960; before 4:30 p.m. at the office of the Registrar, Sproul Hall.

Oct. 9, Friday  Last day for filing applications in candidacy for the degrees of Doctor of Philosophy, Doctor of Public Health, Doctor of Engineering, Doctor of Education, and Doctor of Library Science, to be conferred in June, 1960; office of the Dean of the Graduate Division, 102 Sproul Hall. All signatures required upon these applications must be obtained in advance.

Oct. 28, Wednesday  Last day to file petitions to add or drop courses. After this date, upon written petition duly approved by the dean of the college or school, an undergraduate student may discontinue attendance in a course, though without permission to drop the course from the study list. Normally, "F" will be assigned as the final grade in such discontinued courses. Graduate students may drop courses after this date with the permission of the Dean of Graduate Division.

Nov. 6, Friday  Last day to file application to take an engineering examination for admission in the spring semester, 1960.

Last day for filing in final form with the committees in charge theses for the degrees of Doctor of Philosophy, Doctor of Public Health, Doctor of Engineering, Doctor of Education,

* Importance of early application: In order to give time for necessary correspondence and for due notice to applicants who may be required to take examinations for admission, applications and credentials should be forwarded to the Director of Admissions at the earliest possible date.
Calendar

Nov. 7, Saturday
Engineering Examinations: Lower Division, 8 a.m. to 12:30 p.m.; Upper Division, 8 a.m. to 4:30 p.m.

Nov. 17, Tuesday
Last day to file application for admission or readmission to the University for students wishing to enroll in the College of Engineering in the spring semester, 1960.

Nov. 26, Thursday
Thanksgiving holiday—academic and administrative.

Nov. 27, Friday
Fall recess—an academic holiday.

Nov. 26, Thursday, to Nov. 28, Saturday
Last day for filing credentials and applications with the Dean of the Graduate Division for admission to graduate standing in the spring semester.

Last day for filing applications with the Dean of the Graduate Division for readmission to graduate standing in the spring semester.

Last day for filing in final form with the committees in charge of theses for master's degrees to be conferred in January, 1960.

Dec. 15, Tuesday
Christmas recess—an academic holiday.

Dec. 21, Monday, to Jan. 2, Saturday
Christmas holiday—academic and administrative.

Dec. 24, Thursday
New Year's holiday—academic and administrative.

Dec. 25, Friday

Dec. 31, Thursday

Jan. 1, Friday

1960
Jan. 4, Monday
Instruction resumes.

Jan. 7, Thursday

Jan. 11, Monday
Last day for students enrolled in the current session to file applications for undergraduate scholarships for 1960–1961.

Jan. 16, Saturday
Instruction ends.

Jan. 18, Monday, to Jan. 27, Wednesday
Final examinations in the departments at Berkeley.

Jan. 28, Thursday
Fall semester ends.

Jan. 15, Friday
Last day for filing theses with the Dean of the Graduate Division for master's degrees to be conferred in January, 1960.

1959
Dec. 15, Tuesday
Last day for filing credentials and applications with the Dean of the Graduate Division for admission to graduate standing.

Last day for filing applications with the Dean of the Graduate Division for readmission to graduate standing.

1960
Jan. 15, Friday
Applications for admission to undergraduate status for the spring semester and credentials to be filed with the Director of Admissions.

Last day for filing applications for readmission to undergraduate status with the Registrar.

Jan. 29, Friday, or Feb. 1, Monday
Examination in English for foreign students, 1 to 4 p.m., 101 California Hall.

Jan. 30, Saturday
Subject A Examination, 9 a.m. to 12 m.

Feb. 1, Monday
Spring semester begins.

Feb. 3, Wednesday
Registration of students, graduate and undergraduate, in the departments at Berkeley for courses of the spring semester.

Feb. 4, Thursday
Advance enrollment. Assignment to sections.

Feb. 5, Friday
Last day for filing applications for fellowships and graduate scholarships for 1960–1961.*

Feb. 8, Monday
Instruction begins.

* Established date of February 7 being Sunday, the deadline is changed to February 8.
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<td>Last day for filing applications in candidacy for all master's degrees to be conferred in June, 1960; office of the Dean of the Graduate Division, 102 Sproul Hall. All signatures required upon these applications must be obtained in advance.</td>
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<td>Feb. 22, Mon</td>
<td>Washington's Birthday—an academic and administrative holiday.</td>
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<tr>
<td>Feb. 23, Tue</td>
<td>Last day for filing announcement of candidacy for a bachelor's degree to be conferred in June, 1960; before 4:30 p.m. at the office of the Registrar, Sproul Hall.</td>
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<td>Feb. 26, Fri</td>
<td>Last day for filing applications in candidacy for the degrees of Doctor of Philosophy, Doctor of Public Health, Doctor of Engineering, Doctor of Education, Doctor of Library Science, and Doctor of Social Welfare, to be conferred in January, 1961; office of the Dean of the Graduate Division, 102 Sproul Hall. All signatures required upon these applications must be obtained in advance.</td>
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<tr>
<td>Feb. 29, Mon</td>
<td>Last day to file petitions to add or drop courses. After this date, upon written petition duly approved by the dean of the college or school, an undergraduate student may discontinue attendance in a course though without permission to drop the course from the study list. Normally, &quot;F&quot; will be assigned as the final grade in such discontinued courses. Graduate students may drop courses after this date with the permission of the Dean of the Graduate Division.</td>
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<td>March 1, Tue</td>
<td>Last day for filing applications and programs in candidacy for the certificates of completion of teacher-training curricula to be received in June, 1960; Office of the Faculty Counseling Committee of the School of Education, 103 Haviland Hall.</td>
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<td>March 23, Wed</td>
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<td>April 11, Mon</td>
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<td>Last day to file application for admission or readmission to the University for students wishing to enroll in the College of Engineering in the fall semester, 1960.</td>
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<td>May 9, Mon</td>
<td>Last day for filing in final form with the committees in charge theses for master's degrees to be conferred in June, 1960.</td>
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<tr>
<td>May 19, Thu</td>
<td>Last day for filing theses with the Dean of the Graduate Division for the degrees of Doctor of Philosophy, Doctor of Public Health, Doctor of Engineering, Doctor of Education, and Doctor of Library Science, to be conferred in June, 1960.</td>
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<td>May 28, Sat</td>
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<td>May 30, Mon</td>
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<td>May 31, Tue, to June 9, Thu</td>
<td>Final examinations in the departments at Berkeley.</td>
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<tr>
<td>June 9, Thu</td>
<td>Last day for filing theses with the Dean of the Graduate Division for master's degrees to be conferred in June, 1960.</td>
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THE REGENTS OF THE UNIVERSITY

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State Capitol, Sacramento 14

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State Capitol, Sacramento 14

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State Capitol, Sacramento 14

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721 Capitol av, Sacramento 14

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804 Mechanics' Institute bldg.
San Francisco 4

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President of the Alumni Association of the University of California
1199 Sherwood rd, San Marino

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President of the University
714 University Hall, Berkeley 4

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717 N Highland av, Los Angeles 38

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GUS OLSON, B.S. (1960)
Clarksburg

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1421 Central bldg, 14th and Broadway, Oakland 12

HOWARD C. NAFFZIGER, B.S., M.S., M.D. (1968)
Room 417, 58 Sutter st, San Francisco 4

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615 University Hall, Berkeley 4

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590 University Hall, Berkeley 4

401 S Broadway, Los Angeles 13

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THOMAS M. STORKE, A.B. (1960)
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701 N Canon dr, Beverly Hills

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811 W Seventh st, Los Angeles 17

Lockheed Aircraft Corporation, 2555 N Hollywood way, Burbank

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3900 Market st, Riverside

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UNIVERSITY OF CALIFORNIA

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Frederick T. Tyler, Ph.D., Associate Dean of the School of Education.
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Orlando W. Wilson, A.B., Dean of the School of Criminology.

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Kathryn M. Smith, M.A., Assistant Dean of the School of Nursing.
David E. Snodgrass, A.B., LL.B., Dean of Hastings College of the Law.
Malcolm S. Watts, M.D., Assistant Dean of the School of Medicine.
Gurdon G. Woods, Director of the California School of Fine Arts.
Wendell L. Wylie, D.D.S., M.S., Assistant Dean of the School of Dentistry.
At least 108 units offered for the degree of Bachelor of Arts must be in courses chosen from the Letters and Science List of Courses.

Courses not on the list, but taken for credit to satisfy a general University requirement established by the Board of Regents, will be accepted as equivalent to courses in the Letters and Science List up to a maximum of 8 units.

Any course not included in the Letters and Science List of Courses, but required, or accepted, as part of a major or group major or as a prerequisite therefor, shall, for students offering that major or group major at graduation, but for not others, be treated as if it were in the Letters and Science List of Courses.

Thirty-six units of upper division courses, selected from the following list, must be completed after the student has attained upper division standing.

Agricultural Economics 112A, 112B, 120.
Anatomy. All undergraduate courses.
Anthropology. All undergraduate courses.
Architecture 14A, 14B, 110, 121, 122, 126, 127.
Art. All undergraduate courses.
Astronomy. All undergraduate courses.
Bacteriology. All undergraduate courses.
Biochemistry. All undergraduate courses.
Botany. All undergraduate courses except 155.
Business Administration 1A, 1B, 10, 18, 100, 150.
Chemistry. All undergraduate courses except 125, 125L.
City and Regional Planning. All undergraduate courses.
Classics. All undergraduate courses.
Comparative Literature. All undergraduate courses.
Decorative Art. All undergraduate courses.
Dramatic Art. All undergraduate courses except 190, 191, 192, 193.
Economics. All undergraduate courses.
Education 100A and not more than 3 units from 101, 102, 105.
English. All undergraduate courses.
Forestry 1, 103, 122, 125.
French. All undergraduate courses except 20.
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.
Italian. All undergraduate courses.
Journalism. All undergraduate courses except 131, 152, and 181 series.
Latin. All undergraduate courses.
Linguistics. All undergraduate courses.
Mathematics. All undergraduate courses.
Music. All undergraduate courses; a total of not more than 8 units from the following courses will be accepted as Letters and Science credit: 43, 46, 48, 143, 146, 148.
Near Eastern Languages. All undergraduate courses.
Optometry (see Physiological Optics, below).
Oriental Languages. All undergraduate courses.
Paleontology. All undergraduate courses.
Philosophy. All undergraduate courses.
Physical Education 105.
Physics. All undergraduate courses except 131.
Physiological Chemistry. All undergraduate courses.
Physiological Optics 105A, 105B, 106A, 106B.
Physiology. All undergraduate courses.
Plant Nutrition 115, 117.
Political Science. All undergraduate courses except 183.
Psychology. All undergraduate courses except 3, 104, 114, 116, 117, 180, 185, 186.
Sanskrit. All undergraduate courses.
Scandinavian. All undergraduate courses.

Letters and Science List of Courses

Slavic Languages and Literatures.
All undergraduate courses.
Social Welfare 100, 106, 110A, 110B.
Sociology and Social Institutions. All undergraduate courses.
Spanish and Portuguese. All undergraduate courses.
Speech. All undergraduate courses.
Statistics. All undergraduate courses except 7, 142A, 142B, 142C, 142D, 144.
Virology. All undergraduate courses.
Zoology. All undergraduate courses except 116, 119A–119B, 120, 145.
GENERAL INTEREST COURSES FOR UPPER DIVISION STUDENTS

Listed below are courses of general interest to all upper division students. For the most part, there are no prerequisites except upper division standing. Included are courses offered by departments for nonmajors. For more detailed information, see the complete course description in the departmental announcement on the following pages.

Agricultural Economics: 100A, 100B, Economic Analysis in Agriculture; 112A–112B, Rural Sociology; 120, Agricultural Policy; 130, Agricultural Marketing; 140, Fundamentals of Farm Management; *145, Land Economics and Farm Appraisal.

Anatomy: 102, General Human Anatomy; 103, Neuroanatomy.

Anthropology: 103, Culture Growth; 118, The Nature of Culture; 119, Problems in Culture and Personality; 120, Language and Culture; 124, Primitive Religion; 125, Comparative Society; 152, Human Evolution and Fossil Man; 153, Living Races of Man.


Botany: 115, Plants in Relation to Man; 151, Principles of Plant Distribution.

City and Regional Planning: 110, Introduction to City Planning; 111, Introduction to Housing; *121, Urban Aesthetics.

Classics: 100A–100B, 128, Greek and Latin Literature in Translation; *138, The Greek and Roman Historians; 151, Ancient Greek Religion; 170B, 170C, Classical Archaeology; 178, Mythology; *185, Political and Social Thought of the Ancient Greeks.

Criminology: 100A–100B, Crime Causation, Prevention and Correction; 103, Psychological Aspects of Criminology.


* Not to be given, 1959–1960.
Upper Division Courses of General Interest

Mediterranean; Medieval to Modern Europe); 195A, The History of Interior Design; *195B, American Decorative Art from the First Colonial Periods to 1850.


Education: *101, The History of Education—General Course: 105, Education in Foreign Countries; 106, Philosophy of Education; 100A, Learning and the Learner; 130, The Elementary School Curriculum; 172, Junior High School Education; 182, Problems of Adulthood.


English: 110, The English Language; 114A–114B, The English Drama (114A, From the Miracle Plays to 1642; 114B, From 1642 to 1850); 116, The English Bible as Literature; 117A–117B, Shakespeare; *117E, Shakespeare; *117J, Shakespeare; 119, The Age of Johnson; 121, The Romantic Period; 122, The Victorian Period; 123, Nineteenth-Century British Prose; 125B, The Novel in Western Civilization; 125C–125D, The English Novel; *125E, The American Novel; *128, Regional Literature: California and the West; 130A, American Literature before 1840; 130B, American Literature: 1840–1885; 130C, American Literature: 1885 to the Present; 131, American English; *132, The Transcendental Movement in American Literature; 141, Modes of Writing (Exposition, Fiction, Verse, etc.); *149, The English Lyric; *152, Chaucer.

Entomology and Parasitology: 100, General Entomology; 117, Helminthology; 126, Medical Entomology; 133, Biology of Aquatic Insects.

Forestry: 103, Principles of Forest Ecology; 121, Forest Economics; 122, Forest Policy.

French: *142A–142B, French Literature of the Middle Ages (142A, Epic, Romance, History; 142B, Drama, Lyric and Allegorical Poetry); 146A*–146B, Readings in Contemporary French Literature.

Genetics: *100, Principles of Genetics.

Geography: (All upper division courses.)

History: Many upper division courses in History have no specific prerequisites, although preparation such as that provided by the appropriate lower division course is generally desirable.

Home Economics: 137, Marriage and Family Relationships; 139, The Sociology of Child Development.


* Not to be given, 1959–1960.
Upper Division Courses of General Interest

**Linguistics:** 100, Principles of Descriptive and Historical Linguistics.

**Mathematics:** 190A–190B, Survey of Algebra and Analysis.

**Music:** 127A, Introduction to Opera; *127B, The Symphonies of Beethoven; 127C, Introduction to Contemporary Music; 127D, Bach and Handel; 140, Opera Workshop; 141, Advanced University Symphony Orchestra; 142, University Chamber Band; 143, Advanced University Concert Band; 144, Advanced University Chorus; 146, Advanced Chamber Music Ensemble; 148, Advanced Piano Ensemble; 145, Repertory Chorus; *149, Collegium Musicum.

**Near Eastern Languages:** 1, Cultural and Linguistic Patterns of the Near East; *12, Great Books of Hebrew Literature; 15B, Hebrew Civilization; *25, Great Books of Islamic Literature; 170A–170B, The Religion and Cosmology of Ancient Egypt and Mesopotamia; 180A–180B, Islamic Civilization; *200A–200B, Bibliography and Historiography of Islamic Studies.


**Paleontology:** 170, History of Paleontology.

**Physical Education:** 120, Sports in American Society; 140, Community Recreation; †143A, Theory and Principles of Recreation; †143B, The Organization and Administration of Recreation.

**Physics:** 132, Modern Physics.

**Physiology:** 102, Physiology of Growth and Development in the Child; 107, Environmental Physiology.

**Political Science:** 100A, Government in the United States; 104A, State and Local Government in California; 120A–*120B, Elements of International Relations; 128B, The Conduct of American Foreign Relations; 162A, Public Opinion.

**Psychology:** 136, Psychology of the Unconscious; 145, Social Psychology; *160, Mental Deficiency; 185, Personnel and Industrial Psychology.

**Public Health:** 101, Introduction to Health Administration; 106, Medical Sociology; 111, Environmental Sanitation; 112, Control of Vector and Reservoir Animals Affecting the Public Health; 113, Sanitary Control of Foods; 115, Radiological Aspects of Public Health Engineering; 125, Child Health; 135, Individual Health; 160A–160B, Biometry; 163, Demography; 170, Introduction to Occupational Health and Industrial Hygiene; 186, Social, Medical, and Public Health Aspects of Venereal Disease Control; 189, Nutrition Problems in Public Health.

**Range Management:** 101, Introduction to Range Management.

**Scandinavian:** 100A–100B–100C, History of Scandinavian Literature (*100A, From 1300 to 1850; 100B, From 1850 to World War I; 100C, From World War I to the present); 106, History of Scandinavian Drama

* Not to be given, 1959–1960.
† To be given if a sufficient number of students enroll.
Upper Division Courses of General Interest

up to 1900; 107, The Plays of Ibsen; 108, Strindberg and His Writings; 109, Scandinavian Drama of the Twentieth Century; 120A–120B, The Novel in Scandinavia; 125, Masterpieces of Old Norse Literature.

Slavic Languages and Literatures: 130, Introduction to Russian Literature; 131, Russian Literature (1880–1917); 132, Russian Literature since 1917; 133A, Russian Novelists of the Nineteenth Century and Western European Literatures; 133C, Dostoevsky; 133D, Tolstoy; 133E, Turgenev; 133F, Chekhov; 134, Russian Folklore; 135, The Russian Drama; 140, Survey of Slavic Literatures; 143, Introduction to Modern Slavic Literary Theory; 151, Polish Literature: Sixteenth-Eighteenth Centuries; 153, Polish Literature of the Post-Romantic Period; 154, Polish and Russian Romanticism; 155, Mickiewicz; 160, Survey of Czech and Slovak Literature; 161, Czech and Slovak Literature of the Nineteenth Century; 170, Survey of South Slavic Literatures; 180A–180B, Survey of Russian Culture; 182, History of Polish Culture; 188, The Slavic-Speaking World.


Sociology and Social Institutions: Many upper division courses in Sociology and Social Institutions have no specific prerequisites although preparation such as that provided by the appropriate lower division course is generally desirable.

Speech: 117A–117B, Semantics; 119, Analysis of Communication Content; 135, British Public Address during the Eighteenth and Nineteenth Centuries; 137, American Public Address during the Eighteenth and Nineteenth Centuries; 138, Modern Public Address; 139, Modern Spokesmen; 147, Modern Rhetoric.


* Not to be given, 1959–1960.
COURSES OF INSTRUCTION*
FALL AND SPRING SEMESTERS, 1959–1960

Explanatory Note

The credit value of each course in semester units is indicated for each semester by a number in parentheses following the title. A semester unit is one hour of the student's time at the University, weekly, during one semester, in lecture, or recitation, together with the time necessary in preparation thereafter; or a longer time in laboratory or other exercises not requiring preparation. The session in which the course is given is shown as follows: I, first semester (September to January); II, second semester (February to June); Yr., throughout the first and second semesters. Information concerning class hours will be found in the Schedule and Directory.

Year courses; double numbers.—A course designated by a double number (for example, History 4A-4B) is continued through two successive semesters, ordinarily from September to June; occasionally, however, the first part of a year course may begin in February. The student should use the first number in registering for the course during its first semester, and the second number during its second semester. The first half of such a course is prerequisite to the second half unless there is an explicit statement to the contrary. A final report is made by the instructor at the end of each semester. The student may discontinue the course at the end of the first semester, with final credit for the first half of the course, except as otherwise noted.

Classification and Numbering of Courses—

Courses are classified and numbered as follows:

1. Lower division courses (numbered 1–49, or sometimes indicated by letters if in subjects usually given in high school). A lower division course is open to freshmen and to sophomores. Such courses do not count as upper division work in any department.

2. Upper division courses (numbered 100–199). An upper division course in any department is open to those students only who have completed a lower division course, or courses, in that department; or is an elementary course in a subject of such difficulty as to require the maturity of upper division students. The prerequisites for courses should be noted carefully. Students will not be permitted to register in upper division courses unless they have completed the courses named as prerequisites, or, if no courses are definitely named as prerequisites, until they have attained junior standing in the University. Accepted professional training, however, will be regarded as sufficient preparation for upper division courses in the field in which the student has been trained.

Special study courses for individual advanced undergraduates, usually numbered 199, should be restricted to senior honor students having an adequate preparation in the form of credit for upper division courses.

Five units is the maximum number of units for which a student may enroll or receive credit in any and all 199 courses in any one semester.

Departments may offer special honor 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, and subject to such general restrictions as may be imposed by the department, the college, or school.

* For information concerning general University requirements for degrees and major requirements of colleges and schools at Berkeley, see the Circular of Information.
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, or may be independent of such courses.

(3) **Graduate courses** (numbered 200–299). As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation normally consists of the completion of at least 12 units of upper division work basic to the subject of the graduate course, irrespective of the department in which such basic work may have been completed.

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

(5) **Certain professional courses** in departments other than the Department of Education (numbered 400–499).

Courses are further classified as follows:

**Resident courses.**—Courses of resident instruction are given either during regular sessions or Summer Sessions or (by special arrangement) as 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. All such work is in the form of upper division or graduate extra-session courses, and these courses must be approved in advance by the Committee on Courses of Instruction. Moreover, in pursuance of existing regulations, students must register in advance for all such work, and this registration must be approved by the proper faculty before the work is undertaken.

**University Extension courses.**—In the curricula leading to the A.B. and B.S. degrees, credit is allowed for courses in University of California Extension that bear numbers prefixed by X, XB, XL, XR, or XSB. Such courses are rated, with respect to the general and specific requirements for the bachelor's degree, on the same basis as courses taken in residence at collegiate institutions of approved standing.

For information concerning University Extension courses, apply to the Director, University Extension, University of California, Berkeley 4, California.
AGRICULTURAL CHEMISTRY

Graduate Course

(Concerning conditions for admission to graduate courses, see page 18)

201A–201B. Research in Agricultural Chemistry. (1–6; 1–6) Yr.

The Staff (Mr. Hoskins in charge, including all members of the Graduate Agricultural Chemistry Group)

The research work will ordinarily be under the direction of a member of the instructing staff who is in the field of agriculture in which the student’s preparation has been found to be adequate.

AGRICULTURAL ECONOMICS

(Department Office, 207 Giannini Hall)

Murray R. Benedict, Ph.D., Professor of Agricultural Economics.
Raymond G. Bressler, Jr., Ph.D., Professor of Agricultural Economics.
Varden Fuller, Ph.D., Professor of Agricultural Economics.
Sidney S. Hoos, Ph.D., Professor of Agricultural Economics, Economics, and Business Administration.
George M. Kuznets, Ph.D., Professor of Agricultural Economics, Economics, and Statistics.
George L. Mehren, Ph.D., Professor of Agricultural Economics (Chairman of the Department).
Siegfried V. Wantrup, Dr.Agr., Professor of Agricultural Economics.
Harry R. Wellman, Ph.D., Professor of Agricultural Economics.
Henry E. Erdman, Ph.D., Professor of Agricultural Economics, Emeritus.
David Weeks, Ph.D., Professor of Agricultural Economics, Emeritus.
David A. Clarke, Jr., Ph.D., Associate Professor of Agricultural Economics.
Ivan M. Lee, Ph.D., Associate Professor of Agricultural Economics.
James N. Boles, Ph.D., Assistant Professor of Agricultural Economics.
Norman R. Collins, Ph.D., Assistant Professor of Agricultural Economics.

J. Edwin Faris, Jr., Ph.D., Assistant Professor of Agricultural Economics, Davis.
Chester O. McCorkle, Ph.D., Associate Professor of Agriculture, Davis.
John W. MacSwain, Ph.D., Associate Professor of Entomology.
Knowles A. Ryerson, M.S., Professor of Horticulture.
Loy L. Sammet, Ph.D., Lecturer in Agricultural Economics.
H. Russell Shaw, Ph.D., Assistant Professor of Agricultural Economics, Davis.
Stephen C. Smith, Ph.D., Lecturer in Agricultural Economics.
Laurence W. Taylor, B.S., Lecturer in Agricultural Economics.
Paul S. Taylor, Ph.D., Professor of Economics.

Letters and Science List.—Courses 112A–112B, 120 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Clarke, Mr. Sammet.

Preparation for the Major. See page 77 of the Circular of Information.

Upper Division Courses.—All upper division courses announced by the department presuppose at least junior standing in the College of Agriculture. Juniors and seniors in other colleges may elect such courses in the College of Agriculture as they are qualified to pursue.
To graduate with a major in agricultural economics, a student must have at least a C average in all upper division courses taken in agricultural economics. Students who do not maintain such an average may be required to withdraw from the major at any time.

_Honors._—Students who become candidates for the bachelor's degree in the College of Agriculture may be recommended for honors on the basis of the quality of the work done in the regular curriculum. See page 76 of the Circular of Information.

_Graduate Work._—Concerning conditions for admission to graduate courses, see page 18 of this bulletin. Students who intend to become candidates for higher degrees in the College of Agriculture will be required to give evidence of the completion of an amount of work equivalent, in its value, to that required by the College of Agriculture for the degree of Bachelor of Science. The student is referred to the Announcement of the Graduate Division, Northern Section, for details of graduate work in the various fields of agriculture.

**LOWER DIVISION COURSES**

2. Introduction to Agriculture. (3) I.
   A general survey of United States agriculture, with emphasis on California. Crops and livestock, types of farming, soils and soil conservation, irrigation, pest and disease control, marketing of farm products, economic problems of agriculture, farm organizations and their role.

25. Comparative World Agriculture. (3) II.
   Mr. Ryerson, Mr. Laurence Taylor
   Survey of world agriculture, stressing the development of principal agricultural regions and the interrelations among physical environment, agricultural growth, and population. Tenure, credit, and land reform problems, and the development of backward regions.

**UPPER DIVISION COURSES**

100A. Economic Analysis in Agriculture. (3) I.
   Mr. Sammet
   Prerequisite: Economics 1A-1B, 2, or the equivalent.
   The application of economic principles to problems of agriculture: economic structure and aspects of American agriculture; analysis of demand, supply, production of agricultural products, with particular reference to the individual firm.

100B. Economic Analysis in Agriculture. (3) II.
   Prerequisite: course 100A or the equivalent.
   The application of economic principles to the problems of agriculture: economic pricing of agricultural output and productive services, including multiple products, multiple markets, and multiple time periods; regional specialization, location and trade; determinants of economic change; effects of economic organization.

106. Analysis of Agricultural Economic Data. (3) I.
   Mr. Boles
   Lectures and laboratory. Prerequisite: Economics 2, Mathematics 16A, or the equivalent, or consent of the instructor.
   Evaluation and treatment of economic data in agriculture, with emphasis on methods of analyzing relations among economic variables.

110. Agricultural Finance. (3) I.
   Mr. Benedict
   Prerequisite: Economics 1A or 1B.
   Farmers' credit needs, methods of financing the agricultural industry, and the agencies supplying agricultural credit.
Agricultural Economics

112A-112B. Rural Sociology. (2-2) Yr. Mr. Paul S. Taylor
The forms of human association in rural environment, including their origins, development, structures, functions, and cultural products. Rural population, social organization and institutions, social psychology, ecology patterns, social change, social pathology. Rural community development in underdeveloped countries.

120. Agricultural Policy. (3) II. Mr. Mehren
Prerequisite: Economics 1A-1B.

130. Agricultural Marketing. (3) I. Mr. Sammet
Prerequisite: Economics 1A or 1B.

140. Fundamentals of Farm Management. (4) II. Mr. Carter
Lectures and laboratory. Prerequisite: junior standing.
Farm firm organization and resources; applying economic and technological principles in decision-making; analytical techniques and management control; problems in organizing and managing the farm business.

*145. Land Economics and Farm Appraisal. (3) II.
Lectures and laboratory. Prerequisite: Economics 1A or 1B.
The utilization of agricultural land, economic rent, land appraisal, political and economic problems of land development, land settlement, land policies. The relation of population growth to economic utilization of land and to land value.

Courses 156-175 are senior courses designed for those who have completed courses 100A, 100B, 106, and the appropriate survey course in the 120-145 series. A student not having this preparation but who desires a course in the 156-175 series may be admitted with the consent of the instructor.

156. Agricultural Economic Measurements. (3) II. Mr. Lee
Sources, collection of data, and analysis of selected measurements, including parity prices, parity income, employment, wages, production, and national income.

160A. Economics of Agricultural Marketing. (3) I. Mr. Clarke
An analytical treatment of agricultural marketing; the marketing firm in its economic context; the theory of interregional trade; economic analysis of market organization.

163. Cooperative Management. (3) I. Mr. Clarke
Analysis of organizational and operational problems and policies of agricultural cooperative associations.

175. Economics of Natural Resources. (3) I. Mr. Smith
An analysis of economic issues in public policy decisions affecting natural resources: economic evaluation of projects and programs; tenure of resources; development; conservation; taxation; location; analytical techniques; public policy formation and execution.

* Not to be given, 1959-1960.
198. Directed Group Study. (1-5) I and II. 
   The Staff (Mr. Clarke in charge) 
   Directed group study of selected topics in Agricultural Economics for advanced undergraduates.

199. Special Study for Advanced Undergraduates. (1-5) I and II. 
   The Staff (Mr. Clarke in charge) 
   Prerequisite: senior standing and approval of the department. Limited to agricultural economics majors.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

200A–200B. Economics of Agricultural Production and Consumption. 
   (3–3) Yr. 
   Mr. Hoos, Mr. Bressler
   (Formerly numbered 206A and 206B.) 
   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.

210A–210B. Quantitative Methods in Agricultural Economics. (3–3) I and II. 
   Mr. Boles, Mr. Lee
   (Formerly numbered 204A–204B.) 
   Prerequisite: Statistics 131 and 131L. 
   210A: II. 210B: I. 
   Measurement of economic aggregates; statistical estimation of economic relations; models and studies of intersectoral relations; recursive and independent equation systems; total economy, sector, and commodity models.

220. Agriculture in the General Economy. (3) I. 
   Mr. Mehren 
   Growth trends and cyclical variation in agriculture and in the national economy; comparative income level and distribution; production trends, variations, and projections; changing organization and structure of agriculture in relation to the general economy.

221. Formation and Administration of Agricultural Policy. (3) II. 
   Mr. Fuller 
   (Formerly numbered 180.) 
   Political economy of agricultural policy; defining problems and policy objectives; economic analysis of policy objectives, of program alternatives for their achievement, and of program results.

222. National and World Policies for Agriculture. (2) II. 
   Mr. Fuller 
   (Formerly numbered 202.) 
   A comparative study of national systems of policy formation, objectives, and programs; interrelations of national policies; instruments and institutions for reconciliation of conflicting national interests and objectives.

223. Seminar in Economic Development and Agriculture. (2) I. 
   Mr. Benedict 
   (Formerly numbered 210.) 
   An analysis of the role of agriculture in economic development of selected foreign countries, with emphasis on institutional conditions and government programs.

230A–230B. Agricultural Marketing Research. (3–3) Yr. 
   Mr. Clarke, Mr. Collins 
   A seminar on the literature, current research problems, and methods of analysis in agricultural marketing.
Agricultural Economics; Air Science

240A-240B. Farm Management Research. (3-3) Yr.
(Formerly numbered 212.) Mr. Faris, Mr. McCorkle
A seminar on the literature, current research problems, and methods of analysis in farm management.

270A-270B. Natural Resource Economics Research. (2-3; 3) Yr.
(Formerly numbered 207 and 208.) Mr. Smith, Mr. Wantrup
Prerequisite: 270A is open to qualified graduate students from all departments. 270A is prerequisite to 270B.
270A: Seminar in the application of economics to problems of natural resources. 270B: Seminar in the literature, current research, and methods of analysis in natural resources economics, with emphasis on land and water.

290. Problems in Agricultural Economics Research. (3) II. Mr. Bressler
Identification and statement of research problems; formation of hypotheses; selection and employment of research methods; aggregation of research findings; derivation of policy implications.

298. Individual Research. (1-6) I and II.
(Formerly numbered 203.) The Staff (Mr. Mehren in charge)

299. Special Study for Graduate Students. (1-4) I and II.
The Staff (Mr. Mehren in charge)
Any properly qualified graduate student who wishes to pursue a special field of study may do so if his proposed program of study is acceptable to the member of the staff with whom he works.

AIR SCIENCE
(Department Office, 218 Building T-9)

Samuel C. Gurney, Jr., Colonel, U.S.A.F.; Professor of Air Science (Chairman of the Department).
Eugene J. Kraft, Major, U.S.A.F.; Associate Professor of Air Science.
Vance F. Mitchell, Major, U.S.A.F.; Associate Professor of Air Science.
Augie T. Ong, Major, U.S.A.F.; Associate Professor of Air Science.
Roy V. Deselms, Captain, U.S.A.F.; Assistant Professor of Air Science.
Frank D. Hurlbut, Captain, U.S.A.F.; Assistant Professor of Air Science.
Jon R. Levy, Captain, U.S.A.F.; Assistant Professor of Air Science.
Robert D. Power, Captain, U.S.A.F.; Assistant Professor of Air Science.
Richard J. Schimberg, Captain, U.S.A.F.; Assistant Professor of Air Science.

LOWER DIVISION COURSES

The lower division or basic courses in air science meet the requirements established by the Regents for military training in the first and second undergraduate years. Enrollment in air science is limited to students who are male citizens of the United States, physically fit for military service and who are at least 14 years of age or have not reached their 23d birthday at time of initial enrollment. The air science basic course consists of three hours of formal instruction per week for two academic years. Uniforms and textbooks as required are provided by the government, and must be returned in good condition on completion of the course.

1A. Air Science I. (2) I. The Staff (Mr. Kraft in charge)
General survey designed to provide understanding of elements and potentials of air power, including: fundamentals of world military air power, military research and development, air vehicle industries; elements of aircraft; aerodynamics and lift; control; navigation, guidance, and propulsion systems; space vehicles; and basic military training.
1B. Air Science I. (2) II.
The Staff (Mr. Kraft in charge)
1A is not prerequisite to 1B.
A general survey of air power to include: air lines and airways; general aviation; military background of the United States; military instruments of national security; Air Force officer careers; and basic military training.

21A. Air Science II. (2) I.
The Staff (Mr. Ong in charge)
Prerequisite: courses 1A and 1B, or the equivalent.
More advanced consideration of air power, emphasizing combat operational capabilities of the United States Air Force. Principles and development of aerial warfare; analysis of targets; survey of conventional and nuclear weapons; and leadership laboratory. Special emphasis on nuclear warfare.

21B. Air Science II. (2) II.
The Staff (Mr. Ong in charge)
Prerequisite: courses 1A and 1B, or the equivalent.
Treatment of aerial warfare continued, including aircraft and missiles as weapons systems, the base as an operational site, combat and support organization of the Air Force, current concepts of force employment and leadership laboratory. Emphasis placed on realistic operational problems.

Upper Division Courses

Students who have successfully completed the basic courses or have received credit in lieu thereof may apply for enrollment in the advanced course in air science. In general, students selected for this course are those who have shown potentials for leadership and command, whose aptitude, growth potential, and interest in becoming Air Force officers has been demonstrated. The advanced course consists of five hours of formal instruction per week for two academic years, but the student may expect that at least two additional hours per week will be required for extra activities not specifically covered in the formal program but essential in his over-all development as an officer. The number selected for enrollment in the advanced course may vary from year to year and is dependent upon the quota allocated annually based upon the requirements of the United States Air Force for officers. For admission to the upper division or advanced courses of air science, students must meet the following requirements:

1. Have attained upper division standing in the University.
2. Be citizens of the United States and be regularly enrolled in good standing in the University of California.
3. Be not more than 26½ years of age at anticipated date of graduation and commissioning.
4. Agree to accept an appointment to an Air Force flight training school subsequent to graduation and commissioning, at a time convenient to the United States Air Force.
5. Be selected by the Professor of Air Science and the Chancellor at Berkeley.
6. Successfully complete such survey or screening tests as may be prescribed.
7. Execute a written agreement with the government to complete the two-year advanced course, including attendance at summer training; to accept a commission, if tendered; to serve on active duty after receipt of such commission for a specified period, subject to call by the Secretary of the Air Force.
8. Pass successfully a prescribed physical examination. A limited number of students who fail to meet the stringent physical requirements for air crew training but are otherwise qualified and are engaged in scientific fields of study of special import to the Air Force will also be selected to enroll in the advanced course.
Students are required to attend summer training, normally of four weeks' duration, during the summer between their junior and senior years. Students attending this advanced summer camp will receive pay (approximately $75), transportation allowance to and from camp, quarters, uniforms, meals, and medical service while at camp.

At the beginning of the advanced course (junior year), an officer-type uniform is furnished each student, which becomes his personal property upon his successful completion of the advanced course. During this two-year period, each student also receives a daily monetary allowance totaling approximately $548 for the two years.

Successful completion of the advanced Air Force R.O.T.C. course and four years of education leading to the granting of a bachelor's degree, qualify the student for appointment and commission by the President of the United States as a Second Lieutenant in the Air Force Reserve. In addition, a limited number of "Distinguished Air Force Graduates" are eligible for appointment as Second Lieutenants in the Regular Air Force.

For further information about the Air Force Reserve Officers' Training Corps, consult the Professor of Air Science, Room 216, Building T-9.

131A. Air Science III. (3) I. The Staff (Mr. Mitchell in charge)
Prerequisite: courses 21A and 21B, or the equivalent.
Knowledge and skills required of a junior officer in the Air Force. This includes staff organization and functions, communicating, instructing, techniques of problem-solving, and leadership laboratory.

131B. Air Science III. (3) II. The Staff (Mr. Mitchell in charge)
Prerequisite: courses 21A and 21B, or the equivalent.
Principles and practices of leadership. This includes basic psychology of leadership, the military justice system, the application of problem-solving techniques and leadership theory to simulated and real Air Force problems, and leadership laboratory.

141A. Air Science IV. (3) I. The Staff (Mr. Deselms in charge)
Prerequisite: courses 131A and 131B, or their equivalent.
Air Force career guidance; principles of leadership and management (proseminar); leadership laboratory for cadet officers.

141B. Air Science IV. (3) II. The Staff (Mr. Deselms in charge)
Prerequisite: courses 131A and 131B, or their equivalent.
Military aviation and the evolution of warfare; military aspects of world political geography; briefing for commissioned service; leadership laboratory for cadet officers.

ANATOMY AND PHYSIOLOGY

ANATOMY
(For courses in Physiology, see page 326.)
(Office, 4551 Life Sciences Building)

C. Willet Asling, Ph.D., M.D., Professor of Anatomy (Co-Chairman for Anatomy).
Miriam E. Simpson, Ph.D., M.D., Docteur h.c. (Aix-Marseille), Professor of Anatomy.
Herbert McLean Evans, B.S., M.D., D.med. h.c. (Freiburg i.B., Santiago),
Docteur h.c. (San Marcos, Paris, Ecuador, Genève), D.Sc. (Birmingham,
Johns Hopkins), LL.D., Professor of Anatomy, Emeritus, Morris Herzstein
Anatomy and Physiology

Professor of Biology, Emeritus, and Director of the Institute of Experimental Biology, Emeritus.
Alexei A. Koneff, M.D., Professor of Anatomy, Emeritus.
Edward S. Evans, A.B., Ph.D., Assistant Professor of Anatomy.
Herbert H. Srebnik, A.B., M.A., Ph.D., Assistant Professor of Anatomy.

Marjorie M. Nelson, M.S., Ph.D., Lecturer in Anatomy.

Letters and Science List.—All undergraduate courses in anatomy are included in the Letters and Science List of Courses. For further information concerning this list, see page 11.

Departmental Adviser: Mr. Asling.

Upper Division Courses

101A–101B. Histology and Microscopic Organology. (3–3) Yr.

Mr. E. Evans, Miss Simpson
Lectures and laboratory. Prerequisite: Zoology 1A–1B, Chemistry 8, and Zoology 100 (may be taken concurrently) or other advanced work in mammalian biology.

Microscopic study of the tissues and organs of the body, including their histophysiologic and histochemical aspects. Special attention is devoted to human structure.

102. General Human Anatomy. (3) II.

Mr. Asling
Lectures and laboratory. Prerequisite: Zoology 1A or Physiology 1, 1L.
Enrollment limited to two hundred students.

Demonstration and laboratory study of prepared human dissections, models, and microscope slides.

103. Neuroanatomy. (4) I.

Mr. Asling
Lectures and laboratory. Prerequisite: junior standing with major in animal biological sciences.
The structure, functional relationships, and development of the human nervous system.

105A–105B. Systematic and Regional Human Anatomy. (3–4) Yr.

Mr. Srebnik, Mr. Asling
Lectures and laboratory. Prerequisite: Zoology 100 or other advanced work in mammalian biology; consent of the instructor.
The gross anatomy of the human body, as demonstrated by dissection, X-ray, and surface anatomy, with special reference to the functional capacities of the structures examined.

199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Miss Simpson, Mr. Asling in charge)
Prerequisite: senior standing, with B average, and consent of the instructor.

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 18)

210. Physiological Anatomy of Reproduction. (2) I and II. Miss Simpson
Two hours per week.
Informal conferences and demonstrations. Outside reading required.

211. Haematology. I and II.
Miss Simpson
Credit to be arranged.
Informal conferences and demonstrations. Outside reading required.
Anatomy and Physiology; Anthropology

213. Original Investigation. I and II.
   The Staff (Miss Simpson, Mr. Asling in charge)
   Hours and credit to be arranged.
   Students who are prepared to undertake research in the field of anatomy
   will be accorded facilities and encouragement by members of the staff.

214. Anatomy for Advanced Students. I and II.
   Hours and credit to be arranged. The Staff (Mr. Asling in charge)
   Qualified students may undertake special study in selected areas of human
   anatomy.

ANTHROPOLOGY

(Department Office, 232 Kroeber Hall)

William R. Bascom, Ph.D., Professor of Anthropology and Director of the
Museum of Anthropology.
George M. Foster, Ph.D., Professor of Anthropology and Curator of Mexican
Anthropology (Chairman of the Department).
Robert F. Heizer, Ph.D., Professor of Anthropology, Director of the Univer-
sity of California Archaeological Survey, and Curator of North American
Archaeology.
Theodore D. McCown, Ph.D., Professor of Anthropology and Curator of
Physical Anthropology.
David G. Mandelbaum, Ph.D., Professor of Anthropology and Curator of
Ethnology.
John H. Rowe, Ph.D., Litt.D., Professor of Anthropology and Curator of
South American Archaeology (Vice-Chairman of the Department).
David M. Schneider, Ph.D., Professor of Anthropology.
* Sherwood L. Washburn, Ph.D., Professor of Anthropology.
A. L. Kroeber, Ph.D., ScD., L.H.D., LL.D., Professor of 'Anthropology,
Emeritus, and Director of the Museum of Anthropology, Emeritus.
Ronald L. Olson, Ph.D., Professor of Anthropology, Emeritus.
Lloyd A. Fallers, Ph.D., Associate Professor of Anthropology.
Gerald D. Berreman, Ph.D., Acting Assistant Professor of Anthropology.
Clifford J. Geertz, Ph.D., Assistant Professor of Anthropology.
René F. Millon, Ph.D., Assistant Professor of Anthropology.
* Robert F. Murphy, Ph.D., Assistant Professor of Anthropology.
Edward Norbeck, Ph.D., Assistant Professor of Anthropology.
Richard F. Salisbury, Ph.D., Assistant Professor of Anthropology.
Nancie L. Solien, Ph.D., Acting Instructor in Anthropology.

Frederica DeLaguna, Ph.D., Visiting Professor of Anthropology for the Fall
Semester.
Anna Hadwick Gayton (Anna Hadwick Gayton Spier), Ph.D., Professor of
Decorative Art and Curator of Textiles, Museum of Anthropology.
George A. Pettitt, Ph.D., Lecturer in Anthropology.

Letters and Science List.—All undergraduate courses in anthropology are
included in the Letters and Science List of Courses. For further information
concerning this list, see page 11.

Departmental Major Advisers: Mr. Murphy, Mr. Norbeck.

The Major.—Required: Anthropology 1, 2A–2B, 105A or 105B, 152 or 153,
and 6 units from the following: 101A–101B, 115, 139, 143A or 143B, 147,

* In residence spring semester only, 1959–1960.
149, 161. Also required are additional elective courses aggregating 12 upper
division units in anthropology: with substitutions permitted among these 12
of not more than 6 upper division course units in allied subjects approved by
the department. Students who fail to maintain a scholarship average in the
major of at least C may be dismissed from the major at any time.

LOWER DIVISION COURSES

1. General Anthropology: Physical and Biological Factors. (3) I and II.
   Three lectures and one section meeting. Mr. Heizer, Mr. Washburn
   Human biology in terms of human evolution, fossil man, races, race
differences, and problems.

2A–2B. General Anthropology: Cultural Factors. (3–3) Yr.
   Mr. Mandelbaum, Mr. Millon, Mr. Salisbury
   Lectures and one section meeting per week.
   2A. Prehistory and cultural growth: Mr. Mandelbaum, Mr. Millon.
   2B. Cultural patterns and dynamics: Mr. Mandelbaum, Mr. Salisbury.
   2A is not prerequisite to 2B.

3. The Comparison of Cultures. (3) I.
   Miss Solien
   A survey of selected cultures; analysis of common factors and major
   variations in social life and cultural resources.

UPPER DIVISION COURSES

General prerequisite: junior standing or courses 1, 2A–2B.

101A–101B. Ethnography of the World. (3–3) Yr. Mr. Berreman
   A descriptive survey of representative cultures, including primitive and
   folk societies and some comparative materials from civilizations. Either half
   of the course may be taken independently.

103. Culture Growth. (3) I. Mr. Millon
   Culture and civilization; comparative history of Mesopotamian, Egyptian,
   Indus, Chinese, Peruvian, and Mexican civilization; expansion of Western
   civilization; archaeological theory.

105A–105B. The American Indians. (3–3) Yr. Mr. Heizer, Mr. Rowe
   Development, spread, and attainments of culture; native races and lan-
   guages.
   105A. Central America, Mexico, and North America: Mr. Heizer.
   105B. South America: Mr. Rowe.
   Either half of the course may be taken independently.

*106. Archaeology of North America. (3) I. Mr. Heizer
   Prehistory of North American Indians; prehistoric culture areas; rela-
   tions with historic Indians.

107. Archaeology and Society. (3) II. Mr. Heizer
   Introduction to archaeological methods and techniques employed, types of
   archaeological sites and materials preserved, methods of determining age;
   nature of prehistoric societies; development of the discipline of prehistory;
   absolute values of archaeology.

111. Prehistory. (3) II. Mr. McCown
   Prerequisite: course 2A.
   Origin, development, and distribution in space and time of the prehistoric
cultures of the Old World.

* Not to be given, 1959-1960.
115. People of the Philippines and Indonesia. (3) I. Mr. Geertz
   Geography, races, populations, cultures, and development of the Philip­
   pines, as part of the larger Indonesian sphere of world history.

116. Peoples of the Circumpolar Regions. (3) I. Miss DeLaguna
   A survey of representative peoples of circumpolar Eurasia and America,
   including the problem of environmental factors, independent invention, and
   diffusion in the development of adaptive cultures in northern latitudes.

118. The Nature of Culture. (3) I and II. Mr. Norbeck, Miss Solien
   The general structure and basic processes of cultural behavior; dynamics
   of cultural life; cultural change; illustrative data from primitive and modern
   societies.

119. Problems in Culture and Personality. (3) II. Mr. Schneider
   The interplay of cultural and personality factors in human development;
   personality in various cultural settings; the “national character” concept
   and other concepts in the field; techniques for the study of culture-per
   sonality relations.

120. Language and Culture. (3) I. Mr. Rowe
   Language and thought; classification of languages; linguistic aspects of
   culture; language, nation, and state.

121. Folklore. (3) II. Mr. Bascom
   An introduction to the study of folktales, myths, legends, proverbs, riddles,
   and other forms of verbal tradition. Methods and theories of folklore.

122. Economic Anthropology. (3) II. Mr. Geertz
   A comparative approach to the study of economic processes in nonindustrial
   societies; emphasis upon the relation of economics to the general cultural
   patterns of which they are a part, and upon interactions between social and
   economic change.

123. Politics and Law in Non-Industrial Societies. (3) II. Mr. Fallers
   Centralized, segmentary, and simple band types of polity; factors tending
   to concentrate or diffuse power; the political role of kinship groups, associa­
   tions, and social strata; the cultural expression of authority and status; jural
   institutions in the simpler societies.

124. Primitive Religion. (3) II. Mr. Norbeck
   Comparative survey of religion and magic.

125. Comparative Society. (3) I. Mr. Geertz
   Survey of kinship and family types throughout the world; their place
   within the total social structure; selected topics in the analysis of kinship
   and the family, including problems of stability and change.

*126. Invention and Technology. (3) II. Mr. Geertz
   Psychology of invention; origin, history, and spread of fundamental inven­
   tions; illustrative material from the Museum of Anthropology.

*137. Indians of California. (3) II. Mr. Heizer
   Origin and relationships of the natives; prehistoric remains; shell mounds.
   Tribal divisions; arts; customs; industry; beliefs.

*138. Indians of Western North America. (3) I. Mr. Heizer
   Tribes, culture types, and culture history of aboriginal peoples west of the
   Rocky Mountains.

* Not to be given, 1959-1960.
§ To be given, 1959-1960 only.
Anthropology

*139. Africa. (3) II.
   Races; Egyptian, Mediterranean, and Negro cultures, past and present; native achievement; Asiatic relations and influences.

141. Mexico and Central America. (3) II.
   Achievements of the Aztecs, Mayas, and their predecessors.
   Mr. Millon

*142. Peoples of the Andes. (3) II.
   Culture of the Incas of Peru and of other Andean peoples.
   Mr. Rowe

143A–143B. Peoples of India. (3–3) Yr. Mr. Mandelbaum, Mr. Berreman
143A. The main tradition of Indic culture. Archaeological and literary evidence, caste, Hinduism and Islam, the tribal tradition; village life and the national scene.
143B. The structure of society in India and Pakistan. Population factors, family organization, caste relations, economic forces; the meeting of diverse cultural influences.

*147. Peoples and Cultures of the Pacific Islands. (3) II. Mr. Salisbury
   Oceanian races and cultures; indigenous origins; Asiatic relations and influences.

*149. Cultures of the Near East. (3) II. Mr. Murphy
   Cultures of the contemporary Near East, with special emphasis upon the Arab populations of Iraq, Lebanon, Trans-Jordan, Israel, Syria, and the Arabian peninsula.

152. Human Evolution and Fossil Man. (3) II. Mr. Washburn
   Prerequisite: course 1 or the equivalent.
   Nature and results of the evolutionary processes involved in the formation and differentiation of mankind.

152L. Human Evolution and Fossil Man. Laboratory. (2) II.
   Lecture and laboratory. Mr. Washburn
   Prerequisite: course 152 (may be taken concurrently). Enrollment limited to 12 students; primarily for majors in anthropology and the life sciences.
   Descriptive and analytical methods relating to the skull and skeleton as these concern the evolutionary development of man.

153. Living Races of Man. (3) I. Mr. McCown
   Physical characters, distribution, and relationships of the living races of mankind.

153L. Living Races of Man. Laboratory. (2) I. Mr. McCown
   Lecture and laboratory.
   Prerequisite: course 153 (may be taken concurrently). Enrollment limited to 12 students; primarily for majors in anthropology and the life sciences.
   Descriptive and analytical methods used in the study of the races of man and of the human subject.

160. Contemporary Civilization. (3) II. Mr. Fallers
   An application of anthropological principles of analysis and interpretation to contemporary civilization.

*161. Europe and the Mediterranean. (3) II. Mr. Foster
   The folk peoples and typical examples of higher cultures will be considered in modern and historical perspective from an anthropological point of view.

* Not to be given, 1959–1960.
162. Anthropology in Modern Life. (3) I and II. 
Mr. Foster, Mr. Berreman

The practical application of anthropological theory and data to problems in such fields as medicine and public health, agriculture, education, industry, and international technical aid programs.

163. Factors in Culture Change. (3) I. 
Mr. Berreman

Contemporary theories of culture change, especially those resulting from contact (acculturation) illustrative materials from anthropological sources.

170. The Transmission of Culture and the Socialization of the Individual. (3) II. 
Mr. Pettitt

Methods and problems in the transmission of culture from generation to generation and of the processes of the socialization of the individual.

186. Ethnology of Japan. (3) I. 
Mr. Norbeck

Ethnological treatment of historic and modern Japanese culture, emphasizing conditions since 1868 and presenting an interpretation of factors which underlie Japanese cultural development.

191. Contemporary Latin-American Culture. (3) II. 
Miss Solien


*193G. Principles of Cultural Anthropology. (3) I. 
Mr. Schneider

Intensive reading, discussion and lecture course covering basic principles and descriptive data of cultural anthropology.

*194G. Principles of Physical Anthropology and Archaeology. (3) II. 
Mr. McCown, Mr. Washburn

Intensive reading, discussion and lecture course covering basic principles and descriptive data of physical anthropology, human evolution, Old World prehistory and archaeology.

*195. Field Course in Archaeological Method. (2) I. 
Mr. Heizer

Lectures, museum preparation, and week-end excavations. Enrollment limited to eighteen students, admitted by consent of the instructor. With consent of the instructor, may be repeated without duplication of credit.

*196. Archaeological Method. (2) I. 
Mr. Millon

Prerequisite: course 195 and consent of the instructor. Enrollment limited to twenty students. With consent of the instructor, may be repeated without duplication of credit.

Museum preparation, advanced field investigation, and guidance in preparation of museum material for publication.

197. Advanced Survey of Anthropology. (3) I. 
Mr. Salisbury

Prerequisite: senior standing or consent of the instructor.

An historical survey of anthropological methods, theories, and findings given at an advanced level. Intended for major students and for other students who have a good background in the subject.

H198. Perceptorial and Reading Course. (3) II. 
Mr. Rowe

Open to seniors. With consent of the instructor, may be repeated without duplication of credit.

* Not to be given, 1959–1960.
Systematic readings in the history of anthropology and in significant modern developments within the field.

199. Special Study for Advanced Undergraduates. (2-3) I and II.
The Staff (Mr. Murphy and Mr. Norbeck in charge)

**GRADUATE COURSES**

(Concerning conditions for admission to graduate courses, see page 18)

*201. Systematic Theory of Human Societies. (3) II.
Mr. Schneider, _______
Two lectures and two hours discussion per week. Prerequisite: Sociology 217.
Systematic Theory of Human Societies will involve reading, discussion and analysis of contemporary systematic theory in sociology and social anthropology. Emphasis is placed on thorough understanding of conceptual schemes, major scientific issues, and the problems of theoretical simplification and integration.

*204A–204B. Fundamentals of Anthropological Theory. (3-3) Yr.
Mr. McCown, Mr. Mandelbaum
A survey of basic concepts in anthropological literature.
Prerequisite: Anthropology 200A–200B or equivalent.
204A. Physical anthropology, human evolution, and prehistory and archaeology: Mr. McCown.
204B. Cultural anthropology and ethnography: Mr. Mandelbaum.

*205. Recent Developments in Anthropology. (2) I. Mr. Mandelbaum

206. Proseminar. (2) I and II.
Mr. Rowe, Mr. Millon, Mr. Geertz
Introduction to research. For new graduate students in anthropology.

*207A–*207B. History and Theory of Anthropology. (2-2) Yr.
Prerequisite: consent of the instructor. Miss DeLaguna

*210A–*210B. Aspects of Culture Structure. (2-2) Yr. Mr. Geertz
Prerequisite: consent of the instructor.
Concepts and problems in such major phases of culture as religion, economics, law, art, and folklore.

215. Ethnological Field Techniques. (2) II. Mr. Salisbury
Prerequisite: consent of the instructor.
The development of field methods in anthropology. Applicability of techniques from other social science disciplines. Conceptual framework of field research. Work with an informant and practice in recording data.

216. Problems in Archaeological Method. (2) II. Mr. Heizer
Techniques of analysis of archaeological data; critical review of excavation data and analytical results; continental perspective of Far Western prehistoric cultures.

217A–*217B. Dynamics of Culture and Society. (2-2) Yr.
Prerequisite: consent of the instructor. Mr. Rowe, Mr. Salisbury
Problems in culture change and stability.

218H. Culture and Personality: the Psychological Approaches. (2) II. Mr. Schneider

* Not to be given, 1959–1960.
225. Kinship and Social Structure. (2) II. Mr. Norbeck
Prerequisite: consent of the instructor.
Systematic treatment of ethnological data and concepts concerned with kinship and the social structuring of human societies; historical, analytical, and interpretative study of continuing and new problems in these fields.

*235. Problems in the Culture History of South America. (2) I. Mr. Rowe
*237. Culture Problems of Western North America. (2) I. Mr. Murphy
Work on problems of tribal distribution and cultures.

239. Problems in African Society and Culture. (2) I. Mr. Fallers
Prerequisite: consent of the instructor.

243A–*243B. Culture Problems of India. (2–2) Yr. Mr. Mandelbaum
Prerequisite: consent of the instructor.

*253. Concepts and Problems in Physical Anthropology. (2) II.
Mr. Washburn
Systematic treatment of concepts in historical perspective and of continuing and new problems in the field of human biology as this concerns physical anthropology.

261A–*261B. Problems in Acculturation. (2–2) Yr.
Prerequisite: consent of the instructor.
Analysis of the forms and variety of culture changes originating in the contact of different ethnic groups.

265. Concepts and Problems in Applied Anthropology. (2) II. Mr. Foster
Prerequisite: consent of the instructor.
Survey and analysis of the use of anthropological concepts, techniques, and methods in such fields as public health and social welfare, technical aid programs, colonial administration, and related fields.

279. Factors in Material Culture. (2) II. Miss Gayton
Analysis of the nature of the materials, techniques of manufacture, decorative elements, and the uses of the total material manufactures of selected culture areas.

290. Problems in the Culture History of Mesoamerica. (2) II. Mr. Millon

299. Directed Research. (2–6) I and II. The Staff (Mr. Fallers in charge)

RELATED COURSE IN ANOTHER DEPARTMENT
Introduction to Social Science (Social Science 1A–1B).

MUSEUM OF ANTHROPOLOGY

The Robert H. Lowie Museum of Anthropology, located in Kroeber Hall, has major facilities for research in archaeology, ethnography, and physical anthropology. The 400,000 catalogue items include 200,000 archaeological and ethnographical specimens from California, 85,000 from other parts of the Americas, 35,000 from Eurasia, 40,000 from Oceania, and 10,000 entries of human skeletal material. Laboratory facilities and desk space are available for study of the collections by visiting scholars, and graduate and undergraduate students. A large exhibition hall is utilized for instructional and educational purposes, particularly in connection with class work. Those interested in the Museum facilities may address the Director, Robert H. Lowie Museum of Anthropology.

* Not to be given, 1959–1960.
ARCHITECTURE

(Department Office, 1 Architecture Building)

James S. Ackerman, Ph.D., Professor of Architecture and Art.
E. Michael Czaia, M.Arch., Professor of Architecture.
Vernon A. DeMars, A.B., Professor of Architecture.
Joseph Esherick, B.Arch., Professor of Architecture.
Michael A. Goodman, M.A., Professor of Architecture.
George P. Simonds, M.A., Professor of Architecture.
William W. Wurster, A.B., F.A.I.A., Professor of Architecture (Chairman of the Department).
William C. Hays, B.S., F.A.I.A., Professor of Architecture, Emeritus.
Raymond W. Jeans, M.A., Professor of Architecture, Emeritus.
Stafford L. Jory, Gr.Arch., Professor of Architecture, Emeritus.
Howard Moise, B.S., M.Arch., Professor of Architecture, Emeritus.
Warren C. Perry, B.S., F.A.I.A., Professor of Architecture, Emeritus.
Kenneth H. Cardwell, A.B., Associate Professor of Architecture.
*Donald L. Foley, Ph.D., Associate Professor of City Planning and Architecture.
Sami Hassid, Ph.D., Associate Professor of Architecture.
*Henry J. Lagorio, M.A., Associate Professor of Architecture.
Charles W. Moore, Ph.D., Associate Professor of Architecture.
Donald P. Reay, M.Sc., Associate Professor of Architecture.
*Jesse Reichek, Associate Professor of Design and City and Regional Planning.
Harold A. Stump, A.B., Associate Professor of Architecture.
Ezra D. Ehrenkrautz, M.Arch., Assistant Professor of Architecture.
Stephen W. Jacobs, B.Arch., M.A., Assistant Professor of Architecture.
Carl G. Kolbeck, A.B., Assistant Professor of Architecture.
Donald Olsen, M.A., Assistant Professor of Architecture.
Philip Thiel, B.Arch., Assistant Professor of Architecture.
Gustavo U. DaRoza, B.Arch., Instructor in Architecture.
Rory A. Fonseca, Gr.Arch., Instructor in Architecture.

*Lawrence Ayer, A.B., Lecturer in Architectural Mechanics.
Ira Beals, M.Arch., Lecturer in Architecture.
Scott Beamer, B.S., Lecturer in Architectural Mechanics.
Theodore Bernardi, A.B., Lecturer in Architecture.
Leo E. Dwyer, B.S., Lecturer in Architectural Mechanics.
Lois Langhorst, M.Arch., Lecturer in Architecture.
Roger Y. Lee, A.B., Lecturer in Architecture.
James M. Leefe, B.Arch., Lecturer in Architecture.
Milton G. Leong, M.S., Lecturer in Structural Design.
Frank E. McClure, B.S., Lecturer in Structural Design.
Gerald M. McCue, M.A., Lecturer in Architecture.
James Prestini, B.S., Lecturer in Design.
Walter W. Soroka, Sc.D., Professor of Mechanics and Design.
Karl V. Steinbrugge, B.S., Lecturer in Structural Design.
Claude Stoller, B.Arch., Lecturer in Architecture.
H. Leland Vaughan, B.S., Professor of Landscape Architecture.
Francis Violich, B.S., Professor of Landscape Architecture and City Planning.

†Sabbatical leave in residence, fall semester, 1959-1960.
§In residence fall semester only, 1959-1960.
*In residence spring semester only, 1959-1960.
Letters and Science List.—Courses 110, 121, 122, 126, 127 are included in the Letters and Science List of Courses. For regulations governing this list see page 11.

Students must complete a History of Architecture requirement for the professional curriculum:

Courses 121, 122, and one intensive period study of the student's selection from courses 123 to 130 inclusive, of which courses 126 and 127 are presently established.

Credit in courses 11, 12, 13 will be allowed up to a total of 4 units each; but in no semester will more than 1 unit be allowed in any one of these courses.

All design courses beginning with Architecture 3N through Architecture 103 require a grade of C or better for advancement to the succeeding course. A grade of D will require one more semester of Design at the same level, for which no further unit credit can be granted. Improvement in grade, however, will be recognized in all cases, and grade points received as earned for lower division course only, in accordance with University regulations.

LOWER DIVISION COURSES

1N. Design. (3) I and II.

Mr. Olsen, Mr. Peters, Mr. Prestini, ---, ---, ---
Six hours per week.
Exploration of tools and materials: study of line, plane, color, texture, tone. Visual and physical structures in two and three dimensions.

2N. Design. (3) I and II.

Mr. Prestini, Mr. Peters, ---
Six hours per week. Prerequisite: course 1N or the equivalent.
Continuation of course 1N, with emphasis on space, scale, form, environment, motion, light. Introduction to basic needs of man relative to architecture.

3N. Design. (3) I and II.

Mrs. Langhorst, Mr. Thiel, Mr. DaRoza, Mr. Cardwell
Six hours per week. Prerequisite: course 2N.
Elementary design of buildings.

4N. Design. (4) I and II.

Mr. Lee, ---, ---
Eight hours per week. Prerequisite: course 3N or 23.
Design of buildings. Continuation of course 3N with increasing scope of problems.

5N. Introduction to the Professions of Architecture, City and Regional Planning, and Landscape Architecture. (2) I.

Mr. Wurster, Mr. Violich, Mr. Vaughan
Lectures in charge of each department chairman introductory to each professional field.

6N. Descriptive Geometry. (2) I and II.

Mr. Cardwell
Four hours per week. Prerequisite: solid geometry.
Lectures, drafting, and problem solution.

7. Shades, Shadows, and Perspective. (2) I and II.

Mr. Kolbeck
Four hours per week. Prerequisite: course 6N.
Lectures, drafting, and problem solution.

11. Graphics. (1) I and II.

Mrs. Langhorst, Mr. DaRoza, Mr. Stump, Mr. Thiel
Three hours per week. Prerequisite: Art 2A or equivalent.
Freehand drawing and rendering in pencil, crayon, charcoal, with varying emphasis in the various sections as determined by the instructor.
12. Graphics. (1) I and II.
Mr. Czaja, Mr. DeMars, Mrs. Langhorst, Mr. DaRoza,
Mr. Peters, Mr. Reay

Three hours per week. Prerequisite: Art 2A or the equivalent.
Painting and rendering in color, with varying emphasis in the various
sections as determined by the instructor.

13. Graphics. (1) I and II.
Mr. Thiel, Mr. Reay, --------, --------

Three hours per week. Prerequisite: Art 2A or equivalent.
Freehand drawing and rendering in black and white, with varying empha­
sis in the various sections as determined by the instructor.

23. Design. (5) I and II.
Mr. Kolbeck, Mr. Stoller
Twelve hours per week. Prerequisite: courses equivalent to 1N and 2N.
Open only to transfer students.
A concentration of courses 2N and 3N to prevent or minimize extension of
time of graduation because of transfer to this College.

UPPER DIVISION COURSES

The general prerequisite for upper division courses is third-year standing.

101. Advanced Design. (5) I and II. Mr. Reay, --------, --------, --------
(Formerly numbered 101B.)
Eight hours per week. Prerequisite: course 4N, 7, and Engineering 18A.
Engineering 18B must be taken at least concurrently.
Architectural design and theory with increased emphasis on building struc­
ture as it relates to visual design.

102. Advanced Design. (5) I and II. Mr. Bernardi, --------, --------, --------
(Formerly numbered 102A.)
Eight hours per week. Prerequisite: course 101.
Architectural design problems of increasing complexity.

103. Advanced Design. (6) I and II. Mr. Olsen, Mr. DeMars
(Formerly numbered 102B.)
Eight hours per week. Prerequisite: course 102 or former course 102A and
City and Regional Planning 100.
Architectural design problems of large scope.

104. Architectural Design and Working Drawings. (7) I and II.
(Formerly numbered 200.) Mr. Esherick, Mr. McCue, Mr. Simonds
Prerequisite: fifth-year standing and courses 103, 151, 152, Civil Engineer­
ing 126 and 127. Required concurrently: courses 105, 106, and 153.
Complete design (exterior and interior) of a large fire-resistive building
and preparation of architectural working drawings following usual office
practice. Students work in teams of two.

105. Detail Design and Color Study. (1) I and II. Mr. Goodman
(Formerly numbered 201A.)
Prerequisite: fifth-year standing. Required concurrently: courses 104, 106,
and 153.
Detail and color studies of the building designed in course 104. Students
work in teams of two.

106. Structural Design and Working Drawings. (5) I and II.
(Formerly numbered 207.)
Mr. Leong, Mr. McClure, Mr. Steinbrugge, Mr. Wildman
Architecture

Prerequisite: fifth-year standing, courses 103, 151, 152, Civil Engineering 126 and 127. Required concurrently: courses 104, 105, and 153.

Complete structural design and calculations for the building designed in course 104, and preparation of working drawings following usual office practice. Students work in teams of two.

107. Fifth-Year Design Preparation. (2) I and II.

Mr. Czaja, Mr. Hassid, ----, ----

Prerequisite: completion of all required courses through the fourth year, or faculty approval.

Project for study to be selected by the student with approval of the instructor. Preliminary study, conferences, and research as necessary to initiate a program of study for course 108 in the following semester.

108. Fifth-Year Design. (8) I and II. Mr. Czaja, Mr. Hassid, --

(Formerly numbered 201B.)

Prerequisite: courses 104, 105, 106, 107, and 153, or faculty approval.

Comprehensive design of a major architectural project as approved for course 107, including a written program and presentation of results of research.

110. The House. (1) I and II. Mr. Stump, Mr. Goodman

I: Mr. Stump; II: Mr. Goodman.

A general appreciation course dealing with the development, planning, and esthetic qualities of the single-family dwelling.

121. Architectural History. (3) I. Mr. Jacobs

Prerequisite: course 4N for architecture students. No prerequisite for others.

Survey of Ancient and Medieval periods.

122. Architectural History. (3) II. Mr. Ackerman

Prerequisite: course 4N for architecture students. No prerequisite for others. 121 is not prerequisite to 122.

Survey of Renaissance and Modern periods.

126. Architectural History—American. (3) I. Mr. Jacobs

Prerequisite: courses 121 and 122 or the equivalent. Open to other students with consent of the instructor.

Detailed investigation of architecture of the North American continent from colonial times to the present day.

127. Architectural History—Nineteenth and Twentieth Centuries. (3) II.

Prerequisite: courses 121 and 122 or the equivalent. Open to other students with consent of the instructor.

Detailed investigation of architecture, principally European, from the French Revolution to the present day.

131. Building Materials. (2) I and II. Mr. Stoller

Prerequisite: consent of the instructor required. Enrollment limited.

Study of the characteristics of building materials and their relation to architectural design. Seminar and field trips.

132. Professional Practice and Specification. (3) I and II. Mr. Simonds

(Formerly numbered 209.)

Prerequisite: courses 104, 105, 106, and 153.

A study of architectural business relations, contracts, legal aspects of practice, and specification writing.
133. Proseminar in Architecture. (2) I and II.
(Formerly numbered 208.)
Prerequisite: fifth-year standing or consent of the instructor.
Preparation of papers on subjects relating to architecture, to be presented and discussed in seminar meetings. For candidates for the degree Bachelor of Architecture only.

*134. Introduction to Architectural Research. (2) I.
Prerequisite: fourth-year standing and consent of the instructor. Open to qualified students from other departments.
Research bearing on architectural design problems. Special emphasis on the relationships between the physical structures that are designed by the architect and the human values and activities that must be accommodated.

151. Architectural Mechanics. (3) I.
(Formerly numbered 108A.)
Prerequisite: Physics 2B, 3B, and course 101.
Heating, ventilating, air conditioning, and plumbing of buildings.

152. Architectural Mechanics. (3) II.
Mr. Beamer (in charge), Mr. Soroka, Mr. Ayer
(Formerly numbered 108B.)
Prerequisite: Physics 2B, 3B, and course 101. 151 is not prerequisite to 152.
Lighting, electrical work, acoustics and sound control of buildings.

153. Architectural Mechanics. (1) I and II.
Mr. Dwyer, ———
I: Mr. Dwyer; II: ———.
Prerequisite: fifth-year standing and courses 151 and 152. Required concurrently with courses 104, 105 and 106.
Investigation of heating, ventilating, air conditioning, lighting, and acoustic problems relative to the building being designed in course 104.

†199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. Wurster in charge)

GRADUATE COURSES

Admission of graduates for work under the graduate division will be restricted to those who, during their junior and senior years, have maintained in all courses, including design, a sufficiently high scholastic average to indicate ability to carry on work satisfactorily at the graduate level. For other conditions concerning admission to graduate courses, see page 18.

201. Seminar in Architectural Research. (2) I.
Mr. Hassid
Required for all graduate students.
Research methods and problems as applied to architecture. The appraisal of selected research endeavors. Presentations by instructors and guests, discussion of student reports.

Mr. Esherick
Required for all graduate students.
Identification of major problems of architecture; development of approaches to solutions. Problems will be proposed by the instructor, or, with the permission of the instructor, may be proposed by the student.

203. Architectural Design and Research. (2) II.
Mr. Esherick
Required for all graduate students.
Primarily for candidates for the Degree of Master of Architecture. Critical review of development of theses; exchange of content of theses.

* Not to be given, 1959–1960.
† To be given if a sufficient number of students enroll.
204. Seminar in Architecture. (2) II.  
Prerequisite: graduate standing.  
The exploration of topics related to the theory and practice of architecture.  
Ordinarily a major thesis will be selected in advance of each semester.  
Presentation by instructors and guests, discussion of student reports.

208. Seminar in Architecture. (3) I and II.  
Mr. Wurster

298. Special Study for Graduate Students. (1-6) I and II.  
By arrangement only.  
The Staff (Mr. Wurster in charge)

Enrollment in the following courses is subject to the approval of the faculty  
and is limited to former students of the University of California who have  
received the nonprofessional A.B. degree in architecture and who qualify  
also for admission to graduate school. These courses are accepted in partial  
satisfaction of the requirements of the M.A. degree in architecture.

200. Comprehensive Graduate Problems. (5) I and II.

201A. Design and Theory: Graduate Sketch Problems. (1) I and II.

201B. Design and Theory: Graduate Problems. (7) I and II.

207. Architectural Engineering. (3) I and II.

209. Seminar in Professional Practice. (2) I and II.

Mr. Esherick

REQUIRED COURSES IN OTHER DEPARTMENTS

City Planning for Architects and Landscape Architects (City and Regional  
Planning 100).
First-Year Reading and Composition (English 1A, 1B) or Elements of  
Speech (Speech 1A, 1B).
General Physics Lectures (Physics 2A-2B).
General Physics Laboratory (Physics 3A-3B).
Introduction to Mathematical Analysis (Mathematics 3A, 3B).
Strength of Materials (Engineering 18A, 18B; Civil Engineering 112).
Elements of Framed Structures (Civil Engineering 125, 126, 127).
Plane Surveying (Engineering 21).
Principles of Landscape Architecture (Landscape Architecture 100).
Sculpture (Art 14A, 142).

ART

(Department Office, 238 Kroeber Hall)

James S. Ackerman, Ph.D., Professor of Art and Architecture.
Darrell A. Amyx, Ph.D., Professor of Art and Associate Curator of Ancient  
Mediterranean Art, Museum of Anthropology.
John C. Haley, Professor of Art.
Walter W. Horn, Ph.D., Professor of Art (Chairman of the Department).
*J. Ward Lockwood, Professor of Art.
Erle Loran, Professor of Art.
*James McCray, M.A., Professor of Art.
Otto J. Maench, Ph.D., Professor of Art.
Felix Ruvolo, Professor of Art.

1 In residence fall semester only, 1959—1960.
* In residence spring semester only, 1959—1960.
Jacques Schnier, M.A., Professor of Sculptural Design.
*Glenn A. Wessels, M.A., Professor of Art.
Eugen Neuhaus, Ph.D., (hon.c.), Professor of Art, Emeritus.
Stephen C. Pepper, Ph.D., L.H.D., Mills Professor of Intellectual and Moral
Philosophy and Civil Polity, Emeritus.
Worth Ryder, Professor of Art, Emeritus.
Chiura Obata, Associate Professor of Art, Emeritus.
Karl Kasten, M.A., Associate Professor of Art.
Richard O'Hanlon, Associate Professor of Sculptural Design.
David Park, Associate Professor of Art.
Herschel B. Chipp, Ph.D., Assistant Professor of Art.
Sidney Gordin, Assistant Professor of Art.
Juergen Schulz, Ph.D., Instructor in Art.

Alfred Frankenstein, Ph.B., Lecturer in Art for the spring semester.
Stephen W. Jacobs, M.F.A., Assistant Professor of Architecture and Art.
Raymond Rocklin, Visiting Assistant Professor of Art.

Letters and Science List.—All undergraduate courses in art are included in
the Letters and Science List of Courses. For further information concerning
this list, see page 11.

Departmental Major Advisers: Painting: Mr. Kasten, Mr. Ruvolo, Mr.
Wessels; History of Art: Mr. Maenchen; Sculpture: Mr. O'Hanlon.

Preparation for the Major in Art.—For all Art majors: 6 units chosen
from courses 1A, 1B, 1C, 1D; and courses 2A, 2B, and 14A. In addition,
special preparation for the Painting major requires Art 3 and Art 4; and
special preparation for the Sculpture major requires Art 3 and Art 14B.
Recommended for prospective majors in History of Art: History 4A–4B.

The Major.—A student may elect an Art major emphasizing Painting,
History of Art, or Sculpture. Major students are required to consult with
their major advisers regarding their programs before enrolling. The depart­
ment will recommend for graduation only students with at least a C average.
Students who fail to maintain at least a C average may be asked to drop
the major at any time.

I. Painting. Required: 12 units of Group A courses under at least three
instructors of the regular staff, Art 176A–176B (6 units), Art 132 (2 units),
2 units of any course in Group D, and 4 additional units of any courses in
Groups A, B, C, and D.

II. History of Art. Required: Art 176A–176B (6 units), 12 additional
units of Group C courses of which 6 units must be in an historical sequence
(such as 154A–154B), Art 132 (2 units) and 6 additional units of any courses
in Groups A, B, C, and D. With approval, substitutions may be made within
these 6 units of certain courses offered in other departments. Students plan­
ing to do advanced work in History of Art are urged to develop their
knowledge of foreign languages (especially French and German) as early
as possible.

III. Sculpture. Required: 12 units of Group D courses under at least three
instructors, Art 176A–176B (6 units), Art 132 (2 units), 2 units of any
course in Group A, and 4 units chosen from Groups A, B, C, and D.

Assignment to Sections.—Inasmuch as space and facilities for technical
courses are limited, students are advised to register by mail and pre-enroll
in all Group A and Group D courses or to pre-enroll during Registration
Week on the day to be announced on placards on bulletin boards. Preference

1 In residence fall semester only, 1959–1960.
* In residence spring semester only, 1959–1960.
is given to first applicants, but the department reserves the right to deny admission to applicants who pre-enroll in courses for which they lack adequate preparation.

Transfer Students.—Transfer students who have fulfilled unit requirements elsewhere should present examples of their work done in other institutions before being admitted to studio classes and before credit can be given toward the major for work done elsewhere. Otherwise, additional work may be required. Transfer students who qualify for upper division studio courses will be required to take course 195.

LOWER DIVISION COURSES

1A. History of Ancient Mediterranean Art. (3) II. Mr. Amyx
   Lectures and weekly section meetings to be arranged. Prerequisite for all upper division courses in ancient art.
   From the Stone age to the end of the Roman Empire.

1B. History of Medieval, Renaissance, and Modern Art—Emphasis on Painting. (3) II. Mr. Chipp
   Lectures and weekly section meetings to be arranged.

1C. History of Medieval, Renaissance, and Modern Art—Emphasis on Architecture and Sculpture. (3) I. Mr. Horn
   Lectures and weekly section meetings to be arranged.

1D. History of Oriental Art. (3) I. Mr. Maenchen
   Lectures and weekly section meetings to be arranged.
   The art of India, China, and Japan.

2A–2B. Elementary Form and Color. (2–2) Yr. Beginning each semester.
   Mr. Haley, Mr. Kasten, Mr. Lockwood, Mr. Loran, Mr. McCray, Mr. Park, Mr. Ruvolo, Mr. Wessels
   2A: Form in composition, using black and white media.
   2B: Introduction to color in composition.

3. Intermediate Form. (2) I and II. Mr. Kasten, Mr. Wessels
   (Formerly numbered 3B.)
   Prerequisite: course 2A–2B.
   Form in composition, using the human figure as subject.

4. Materials of Painting. (2) I and II. Mr. Kasten
   Prerequisite: course 2A–2B.
   A study in the means of expression.

10. An Introduction to Art. (2) I. Mr. McCray
   Lectures, illustrated with lantern slides. Open to nonmajors.
   The understanding and appreciation of painting, sculpture, architecture, and industrial art.

14A–14B. Elements of Sculpture. (2–2) Yr. Beginning each semester.
   Mr. Schnier, Mr. O’Hanlon, Mr. Rocklin, Mr. Gordin, ———
   Six hours per week.
   14A. Introduction to basic elements of volume design, using nonobjective and representational subject matter in three dimensions and relief.
   14B. An introduction to space design and materials, with construction in wood, metal, and plaster.

* Not to be given, 1959–1960.
UPPER DIVISION COURSES

Group A: Painting

Prerequisite: courses 2A–2B, 3, 4.

The various courses in Group A differ in content, use of materials, type of subject matter, etc., depending upon the individual aims of the artists in charge. In this group, Part A is not prerequisite to Part B. All courses in this group may be repeated indefinitely without duplication of credit.

The subject matter will range from still life and landscape to life classes, figure and mural compositions.

The materials used will range from charcoal and sumi to water color, gouache, egg, tempera, oil, mixed technique, and fresco painting.

103A-*103B. Advanced Drawing and Painting. (2-2) Yr. Mr. Lockwood
103A is not prerequisite to 103B.

104A–104B. Advanced Drawing and Painting. (2-2) Yr. Mr. Haley
104A is not prerequisite to 104B.

105A–105B. Advanced Drawing and Painting. (2-2) Yr. Mr. Loran
105A is not prerequisite to 105B.

106A–*106B. Advanced Drawing and Painting. (2-2) Yr. Mr. McCray
106A is not prerequisite to 106B.

*108A–108B. Advanced Drawing and Painting. (2-2) Yr. Mr. Kasten
108A is not prerequisite to 108B.

109A–109B. Advanced Drawing and Painting. (2-2) Yr. Mr. Ruvolo
109A is not prerequisite to 109B.

110A–110B. Advanced Drawing and Painting. (2-2) Yr. Mr. Park
110A is not prerequisite to 110B.

111A–111B. Advanced Drawing and Painting. (2-2) Yr. Mr. Wessels
111A is not prerequisite to 111B.

*113A–113B. Advanced Drawing and Painting. (2-2) Yr. Mr. Wessels
113A is not prerequisite to 113B.

128. Mural Methods in Fresco Painting. (2) I and II. Mr. Haley
For graduates and advanced undergraduates who have had at least 6 units of upper division painting courses.

129A–129B. Practice in the Graphic Arts. (2-2) Yr. Mr. Kasten
129A is not prerequisite to 129B.

Group B: Theory and Criticism

132. Picture Analysis. (2) II. Mr. Wessels
Prerequisite: one upper division painting course and one upper division art history course, or consent of the instructor.
A comparative analysis of paintings and critical systems.

* Not to be given. 1959–1960.
Group C: History of Art and Archaeology

Open to nonmajors. General prerequisite: upper division standing and consent of the instructor.

*150. The Art of Primitive Peoples. (3) I. Mr. Chipp
An analysis of style and an aesthetic evaluation of forms in the art of several primitive cultures, developed according to art-historical principles. Special consideration is given to an integration of the art with the cultural background.

153. Aegean Art. (2) I. Mr. Amyx
The art of Crete and Greece in the Bronze Age, with attention to connections with neighboring cultures.

154A–154B. Greek Art. (3–3) Yr. Mr. Amyx
From the Geometric Period to the beginning of the Roman Empire.
154A. From 1100 to 450 B.C.
154B. From 450 to 30 B.C.
154A is not prerequisite to 154B.

*159. Roman Art. (3) I. Mr. Amyx
The art of Italy and the Roman Empire from the Early Iron Age to the period of Constantine.

160A–160B. History of Early Chinese Art. (2–2) Yr. Mr. Maenchen
From Shang to T'ang.

*161. History of Later Chinese Art. (2) I. Mr. Maenchen
From Sung to Ch'ing.

*162. The Art of Japan. (3) II. Mr. Maenchen
From prehistoric times to Hokusai.

163. The Art of India. (3) II. Mr. Maenchen

*164. The Art of Greater Iran. (2) II. Mr. Maenchen
The art of Iran from the Late Bronze Age to the Arab Conquest; the art of the Steppe peoples.

*175A–175B–175C. Medieval Art. (3–3–3) Mr. Horn
One part is not prerequisite to another.
175A. Early Christian and Byzantine art. I.
Mediterranean roots of medieval art.
175B. Germanic and Celtic art. II.
Northern roots of medieval art.
175C. Medieval Art. I.
Carolingian renaissance to the end of the thirteenth century.

176A–176B. Italian Renaissance Art. (3–3) Yr. Mr. Ackerman
176A is not prerequisite to 176B.
176A. Italian art of the fourteenth and fifteenth centuries.
176B. Italian art of the sixteenth century.

177A–177B. The Renaissance in Northern Europe. (3–3) Yr. Mr. Schulz
177A is not prerequisite to 177B.
177A. Art of the Fourteenth and Fifteenth Centuries in Northern Europe.
177B. Art of the Sixteenth Century in Northern Europe.

* Not to be given, 1959–1960.
178. Baroque Art. (3) I. Mr. Schulz
European Art in the Seventeenth and Eighteenth Centuries.

179. Italian Renaissance Architecture. (3) I. Mr. Ackerman
Architectural planning and architectural theory in Italy from 1400 to 1600.

183A–183B. Modern Art—Emphasis on Painting. (3–3) Yr. Mr. Chipp
183A is not prerequisite to 183B.
183A. Art of the nineteenth century.
183B. Art of the twentieth century.

188. History of American Art (3) II. Mr. Frankenstein

Group D: Sculpture
General prerequisite for Group D studio courses (140, 141, 142, 143, 148, 149): Art 14A–14B or Art 14A and 3 art or design courses. Courses 140, 141, 142, 143, 148, and 149 may be repeated indefinitely without duplication of credit.

140. Sculptural Design: The Statue. (2) I. Mr. Gordin
Advanced design in permanent materials, featuring three-dimensional sculptural composition in relation to architecture and the allied arts.

141. Sculptural Design: The Relief. (2) II. Mr. O’Hanlon
Advanced design in permanent materials, featuring relief sculpture in confined and free-outline space in relation to architecture.

142. The Human Figure in Sculpture. (2) I and II.
Six hours per week. Mr. O’Hanlon, Mr. Schnier, ———
Design exercises with form, line, and space in three-dimensions and low-relief, featuring the human figure as subject matter.

143. The Human Figure in Sculpture: Special Problems. (2) II.
Mr. Rocklin
Sculptural composition featuring the human figure, in various materials such as terra cotta, gypsum, magnesite, cast stone, and metal.

146. Analysis of the Creative Process. (2) I and II. Mr. Schnier
Prerequisite: upper division standing.
Application of psychological principles to the study of artistic creativity, including expressionism in sculpture and the allied arts, art symbolism, and the various processes operating in creative expression.

148. Sculpture Methods and Materials. (2) I. Mr. O’Hanlon
Six hours per week.
Design exercise, featuring the use of sculptural mediums.

149. Sculpture Methods and Materials. (2) II. Mr. O’Hanlon
Design exercises, featuring the use of stone, metal, and plaster.

Special Study Courses
190. Senior Proseminar in the History of Art. (3) II. Mr. Schulz
Lectures, discussions, and reports. An introduction to research techniques.

195. Special Study in Practice of Art. (2) I and II. Mr. Loran, Mr. Haley
Prerequisite: 8 units of practice work in drawing and painting or the equivalent, taken at another university. Restricted to art majors. Qualified upper division or graduate transfer students will be required to take course 195. Other transfer students will be required to take course 2A. May not be repeated for credit.
Art

199. Special Study for Advanced Undergraduates. (1-4) I and II.
   The Staff (Mr. Haley in charge)
   Prerequisite: senior standing in art, with at least a B average in the major, and approval of the department. Permission to enroll is subject to staff review and is granted only for exceptionally specialized projects. Credit gained in course 199 will be accepted in fulfillment of requirement in Groups A, B, C, or D.

   Graduate Courses
   (Concerning conditions for admission to graduate courses, see page 18)

201. Advanced Practice in Selected Painting and Drawing Techniques. (3) I and II.
   Mr. Wessels
   Prerequisite: at least a B average in the undergraduate major in art. Also, applicants must demonstrate ability in composition in an examination at the opening of the semester.
   Original works are produced for group discussion and criticism. May be repeated for credit.

220. Seminar in Art. (3) I and II.
   Mr. Loran, Mr. Lockwood, Mr. Park, Mr. Ruvolo
   Prerequisite: at least a B average in the undergraduate major in art. Also, applicants must demonstrate ability in composition in an examination at the opening of the semester.
   Seminar in the practice of painting and drawing. Original works are produced for group discussion and criticism. Ancillary topics of a contemporary or historical nature will be introduced. May be repeated for credit.

240. Advanced Practice in Selected Sculpture Techniques. (3) I and II.
   Mr. O'Hanlon, Mr. Schnier
   Prerequisite: at least a B average in the undergraduate major in art. Also, applicants must demonstrate ability in composition in an examination at the opening of the semester.
   Original works are produced for discussion and criticism. May be repeated for credit.

245. Seminar in Sculpture. (2) I and II.
   Mr. Schnier, Mr. O'Hanlon
   Prerequisite: at least a B average in the undergraduate major in art. Also, applicants must demonstrate ability in composition in an examination at the opening of the semester.
   Seminar in Sculpture. Original works are produced for discussion and criticism. Ancillary topics of a contemporary or historical nature will be introduced. May be repeated for credit.

254. Seminar in the History of Ancient Art. (3) I.
   Mr. Amyx
   May be repeated for credit.

260. Seminar in the History of Oriental Art. (3) II.
   Mr. Maenchen
   May be repeated for credit.

275. Seminar in the History of Early Christian and Medieval Art. (3) II.
   Mr. Horn
   May be repeated for credit.

276. Seminar in the History of Renaissance Art. (3) I.
   Mr. Ackerman
   May be repeated for credit.

277. Seminar in the History of Northern European Art. (3) II.
   Mr. Schulz
   May be repeated for credit.
283. Seminar in the History of Modern Art. (3) I. Mr. Chipp
May be repeated for credit.

284. Seminar in the History of Modern Architecture. (3) II. Mr. Jacobs
May be repeated for credit.

298. Special Study for Graduate Students. (1-6) I and II.
The Staff (Mr. Haley in charge)
Prerequisite: at least a B average in the upper division and graduate
courses taken in the Department of Art. A student may not register with
more than two instructors in any one semester for credit. Permission to en­
roll is subject to staff review and is granted only for exceptionally spe­
cialized projects.

299. Special Study for Graduate Students in the History of Art. (1-4)
I and II. The Staff (Mr. Chipp in charge)

RELATED COURSES IN OTHER DEPARTMENTS
Architectural History (Architecture 121, 122).
Architectural History—American (Architecture 126).
Architectural History—Nineteenth and Twentieth Centuries (Architec­
ture 127).
Classical Archaeology: Elementary Classical Archaeology (Classics 17A–
17B); Vase Painting (Classics 170A*-170B–170C).
Advanced Course in Archaeological Method (Classics 270A–270B).
History of Design since the Industrial Revolution (Decorative Art 167).
Italian Culture in Transition (History 130).

UNIVERSITY ART GALLERY
The University Art Gallery was established in 1933 with funds con­
tributed for the purpose by the Class of 1933, the Regents of the Univer­
sity, Albert M. Bender, and other generous friends and alumni of the
University. Owing to limitations of space and facilities, the gallery does
not maintain a permanently installed exhibition, but presents from time
to time temporarily installed exhibits covering various phases of art. The
material comprising these exhibits is drawn either from University col­
clections in storage, or borrowed from other institutions and organizations,
or from private individuals. Those interested in the gallery's activities
may address the Director, Mr. Winfield S. Wellington, Department of
Decorative Art.

ASTRONOMY
(Department Office, 601 Campbell Hall)
Louis G. Henyey, Ph.D., Professor of Astronomy and Director of the Leusch­
er Observatory.
Otto Struve, Ph.D., Sc.D., Professor of Astronomy.
Harold F. Weaver, Ph.D., Professor of Astronomy.
Sturla Einarsson, Ph.D., Professor of Astronomy, Emeritus, and Director of
the Leuschner Observatory, Emeritus.
Leland E. Cunningham, Ph.D., Associate Professor of Astronomy.
John G. Phillips, Ph.D., Associate Professor of Astronomy.

* Not to be given, 1959–1960.
Astronomy

Edward A. Spiegel, Ph.D., Instructor in Astronomy.  
George Wallerstein, Ph.D., Instructor in Astronomy.

Albert E. Whitford, Ph.D., Director of the Lick Observatory and Astronomer.

Letters and Science List.—All undergraduate courses in astronomy are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Henyey, Mr. Phillips.

Preparation for the Major: Physics 4A-4B-4C, or the equivalents; Mathematics 3A-3B, 4A-4B, or the equivalents, and a course in statistics; Astronomy 7A-7B; a reading knowledge of French, German, or Russian.

The Major: The major consists of a minimum of 24 units of upper division work in astronomy and allied subjects taken in accordance with a plan approved by the major adviser. Normally, students majoring in astronomy must take courses 104A-104B, 105A-105B, and 117A-117B.

Honors in Astronomy.—Honors are recommended on the basis of excellence of work in the major.

LOWER DIVISION COURSES

1. Introduction to Astronomy. (3) I and II.  Mr. Struve
   Three lectures and one discussion section per week.
   General facts and principles of the science of astronomy.

7A-7B. General Astronomy. (3-3) Yr.  Mr. Phillips
   A three-hour laboratory or observing period will be substituted occasionally for one of the lectures. Prerequisite: Mathematics 3A. Intended for majors in the natural sciences and engineering. Required in preparation for a major in astronomy.
   The facts and principles underlying all branches of astronomy.

UPPER DIVISION COURSES

104A-104B. Practical Astronomy. (3-3) Yr.  Mr. Wallerstein
   Prerequisite: Mathematics 3A-3B, Physics 4A-4B, and either course 1 or 7A-7B. Course 105A-105B is recommended and may be taken concurrently.
   104A. Precise determination of latitude, time and longitude. Precession, nutation, proper motion and refraction.
   104B. Optical properties of a telescope. Differential measurement of star positions.

105A-105B. Astronomical Computations. (3-3) Yr.  Mr. Cunningham
   Prerequisite: Mathematics 4B and 119 (may be taken concurrently with course 105B), or consent of the instructor.
   Theory and application to astronomical problems of interpolation, numerical differentiation and integration, determinants and matrices, solution of linear and transcendental equations, least squares, numerical solution of differential equations.

117A-117B. Introduction to Astrophysics. (3-3) Yr.  
   A laboratory period will occasionally be substituted for one of the regular periods. Prerequisite: consent of the instructor.

H195. Special Study for Honors Candidates. (1-3) I and II.  The Staff

199. Special Study for Advanced Undergraduates. (1-3) I and II.  Mr. Weaver
GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

*205. Utilization of Modern Computing Machinery. (3) I.
Prerequisite: course 215, or consent of the instructor. Mr. Cunningham
Theory and practice of the solution of large astronomical problems with
punch-card and electronic calculators.

207A–207B. Physical Foundations of Astrophysics. (4–4) Yr.
Mr. Spiegel
Prerequisite: Mathematics 110A–110B, Physics 121 or the equivalent.
A discussion of the physical foundations of modern astrophysics, with
emphasis on those topics bearing directly on astrophysical theories.

215A–215B. Orbit Theory and Practice. (3–3) Yr. Mr. Cunningham
Prerequisite: course 105 and Physics 105 (may be taken concurrently), or
consent of the instructor. May be taken by qualified seniors.
Various orbit methods, reduction of observations, special perturbations,
introduction to general perturbations.

217A–217B. Astrophysics. (3–3) Yr. Mr. Henyey
Prerequisite: course 117A–117B.
The physics of stellar atmospheres.

218A–218B. Statistical Astronomy. (3–3) Yr. Mr. Weaver
An introduction to the principal problems of galactic structure.

*225A–225B. Celestial Mechanics. (3–3) Yr. Mr. Cunningham
Prerequisite: Physics 105.

*227A–227B. Stellar Structure. (3–3) Yr. Mr. Henyey
Prerequisite: course 117A–117B and 207A–207B, or the equivalent.
The physics of the stellar interior, energy sources, stellar rotation, and
pulsation.

Prerequisite: Physics 211 or the equivalent.
The application of the principles of atomic and molecular spectroscopy to
the study of the spectra of astronomical sources.

*245. Satellite Theory. (3) II. Mr. Cunningham
Prerequisite: courses 205 and 215, or consent of the instructor.
Theories for the motion of natural and artificial satellites. Practical deter-
mination of their orbits and perturbations.

Prerequisite: Physics 211 or the equivalent. Mr. Phillips
Advanced topics in astronomical spectroscopy: spectra of Wolf-Rayet
stars, novae, Cepheid variables, spectrum variables, late-type stars, comets,
planets, night sky, interstellar matter.

†291. Proseminar. (1–3) II. Mr. Weaver
Introduction to research. For new graduate students in astronomy.

292. Astrophysics Seminar. (1–3) I and II. Mr. Struve, Mr. Henyey

†293. Seminar in Orbits. (1–3) I and II. Mr. Cunningham

*294. Seminar in Statistical Astronomy. (1–3) I. Mr. Weaver

* Not to be given, 1959–1960.
† To be given if a sufficient number of students enroll.
298. Advanced Study and Research at Lick Observatory. (1–4) I and II.
   The Staff (Mr. Whitford in charge)
   Intended for graduate students who require observational experience as well as for those working upon observational problems for their theses.

299. Advanced Study and Research. (1–4) I and II.
   The Staff (Mr. Struve in charge)

LICK OBSERVATORY

The Lick Observatory at Mount Hamilton is a separate research campus of the University and provides facilities for advanced astronomical work. Opportunities are available to graduate students to do research at the Observatory under the direction of the astronomers. In the course of such work a student may obtain observational material for a doctor's or a master's dissertation.

BACTERIOLOGY

(Department Office, 3573 Life Sciences Building)

Michael Doudoroff, Ph.D., Professor of Bacteriology.
Sanford S. Elberg, Ph.D., Professor of Bacteriology.
John H. Northrop, Ph.D., Sc.D., LL.D., Professor of Bacteriology (Professor and Member of the Rockefeller Institute for Medical Research).
Roger Y. Stanier, Ph.D., Professor of Bacteriology.
Gunther S. Stent, Ph.D., Professor of Bacteriology.
Albert P. Krueger, A.B., M.D., Professor of Bacteriology, Emeritus.
Edward A. Adelberg, Ph.D., Associate Professor of Bacteriology (Chairman of the Department).
Jacob Fong, Ph.D., Associate Professor of Bacteriology.
John H. Phillips, Ph.D., Assistant Professor of Bacteriology.
David W. Weiss, Ph.D., D.Phil., Assistant Professor of Bacteriology.
Adelien Larson, A.B., Associate in Bacteriology.

Horace A. Barker, Ph.D., Professor of Microbial Biochemistry.
Stewart H. Madin, D.V.M., Lecturer in Bacteriology.

Letters and Science List.—All undergraduate courses in bacteriology are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Doudoroff.

Students in the lower division are urged to consult with the major adviser concerning the specific courses to be taken as a basis for a major in bacteriology.

The Major.—The following lower division courses are required: Chemistry 1A, 1B, 5; Chemistry 8 or 12; Zoology 1A or Botany 1 or Biology 11A–11B; Physics 2A and 2B, Bacteriology 1 and 4. (Note: Students from other institutions presenting a course of 4 units in introductory bacteriology, including laboratory, must have the consent of the departmental adviser, in order to proceed with the major.)

A total of 24 units of upper division work must also be completed, and must include the following courses: Bacteriology 100 or 104; Bacteriology 101; Biochemistry 102 or 100A–100B; Biochemistry 102L or 101A; and 4 additional upper division units in bacteriology. The rest of the 24 upper
division units may be chosen from the following list: Bacteriology 100, 102, 102C, 103, 104, 105, 106, 106C, 107; Botany 100; Zoology 110, 111, 117; Biochemistry 101B; Entomology 126; Public Health 147A–147B; Virology 100A; Chemistry 112, 128, 129.

Students planning to go on to graduate work are advised to select additional courses from the following list: Botany 101; Zoology 101, 101C, 102, 107, 107C; Zoology 114 or 115 or Genetics 100; Chemistry 109 or 110A–110B. It is recommended that these students offer either German or French in satisfaction of the language requirement for the College of Letters and Science.

**LOWER DIVISION COURSES**

1. **General Bacteriology.** (3) II. Mr. Stanier
   Three lectures per week. Prerequisite: Chemistry 1A, 1B, 8 or 12; Zoology 1A or Botany 1 or Biology 11A–11B. Course 4 must be taken concurrently.
   A course designed to acquaint the student with the morphology, physiology, biochemistry, and ecology of bacteria, with principal emphasis on nonpathogenic types.
   The basic course in bacteriology for students majoring in any of the biological sciences.

2. **A Survey of Bacteriology.** (2) II. Mr. Adelberg, Mr. Phillips
   Two lectures per week. Prerequisite: Chemistry 1A. Course 4 must be taken concurrently.
   An elementary course, designed for students not planning to major in any of the biological sciences.

4. **Laboratory Course in General Bacteriology.** (2) II. Mr. Adelberg
   Two three-hour laboratory periods per week. Prerequisite: Chemistry 1A.
   Either course 1 or 2 must be taken concurrently.
   Designed to provide an introduction to bacteriological techniques and to illustrate some important concepts of bacteriology.

**UPPER DIVISION COURSES**

A grade of C or higher in the preceding courses in this department is required for admission to the upper division courses.

100. **Bacterial Physiology.** (5) I. Mr. Doudoroff
   Two lectures and three three-hour laboratory periods per week. Prerequisite: course 1 or 2; course 4; Chemistry 5; Biochemistry 102 or the equivalent.
   Selected topics in bacterial physiology, with primary emphasis on quantitative aspects of growth, nutrition, metabolism, and genetics.

101. **The Pathogenic Bacteria.** (6) I. Mr. Fong, Mr. Weiss
   Three lectures and three three-hour laboratory periods per week. Prerequisite: course 1 or 2; course 4; Chemistry 8 or 12; Zoology 1A or Biology 11A–11B.
   A course designed to acquaint the student with principles and laboratory procedures necessary for studying the pathogenesis of bacterial and other microbial infections of man.
   Students who plan to take Bacteriology 101 should report to Cowell Hospital for immunization against tetanus, diphtheria, and typhoid fever.

102. **Immunology.** (2) II. Mr. Elberg
   Prerequisite: course 101.
   The factors underlying the virulence of microorganisms; mechanisms of bacterial infection; specific and nonspecific reactions in antimicrobial immunity; the antigen-antibody reaction; nature and serological specificity of antibodies.
102C. Immunology Laboratory. (3) II. Mr. Elberg, Mr. Phillips
Three three-hour laboratory periods per week. Prerequisite: course 102
(may be taken concurrently).

103. Immunochemical Techniques. (4) I. Mr. Phillips
Prerequisite: Chemistry 8 or 12.
Two lectures and two three-hour laboratory periods per week.
The application of immunochemical procedures to problems in biology.

104. The Biology of Nonpathogenic Bacteria. (5) II. Mr. Stanier
Two lectures and three three-hour laboratory periods per week. Prereq­
uisite: Biology 11A–11B or Zoology 1A or Botany 1; Biochemistry 102 or
the equivalent; course 1 or 2, or consent of the instructor.
The cytology of bacteria; enrichment, isolation, and study of representa­
tives of the major bacterial groups.

105. The Biology of Infectious Disease. (2) II. Mr. Weiss
Prerequisite: open to juniors, seniors, and graduate students majoring
in any of the biological sciences, or by special permission of the instructor.
A course designed to acquaint the student with the special biological and
ecological problems of the host-parasite relationship in infectious disease.

*106. Introduction to the Animal Viruses. (2) II. Mr. Fong
Prerequisite: course 101.
An introduction to the animal viruses, including pathogenesis, immunity,
and virus-host relationship.

*106C. Laboratory in Virology. (2) II. Mr. Fong
Prerequisite: course 106 (may be taken concurrently).
A basic course in laboratory techniques for isolation, cultivation, and
identification of animal viruses. Application of these procedures in diagnosis,
immunology, and pathogenesis of viral diseases. Studies on the nature and
reproduction of viruses and the host-virus relationships.

107. Bacterial Genetics. (2) I. Mr. Adelberg, Mr. Stent
Prerequisite: an elementary bacteriology course, or consent of the instruc­
tor. An elementary course in genetics is recommended.
An introduction to the genetics of microorganisms, with emphasis on
bacteria.

199A–199B. Special Study for Advanced Undergraduates. (2–2) Yr.
Beginning each semester. The Staff (Mr. Adelberg in charge)
199A is not prerequisite to 199B. Open only to senior students in bacteriol­
ogy with a grade B average. Study of a selected topic and preparation of a
term paper.

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 18)

203. Microbial Metabolism. (2) I. Mr. Barker, Mr. Doudoroff
Prerequisite: Biochemistry 100B, or consent of the instructor. Recom­
mended: an elementary bacteriology course.
A course covering selected topics on the metabolism of microorganisms,
with special emphasis on intermediary metabolism.

206A–206B. Experimental Pathology. (4–4) Yr. Mr. Madin
Two lectures and two three-hour laboratory periods per week. Prerequisite:
course 101, or consent of the instructor.
Abnormal mammalian biology in relationship to infectious disease and
neoplasia.

* Not to be given, 1959–1960.
Bacteriology; Biochemistry

212. Seminar in Current Research. (1) I. Mr. Adelberg
Prerequisite: consent of the instructor.
Presentation of current research projects.

213. Seminar in Microbial Genetics. (1) II. Mr. Adelberg, Mr. Stent
Prerequisite: course 107.

214. Seminar in Medical Microbiology. (1) II. Mr. Weiss

215. Seminar in Immunology. (1) II. Mr. Elberg

280. Research. (1-9) I and II. The Staff (Mr. Adelberg in charge)

299. Special Study for Graduate Students. (2-4) I and II.
The Staff (Mr. Adelberg in charge)

Any properly qualified student who wishes to pursue a problem through nonlaboratory study may do so upon approval by a member of the staff with whom he wishes to work.

BIOCHEMISTRY

(Department Office, 229 Biochemistry and Virus Laboratory)

Horace A. Barker, Ph.D., Professor of Biochemistry.
William Z. Hassid, Ph.D., Professor of Biochemistry.
Choh H. Li, Ph.D., Professor of Biochemistry and Experimental Endocrinology.
Howard K. Schachman, Ph.D., Professor of Biochemistry and Virology.
Esmond E. Snell, Ph.D., Professor of Biochemistry (Chairman of the Department).
Wendell M. Stanley, Ph.D., Sc.D., LL.D., Docteur h.c. (Paris), Professor of Biochemistry and Virology and Director of the Virus Laboratory.
Hermann O. L. Fischer, Ph.D., Professor of Biochemistry, Emeritus.
Clinton E. Ballou, Ph.D., Associate Professor of Biochemistry.
Frederick H. Carpenter, Ph.D., Associate Professor of Biochemistry.
Charles A. Dekker, Ph.D., Associate Professor of Biochemistry.
John B. Neilands, Ph.D., Associate Professor of Biochemistry.
Arthur B. Pardee, Ph.D., Associate Professor of Biochemistry and Virology.
Jesse C. Rabinowitz, Ph.D., Associate Professor of Biochemistry.
Roger D. Cole, Ph.D., Assistant Professor of Biochemistry.
David P. Hackett, Ph.D., Assistant Professor of Biochemistry.
W. Terry Jenkins, Ph.D., Instructor in Biochemistry.

C. Arthur Knight, Ph.D., Professor of Virology.

Letters and Science List.—All undergraduate courses in biochemistry are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers.—Mr. Carpenter, Mr. Dekker.

Preparation for the Major.—The department offers two programs for the major: Plan I, which is designed especially for students expecting to pursue graduate study in biochemistry, and Plan II, a program for students who do not expect to continue beyond the Bachelor of Arts degree. Students in Plan I may elect the Honors Program.

A grade-point average of at least 2.0 in courses taken in preparation for the major is required for admission to the major. In preparing for the major, attention should be given to the interlocking prerequisites: i.e., Mathematics
3A–3B are prerequisites for Physics 4A–4B, which are in turn required for Chemistry 110A.

**Preparation for Plan I.**—Chemistry 1A–1B, 5, 12; Mathematics 3A–3B; Physics 4A–4B; Physiology 1–1L or Zoology 1A and one of the following: Bacteriology 1, Botany 12, Zoology 1B. Recommended: Botany 1 in place of Botany 12, Physics 4C in addition to Physics 4A–4B, a course in statistics, and a reading knowledge of German and one other foreign language.

**Preparation for Plan II.**—Chemistry 1A–1B, 5, 8, 9; Mathematics 3A–3B or 16A–16B; Physics 2A–2B, 3A–3B; Physiology 1–1L or Zoology 1A and one of the following: Bacteriology 1, Botany 1 or 12, Zoology 1B.

**The Major.**—Plan I. The 24-unit major must include courses 100A–100B, 101A–101B, 112, Chemistry 110A–110B and 112C (Chemistry 112 is recommended in place of 112C). Additional courses in biochemistry and in allied subjects chosen in accordance with a plan approved by the departmental adviser are recommended (see Related Course List on page 56). Chemistry 110A and 112C may be taken concurrently with Biochemistry 100A. The department will certify to the completion of the major for graduation under Plan I only on the basis of a grade-point average of at least 2.0 in biochemistry courses, as well as in all upper division courses acceptable in the major. Students who cannot maintain such an average may be required at any time to withdraw from the major in biochemistry. Students planning to pursue graduate study in biochemistry should maintain a grade-point average of at least 3.0 in biochemistry courses and other courses acceptable in the major.

**Honors Program.**—Students who are enrolled in the major under Plan I, and who have a grade-point average of at least 3.0 in courses acceptable in the major, may elect the Honors Program (at any time not later than the first semester of the senior year). In addition to the courses prescribed under the Plan I major, the students in this program will be required to complete 3 units in course 180 and write a thesis based on this research. They will also offer course 290 (1 unit) in place of course 112. Certain graduate biochemistry courses will be open to these students on approval of the instructor and adviser. To remain in the Honors Program a student must maintain a grade-point average of at least 3.0 in biochemistry courses and in those courses acceptable in the major.

**Plan II.**—The major must include courses 100A–100B, 101A–101B, 112, and Chemistry 109. The balance of the 24 units required for the major must include additional courses in biochemistry or allied subjects chosen in accordance with a plan approved by the departmental adviser (see Related Courses List on page 56). Chemistry 109 may be taken concurrently with Biochemistry 100A. The department will certify to the completion of the major program for graduation under Plan II only on the basis of a grade-point average of at least 2.0 in the upper division courses acceptable in the major. Students who cannot maintain such an average may be required at any time to withdraw from the major in biochemistry.

**Upper Division Courses**

**100A–100B. General Biochemistry.** (3–3) Yr. Mr. Carpenter, Mr. Snell

100A: Mr. Carpenter; 100B: Mr. Snell.

Prerequisite: Chemistry 8 and 9 or 12 with a grade of C or higher; Chemistry 109 or 110A (may be taken concurrently), and Physiology 1–1L or Zoology 1A (may be taken concurrently), or consent of the instructor. Designed for biochemistry majors.

Lectures on the chemical and physical factors concerned in life processes, including the chemistry and metabolism of salts, vitamins, hormones, lipids, carbohydrates, and proteins, with a survey of nutrition and energy exchange.
101A–101B. General Biochemistry Laboratory. (3–3) Yr.
Mr. Cole, Mr. Jenkins, Mr. Neilands
101A: Mr. Cole, Mr. Jenkins; 101B: Mr. Jenkins, Mr. Neilands.
One lecture and two three-hour laboratory periods per week. Prerequisite: Chemistry 5, course 100A or 102 (may be taken concurrently).
Laboratory practice with the more important constituents of living matter to illustrate their chemical behavior. The experimental work is planned to accompany the lectures in course 100A–100B.

102. A Brief Survey of the Principles of Biochemistry. (3) I and II.
Mr. Ballou, Mr. Hackett, Mr. Rabinowitz, Mr. Cole
I. Mr. Ballou, Mr. Hackett; II. Mr. Rabinowitz, Mr. Cole.
Prerequisite: Chemistry 8. Recommended: Chemistry 9, 109 and an introductory course in bacteriology, botany, or zoology. Designed for nonbiochemistry majors. Not open for credit to students who have credit in course 100A–100B or equivalent.
A survey of the chemistry of biologically important compounds and their role in animal and plant metabolism.

102L. Biochemistry Laboratory. (3) I and II.
Mr. Ballou, Mr. Barker, Mr. Dekker, Mr. Hassid
I. Mr. Barker, Mr. Hassid; II. Mr. Ballou, Mr. Dekker.
One lecture and two three-hour laboratory periods per week. Prerequisite: Chemistry 5 (or Nutrition and Home Economics 101A) and course 102 (may be taken concurrently). Not open for credit to students who have completed course 101A–101B or the equivalent.
Experimental work to acquaint the student with the properties of biological materials, the action of enzymes, and the use of specific techniques for laboratory work in biochemistry. Planned to accompany lectures in course 102.

112. Proseminar. (1) II.
Mr. Neilands
Prerequisite: courses 100A and 101A.
Biochemical literature and newer developments of the subject.

180. Research. (3–5) I and II. The Staff (Mr. Carpenter in charge)
Prerequisite: courses 100A and 101A with a grade of B or higher.
A limited number of advanced students will be given topics for investigation under the direction of a member of the staff.

199. Special Study for Advanced Undergraduates. (1–2) I and II.
The Staff (Mr. Ballou in charge)
Reading and conference for properly qualified students under the direction of a member of the staff.

GRADUATE COURSES

(Cconcerning conditions for admission to graduate courses, see page 18)
Courses 202 to 222 represent selected topics in biochemistry and are intended to acquaint advanced students with recent advances made in the different fields of biochemistry. Also open to senior students with honor standing by consent of the instructor.

*202. Carbohydrates. (2) I.
Mr. Ballou
Prerequisite: Chemistry 112 or equivalent.
The chemistry of carbohydrates, with an emphasis on the rationalization of properties and reactions according to modern theories of organic chemistry.

* Not to be given, 1959–1960.
Biochemistry

203. Biochemistry of the Hormones. (2) II.
Survey of the biochemistry of the hormones.

204. Biochemistry of Proteins. (3) II.
Prerequisite: course 100A–100B.
The chemistry and metabolism of the amino acids, peptides, and proteins.

205. Biochemistry of Nucleic Acids. (2) I.
Prerequisite: course 100A–100B, or consent of the instructor.
The chemistry and biochemistry of the nucleic acids and their constituents.

206. Physical Biochemistry. (3) I.
Prerequisite: Chemistry 12 or 112 or 112C, 110A–110B, Physics 4A, 4B, 4C,
Mathematics 4A or consent of the instructor. Recommended: course 102 or
100A–100B.
Application of modern physical concepts and experimental methods to the
problems of large molecules of biological interest.

209. Advanced Biochemical Laboratory Methods. (4) I.
One lecture and three three-hour laboratory periods per week. Prerequisite:
courses 100A–100B, 101A–101B, or their equivalent, and consent of the
instructor.
Experimental techniques used in research, including purification of natural
materials, chromatographic analysis and isotopic tracer methods.

210. Fats, Phospholipids, and Related Compounds. (2) I.
Chemical constitution, isolation, synthesis, stereochemistry, relation to
carbohydrates, and the general biological role of these compounds.

211. Enzyme Chemistry. (3) I.
Prerequisite: course 102 or 100A–100B.
Physical chemical properties and mechanism of action of enzymes, and
their role in metabolic processes.

212. Enzyme Chemistry Laboratory. (3) II.
Prerequisite: course 211 (may be taken concurrently) or consent of the instructor.
Experimental methods of enzyme chemistry and biological oxidations.

222. Plant Biochemistry. (2) II.
(Formerly Agricultural Biochemistry 222.)
Prerequisite: course 100A–100B or 102 with a grade of C or higher.
Lectures on the chemistry of important plant constituents and on processes
such as photosynthesis, respiration, and carbohydrate, nitrogen, and fat
metabolism.

280. Research. (1–9) I and II.
The Staff (Mr. Rabinowitz in charge)
Students must enroll for not less than 4 units, except by special permission
of the chairman of the department.

290. Seminar. (1) I and II.
The Staff
Advanced study in various fields of biochemistry. These fields vary from
year to year. The program for 1959–1960 will include four sections each
semester, each emphasizing a somewhat different area: I, Mr. Jenkins, Mr.
Rabinowitz, Mr. Neilands, and Mr. Hackett; II, Mr. Barker, Mr. Cole, Mr.
Dekker, and Mr. Pardee.

* Not to be given, 1959–1960.
299. Special Study for Graduate Students. (1–3) I and II.
The Staff (Mr. Rabinowitz in charge)
Reading and conference for properly qualified graduate students under the
direction of a member of the staff.

RELATED COURSES IN OTHER DEPARTMENTS
Bacteriology 100 (5), 101 (6), 102 (2), 106 (2), 106C (2), 107 (2).
Botany 111 (4), 160A (2), 160B (2), 161A (2), 161B (2).
Food Technology 113 (3), *118 (3), 120 (2).
Genetics 100 (3), 100C (1), 104 (3).
(2–2).
Physics 132 (3).
112 (3), 120A–120B–120C (3–3–3).
Soils and Plant Nutrition 111 (3), 114 (3).
Zoology 100 (4), 101 (2), 101C (2), 102 (2), 107 (2), 114 (3), 118 (3),
*119A–119B (2–2), *120 (3), 123 (2).

BIOLOGICAL CONTROL
(Department Office, University of California Gill Tract,
1050 San Pablo Ave., Albany)
Curtis P. Clausen, M.S., Professor of Biological Control (Chairman of the Department), Berkeley and Riverside.
Edward A. Steinhaus, Ph.D., Professor of Insect Pathology.
Richard L. Doutt, Ph.D., Associate Professor of Biological Control.

Mauro E. Martignoni, Ph.D., Lecturer in Insect Pathology.
(For courses in biological control, see Entomology and Parasitology.)

BOTANY
(Department Office, 2017 Life Sciences Building)
Lincoln Constance, Ph.D., Professor of Botany and Curator of Seed Plant Collections.
Ralph Emerson, Ph.D., Professor of Botany.
Adriance S. Foster, Sc.D., Professor of Botany (Chairman of the Department).
Leonard Machlis, Ph.D., Professor of Botany.
Herbert L. Mason, Ph.D., Professor of Botany and Director of the Herbarium.
George F. Papenfuss, Ph.D., Professor of Botany and Curator of Algal Collections.
Lee Bonar, Ph.D., Professor of Botany and Curator of Mycological Collections, Emeritus.
Alva R. Davis, Ph.D., Sc.D., LL.D. (hon.c.), Professor of Plant Physiology, Emeritus.
* Not to be given, 1959–1960.
Botany

Thomas H. Goodspeed, Ph.D., Doctor (hon.c.), (La Plata), Sc.D. (hon.c.), Professor of Botany, Emeritus, and Director of the Botanical Garden, Emeritus.
Herbert G. Baker, Ph.D., Associate Professor of Botany and Director of the Botanical Garden.
Johannes M. Proskauer, Ph.D., Associate Professor of Botany.
John G. Torrey, Ph.D., Associate Professor of Botany.
William A. Jensen, Ph.D., Assistant Professor of Botany.
Philip J. Snider, Ph.D., Assistant Professor of Botany.

Daniel I. Arnon, Ph.D., Professor of Plant Physiology.
Kenneth L. Babcock, Ph.D., Assistant Professor of Soil Chemistry.
Richard M. Eakin, Ph.D., Professor of Zoology.
Wayne L. Fry, Ph.D., Assistant Professor of Paleontology.
Louis Jacobson, Ph.D., Professor of Soils and Plant Nutrition.
Gordon Mackinney, Ph.D., Professor of Food Technology.
Roy Overstreet, Ph.D., Professor of Soil Chemistry.
Edward C. Stone, Ph.D., Associate Professor of Forestry.
Perry R. Stout, Ph.D., Professor of Soil Science.
Albert Ulrich, Ph.D., Lecturer in Soils and Plant Nutrition.
Frederick R. Whatley, Ph.D., Lecturer in Plant Physiology.

Letters and Science List.—All undergraduate courses in botany except 155 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Proskauer.

Preparation for the Major.—Required: course 1; Chemistry 1A and 8; and Physics 2A-2B and 3A-3B. Recommended: Zoology 1A and elementary courses in other biological sciences; German and French under the foreign language requirement. Students who intend to major in Physiological Botany (II below) are required to take, in addition, Chemistry 1B and 5, and are advised to take Mathematics 3A-3B. If the lower division program is crowded, one or more of the following courses may be postponed until the student reaches the upper division: Chemistry 1B, 5, and 8.

The Major.—The courses in botany are organized on levels of increasing specialization corresponding to the elementary (course 1), intermediate (courses 100, 103, 108, 111), and the advanced stages of instruction. Requirements for the major are: (1) courses 100, 103, 108, and 111; (2) a course in genetics; and (3) completion of field of emphasis I or II below.

I. Morphological Botany: additional upper division courses in botany or approved courses in related departments, to complete the upper division unit requirements.

II. Physiological Botany: Biochemistry 102, and three or four additional upper division courses selected from Botany, Bacteriology, Biochemistry, Chemistry, Food Technology, Plant Nutrition, Soil Science, or Zoology, to complete the upper division unit requirements.

General Biology


(3-3) Yr. Mr. Emerson, Mr. Eakin
Lectures and laboratory. To receive credit toward the natural science requirement of the College of Letters and Science, both semesters must be taken. Not open for credit to students who have taken Botany 1, 12, Zoology 1A, 1B, 10.

*In residence spring semester only, 1959-1960.
An introductory course in biology offered jointly by the departments of Botany and Zoology. Presents and illustrates the main facts and principles of organization, function, heredity, and evolution of plants and animals, and introduces the student to methods of the life sciences.

**Botany**

**LOWER DIVISION COURSES**

1. **General Botany.** (5) I. Mr. Papenfuss
   Prerequisite (effective September, 1960): high school or introductory college chemistry.
   Lectures and laboratory. Designed as the basic course in botany for all students of plant or animal science.
   An introduction to the fundamental principles of biology as illustrated by plants, with emphasis on the morphology, physiology, and phylogenetic relations of the major plant groups.

12. **Plant Biology.** (3) II. Mr. Jensen
   Lectures and demonstrations. Open without prerequisite to all students and designed for those not specializing in botany. Not open to students who have completed course 1 or Biology 11A-11B. Students who have taken course 12 may elect course 1 for credit.
   Emphasis of the course is placed on the fundamental concepts of biology as illustrated in the structure and function of plants.

**UPPER DIVISION COURSES**

In addition to requirements specifically noted, the prerequisite for all upper division courses except Botany 115 and Botany 151 is course 1. Biology 11A-11B may fulfill this requirement with the consent of the instructor.

100. **Comparative Morphology of Thallophytes and Bryophytes.** (4) II. Mr. Proskauer
   Lectures and laboratory.

101. **Mycology.** (4) II. Mr. Emerson
   Lecture and laboratory. Prerequisite: course 100.
   The structure and development of the fungi. Myxomycetes, Phycomycetes, and Ascomycetes.

102. **Mycology.** (4) I. Mr. Snider
   Lectures and laboratory. Prerequisite: course 100. Course 101 recommended but not required.
   Fungi Imperfecti and Basidiomycetes.

103. **Comparative Morphology of Vascular Plants.** (4) I. Mr. Foster
   Lectures and laboratory.

104. **Bryology.** (4) I. Mr. Proskauer
   Lectures and laboratory. Prerequisite: courses 100 and 103. To be offered every other year.
   A general treatment of the morphology and relationships of the bryophytes.

105. **Plant Anatomy.** (4) II. Mr. Foster
   Lectures and laboratory. Prerequisite: course 103 and consent of the instructor.
   Comparative structure and growth of the meristems; development and structure of important cell types, tissues, and tissue systems; comparative anatomy of stem, root, and leaf. Emphasis is placed upon the anatomy of gymnosperms and angiosperms.
*107. Algology. (4) II. Mr. Papenfuss
Lectures and laboratory. Prerequisite: course 100. To be offered every other year.
Advanced morphology and taxonomy of the algae.

108. Taxonomy of Seed Plants. (4) II. Mr. Constance
Lectures, laboratory, and field work.
A survey of the spermatophytes, with lectures on phylogeny and classification; laboratory and field work with collection and identification practice.

110A. Phylogenetic Taxonomy. (3) I. Mr. Mason
Lecture and laboratory. Prerequisite: courses 105 and 108.
Analysis of morphological and logical problems fundamental to the systems of classification, with laboratory work on selected problems in morphology.

110B. Phylogenetic Taxonomy. (3) II. Mr. Mason
Lecture and laboratory. Prerequisite: course 108 and Genetics 100. 110A is not prerequisite to 110B.
An introduction to population studies and experimental and other research methods significant to an explanation of the taxonomic system.

111. Elementary Plant Physiology. (4) I and II. Mr. Machlis, Mr. Torrey
I: Mr. Machlis; II: Mr. Torrey.
Lectures and laboratory. Prerequisite: Chemistry 1A and 8.

115. Plants in Relation to Man. (3) II. Mr. Baker
Prerequisite: a course of high school or college biology or botany, or consent of the instructor.
Lectures on man's selection and use of plants for his own purposes; the cultural significance of plants; and man's influence on natural vegetation.

115C. Plants in Relation to Man. (1) II. Mr. Baker
Prerequisite: course 115 (may be taken concurrently) and Botany 1 or Biology 11A–11B.
Demonstrations, laboratory work, and field trips to illustrate material and processes dealt with in course 115.

130. Plant Cytology. (4) I. Mr. Jensen
Lectures and laboratory.
A synthesis of morphological, biochemical, and genetical information on cell function, reproduction, and development.

151. Principles of Plant Distribution. (3) I. Mr. Mason
Open to students with upper division standing in botany and major students in other biological sciences with consent of the instructor.
An assessment of the elemental facts of biogeography and their relation to the organization and distribution of vegetation and floras.

155. Botanical Microtechnique. (2) II. Mr. Jensen
Prerequisite: courses 105 or 130, or their equivalents, and consent of the instructor.
Techniques in the preparation of plant material for histological study, and the cytohistochemical localization and measurement of cell constituents and enzymes. An understanding of the underlying concepts and the physical-chemical bases of the techniques will be stressed.

* Not to be given, 1959–1960.
160A. Lectures in Plant Physiology. (2) II. Mr. Machlis
Prerequisite: course 111. Biochemistry 102 recommended.
An advanced undergraduate course on the physiology of the algae and fungi.

*160B. Lectures in Plant Physiology. (2) I. Mr. Torrey
Prerequisite: course 111. Biochemistry 102 recommended.
An advanced undergraduate course on the physiology of plant growth and development: embryo development, seed dormancy, germination, the hormonal control of plant growth, auxin metabolism, cellular differentiation, organogenesis, and the physiology of plant reproduction.

161A. Laboratory in Plant Physiology. (2) II. Mr. Machlis
Prerequisite: courses 111, 160A (may be taken concurrently), Chemistry 5. Biochemistry 102 recommended.
To accompany course 160A.

*161B. Laboratory in Plant Physiology. (2) I. Mr. Torrey
Prerequisite: courses 111, 160B (may be taken concurrently), Chemistry 5. Biochemistry 102 recommended.
To accompany course 160B.

H195A–195B. Special Study for Honors Candidates. (1–4) I and II.
Restricted to Honors candidates. The Staff (Mr. Proskauer in charge)

199A–199B. Special Study for Advanced Undergraduates. (1–4; 1–4) Yr.
The Staff (Mr. Proskauer in charge)
Open to specially qualified seniors with consent of the instructor.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

201A–201B. Research. Yr. The Staff (Mr. Papenfuss in charge)
Credit according to the work completed.
Original investigations of special problems in the field, laboratory, herbarium, or botanical garden.

203. Seminar in Cryptogamic Botany. (1) II.
Mr. Papenfuss (in charge), Mr. Emerson, Mr. Proskauer, Mr. Snider
Prerequisite: qualified graduate students.
A seminar on problems in fungi and lower green plants.

204. Seminar in Plant Cytology. (1) II. Mr. Baker (in charge), Mr. Jensen
Prerequisite: qualified graduate students.
A seminar for the study of advanced problems in modern plant cytology.

205. Seminar in Morphology and Taxonomy of Vascular Plants. (1) I.
Mr. Foster (in charge), Mr. Baker, Mr. Constance, Mr. Fry, Mr. Mason

206. Seminar in Plant Physiology. (1) II.
Mr. Arnon, Mr. Babcock, Mr. Broyer, Mr. Jacobson, Mr. Mackinney, Mr. Overstreet, Mr. Stone, Mr. Stout, Mr. Torrey (in charge), Mr. Ulrich, Mr. Whatley
Prerequisite: qualified graduate students, with consent of the staff member in charge.
A seminar on problems of plant physiology in the fields of botany, food technology, forestry, plant nutrition, and soil science.
The fall semester of this seminar is listed under Plant Nutrition 206.

* Not to be given, 1959–1960.
**Botany; Business Administration**

*211A–211B. Advanced Plant Physiology. (2–2) Yr.*

Mr. Machlis, Mr. Torrey

Prerequisite: courses 105 and 160A–160B, 161A–161B, Biochemistry 102, or consent of the instructor. Offered every other year.

Intensive reading of the classical and recent literature in the field of plant physiology with informal group discussions.

**HERBARIA**

The University maintains an herbarium representative of the floras of the world. It contains the original collections sponsored by the Geological Survey of California, the algological herbaria of Setchell and Gardner, the Ira W. Clokey herbarium, the J. P. Tracy herbarium, the H. E. Parks herbarium, the H. M. Hall herbarium, the oriental collections amassed by E. D. Merrill and the Joseph Rock collections and the South American collections made under the auspices of the University Botanical Garden.

The Jepson Herbarium, endowed by the late Professor Willis L. Jepson and maintained by the terms of the bequest as a separate herbarium, specializes almost exclusively on the flora of California and of areas in states immediately adjacent.

**BOTANICAL GARDEN**

The Department of Botany has maintained a Botanical Garden since 1892, and from 1925 onward, it has been located in Strawberry Canyon. It includes a fenced area of approximately twenty acres in a valley which, by reason of its slope toward the Pacific Ocean, enjoys a reduction in the climatic extremes of the Berkeley Hills. The garden provides opportunities for research with living plants, supplies teaching material and provides botanical instruction for the interested public. It contains six greenhouses, a lath-house and associated facilities and approximately twelve acres of outdoor space are cultivated. The garden's collections are especially rich in succulents and South American and South African plants. A California Native Area is being developed. Experimental work is carried out in the greenhouses and in an Experimental Area which provides full facilities for the culture of population-samples outdoors.

**BUSINESS ADMINISTRATION**

(Department Office, 113 South Hall)

David A. Alhadeff, Ph.D., Professor of Business Administration.

John P. Carter, Ph.D., Professor of Business Administration.

C. West Churchman, Ph.D., Professor of Business Administration.

Leonard A. Doyle, C.P.A., Ph.D., Professor of Business Administration.

Delbert J. Duncan, Ph.D., Professor of Marketing.

Walter Galenson, Ph.D., Professor of Industrial Relations.

Robert A. Gordon, Ph.D., Professor of Economics.

Ewald T. Grether, Ph.D., LL.D., Flood Professor of Economics (Chairman of the Department of Business Administration).

Sidney S. Hoos, Ph.D., Professor of Business Administration, Agricultural Economics, and Economics.

Roy W. Jastram, Ph.D., Professor of Business Administration.

†Van Dusen Kennedy, Ph.D., Professor of Industrial Relations.

Clark Kerr, Ph.D., LL.D., Professor of Industrial Relations.

* Not to be given, 1959–1960.


† In residence fall semester only, 1959–1960.

‡ In residence spring semester only, 1959–1960.
Frank L. Kidner, Ph.D., Professor of Economics.
Choh-Ming Li, Ph.D., Professor of Business Administration.
†Sherman J. Maisel, Ph.D., Professor of Business Administration.
Maurice Moonitz, C.P.A., Ph.D., Professor of Accounting.
David A. Revzan, Ph.D., Professor of Business Administration.
Arthur M. Ross, Ph.D., Professor of Business Administration.
Lloyd Ulman, Ph.D., Professor of Economics and Industrial Relations.
Lawrence L. Vance, C.P.A., Ph.D., Professor of Accounting.
William J. Vatter, Ph.D., Professor of Business Administration.
Dow Votaw, M.B.A., LL.B., Professor of Business Law.
Paul F. Wendt, Ph.D., Professor of Finance.
John T. Wheeler, Ph.D., Professor of Business Administration.
Ira B. Cross, Ph.D., LL.D., Flood Professor of Economics, Emeritus.
Charles C. Staehling, C.P.A., M.S., Professor of Accounting, Emeritus.
Royal A. Roberts, M.B.A., Associate Professor of Business Administration, Emeritus.
Hector R. Anton, Ph.D., Associate Professor of Accounting.
*Frederick E. Balderston, Ph.D., Associate Professor of Business Administration.
John W. Cowee, LL.B., Ph.D., Associate Professor of Insurance (Vice-Chairman of the Department).
*Joseph W. Garbarino, Ph.D., Associate Professor of Business Administration.
Richard H. Holton, Ph.D., Associate Professor of Business Administration.
Julius Margolis, Ph.D., Associate Professor of Business Administration.
Richard V. Mattessich, Dr.rer.pol., Associate Professor of Business Administration.
†Frederic P. Morrissey, Ph.D., Associate Professor of Business Administration.
Jack D. Rogers, Ph.D., Associate Professor of Business Administration.
Milo W. Smith, J.D., Associate Professor of Business Law.
D. Gordon Tyndall, Ph.D., Associate Professor of Business Administration.
Harry E. Allison, Ph.D., Assistant Professor of Business Administration.
James L. Blawie, J.D., Acting Assistant Professor of Business Administration.
Louis P. Bucklin, M.B.A., Acting Assistant Professor of Business Administration.
Alan R. Cerf, C.P.A., Ph.D., Assistant Professor of Business Administration.
*Michael Conant, J.D., Ph.D., Assistant Professor of Business Law.
Julian Feldman, M.A., Acting Assistant Professor of Business Administration.
Roy J. Hensley, Ph.D., Assistant Professor of Business Administration.
Austin C. Hoggatt, Ph.D., Assistant Professor of Business Administration.
James R. Longstreet, M.B.A., Ph.D., Assistant Professor of Business Administration.
F. Theodore Malm, Ph.D., Assistant Professor of Business Administration.
*Thomas A. Marschak, Ph.D., Assistant Professor of Business Administration.
William G. Panschar, Ph.D., Assistant Professor of Business Administration.
Lee Egan Preston, Jr., Ph.D., Assistant Professor of Business Administration.
Catherine De Motte Quire, Ph.D., Assistant Professor of Accounting.
Albert H. Schaaf, Ph.D., Assistant Professor of Business Administration.
David C. Smith, Ph.D., Assistant Professor of Business Administration.
†Harry J. Solberg, M.B.A., Ph.D., Assistant Professor of Business Administration.

† Absent on leave, 1959-1960.
* In residence spring semester only. 1959-1960.
Robert T. Sprouse, M.B.A., Ph.D., Assistant Professor of Business Administration.
George J. Staubus, C.P.A., Ph.D., Assistant Professor of Accounting.
Herman O. Stekler, A.B., Acting Assistant Professor of Business Administration.
Tore Tjersland, M.B.A., Acting Assistant Professor of Business Administration.
Samuel G. Trull, Ph.D., Acting Assistant Professor of Business Administration.
Donald K. Abe, M.B.A., Associate in Business Administration.
Loyd D. Heath, M.B.A., Associate in Business Administration.
Max. E. Lupul, B.S., Associate in Business Administration.
Francesco M. Nicosia, Dottore in Economia e Commercio, Associate in Business Administration.
Frank T. Paine, M.B.A., Associate in Business Administration.
Patrick J. Parker, M.B.A., Associate in Business Administration.
Frank K. Stuart, B.S., Associate in Accounting.

Eugene W. Burgess, Ph.D., Lecturer in Industrial Relations.
D. Douglas Davies, LL.B., Lecturer in Business Law.
Malcolm M. Davison, J.D., Ph.D., Professor of Economics.
Albert A. Ehrenzweig, Dr.Jur., J.D., LL.M., J.S.D., Professor of Law.
William Goldner, Ph.D., Lecturer in Business Administration.
Alan F. Kelsey, B.S., Lecturer in Business Administration.
Raymond W. Kettler, M.A., Lecturer in Business Administration.
Thomas N. St. Hill, Ph.B., Lecturer in Business Administration.
Harry S. Schwartz, Ph.D., Lecturer in Finance.
Franklin C. Stark, J.D., Lecturer in Business Law.

The requirements for the curriculum in the School of Business Administration are listed in the Circular of Information.

Letters and Science List.—Courses 1A, 1B, 10, 18, 100 (formerly 101), and 150 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

LOWER DIVISION COURSES

1A–1B. Principles of Accounting. (3–3) Yr. Beginning each semester.

Mr. Anton, Mr. Cerf, Mr. Mattessich, Mr. Sprouse, Mr. Staubus, Mr. Stuart, Mr. Vance

Two lectures and one two-hour laboratory section per week to be arranged. Prerequisite: at least sophomore standing. 1A is prerequisite to 1B. It is recommended that students who plan to enter the School of Business Administration complete this course in their sophomore year.

10. General Accounting. (3) I and II.

Mrs. Quire

Prerequisite: at least sophomore standing in any department of the University. Not open to students who have taken or are planning to take course 1A–1B.

A survey of accounting principles and procedures, particularly as they affect the individual.
18. Business Law: Introduction. (3) I and II.  Mr. Blawie, Mr. Stark
Prerequisite: at least sophomore standing.
Introduction to law; contracts; sales; and agency.

Upper Division Courses

Prerequisite: Economics 1A–1B, 2, and junior standing except where special provision has been made for students in certain curricula.

100. Economics of Enterprise. (3) I and II.
Mr. Alhadeff, Mr. Hensley, Mr. Holton, Mr. Lupul,
Mr. Margolis, Mr. Nicosia, Mr. Parker, Mr. Schaaf,
Mr. W. Smith, Mr. Tyndall

(Formerly numbered 101.)
Prerequisite: Economics 1A–1B, 2. Not open to students who have taken Economics 100B.
The development of economic analysis applicable to the problems of business enterprises in the areas of price, output, and utilization of resources; examination of the effects of business practices and policy on industry structure, consumers, labor and government.

101. Business Fluctuations and Forecasting. (3) I and II.
Mr. Hensley, Mr. Marschak, Mr. Nicosia, Mr. Parker, Mr.
Preston, Mr. D. Smith, Mr. Stekler, Mr. Tyndall, ——

(Formerly numbered 100.)
Prerequisite: course 100. Not open to students who have taken Economics 100A.
General analysis of the factors responsible for economic instability and of the forecasting and other management problems thereby created for the business firm.

102. Advanced Managerial Economics. (3) II.  Mr. Margolis
Prerequisite: courses 100 and 101.
Advanced analysis of the theory and practice of decision-making in business firms, utilizing the concepts and techniques of managerial economics. The business decisions to be investigated include pricing policies, product choice, investment policies, internal transfer pricing, inventory management.

and II.  Mr. Blawie, Mr. Davies, Mr. Votaw
Prerequisite: course 18.
Legal aspects of various types of business organization, including partnerships and corporations; general survey of the law of trade regulation.

106. Real Estate Law. (3) I.  Mr. Davies
Prerequisite: course 180.
Historical development of the law of real property; estates in land; other legal matters affecting real estate.

Prerequisite: course 18.
Negotiable instruments, particularly as devices for transferring credit; a survey of various mechanisms for securing credit such as mortgages, conditional sales, trust receipts, pledges.
121A–121B. Advanced Accounting. (3–3) Yr. Beginning each semester.
   Mr. Anton, Mr. Cerf, Mr. Moonitz, Mr. Sprouse
   A two-hour laboratory period per week to be arranged. Prerequisite: course 1A–1B. Required for those specializing in accounting.
   Intensive study of the advanced theory of accounts and its application. Selected problems and reading on the various phases of accounting procedure.

122. Cost Accounting. (3) I and II.
   Mr. Mattessich, Mr. Sprouse, Mr. Staubus
   Lectures, and a two-hour laboratory period per week to be arranged.
   Prerequisite: course 1A–1B.
   Principles of cost compilation and cost accounting techniques, including the methods of job order, process and standard costs, with attention to cost control devices and managerial use and analysis of cost accounting data; primary emphasis on industrial applications.

123. Auditing. (3) I and II.
   Mr. Vance
   Lectures, and a two-hour laboratory period per week to be arranged.
   Prerequisite: course 121A.
   Procedures for verification of financial records used by public accountants and internal auditors, including ethical, legal, and other aspects of the public accountant's work.

*124. Budgetary Control and Accounting Systems. (3) II. Mr. Staubus
   Prerequisite: courses 121A–121B and 122.
   The preparation and administration of budgets, the design and maintenance of efficient accounting systems for managerial control, and the quantitative analysis of specific problems confronting business management.

126. Problems of Financial Reporting. (3) I.
   Mr. Anton
   (Formerly numbered 121C.)
   Prerequisite: course 121A–121B.
   Consolidated statements, funds statements, index numbers in accounting, special problems in analysis of financial statements.

131. Corporation Finance. (3) I and II.
   Mr. Abe, Mr. Burgess, Mr. Carter, Mr. Heath, Mr. Longstreet, Mr. D. Smith
   Prerequisite: course 1A–1B.
   The corporation as one form of business organization; financial aspects of promotion and organization, operation as a going concern, expansion and consolidation, failure and reorganization; the capital market, financial instruments and institutions; public regulation of security issues and security exchanges.

132. Interpretation of Financial Statements. (3) I and II.
   Mr. Cerf
   Prerequisite: courses 1A–1B, 131, and consent of the instructor. Not open to students who have taken course 121C or 126. Should not be elected by students specializing in accounting.
   Methods of analyzing and interpreting financial statements, primarily in terms of their use in banking, corporation finance, and investment management.

133. Investments. (3) I and II.
   Mr. Heath, Mr. Longstreet
   Prerequisite: course 131.
   A study of the sources of, and demand for, investment capital, operations of security markets, determination of investment policy for individuals and institutions, and current procedures for analysis of different classes of securities.

* Not to be given, 1959–1960.
135. Economics of Insurance. (3) I and II.  
Mr. Cowee, ———
An introduction to the underlying principles of insurance, followed by a descriptive study of the practices in the more important branches of the insurance business.

136. Life Insurance. (3) I and II.  
Prerequisite: course 135.
A nontechnical study of principles and practice.

137. Property Insurance. (3) II.  
Prerequisite: course 135.

138. Casualty Insurance. (3) I.  
Prerequisite: course 135.

140. Production Organization and Management. (3) I and II.  
Primarily for juniors.  Mr. Paine, Mr. Trull, Mr. Vatter
An introduction to the theory and practice of production management; the problems of internal organization; the management of physical resources; product development; materials control; production control; production standards; managerial controls.

141. Facilities Planning. (3) I and II.  
Prerequisite: Economics 1A–1B, 2; course 140.
Mr. Rogers
Economic and administrative aspects of the conception and establishment of industrial facilities. Market and resource considerations in location; relations between production operations and plant requirements; economic analysis applied to problems of plant size, arrangement, and structure; equipment purchase decisions.

142. Production Planning and Control. (3) I and II.  
Mr. Trull
Prerequisite: course 140. Recommended: course 145.
Production planning and budgeting; development of the production control system, including product development, materials control, plant and equipment analysis, production standards and methods, personnel and supervision; control of production quantity through routing, scheduling, and dispatching; quality control—inspection and statistical quality control; measurement of production efficiency.

145. Industrial Procurement. (3) I.  
Mr. Duncan
Prerequisite: course 160.
The problems met in purchasing by industrial organizations. A study of major buying policies, the sources of material, the quantity and quality needed, and the relation to price and production cost. Inspection, inventory control, storage, and reciprocal buying are subjects for oral discussion and for the study of executive report writing.

150. Industrial Relations. (3) I and II.  Mr. Goldner, Mr. Ross, Mr. Ulman
Students will not receive credit for both Economics 150 and course 150.
Designed to help beginning students understand labor-management issues through a study and interpretation of labor history, labor law, unionism, employer organization and policies, collective bargaining, wages, employment, social security, and problems of public policy.

151. Personnel Administration. (3) I and II.  
Mr. Burgess, Mr. Malm, Mr. Raschen, Mr. Rogers
Prerequisite: course 150 or Economics 150, or consent of the instructor.
Personnel policies and procedures, with special attention to the structure
of personal relationships within the enterprise as it affects personnel management, and to the development and administration of the wage structure of a firm.

152. Collective Bargaining System. (3) I and II. Mr. Galenson
Prerequisite: course 150 or Economics 150.

153. Labor Law. (3) I and II. Mr. Davisson
Prerequisite: course 150 or Economics 150.
A study of federal and state laws and court decisions affecting hours, wages, strikes, boycotts, picketing, union recognition and operation, legality of collective agreements, etc. A discussion of the National Labor Relations Act, Fair Labor Standards Act, and other legislation.

160. Marketing. (3) I and II.
Mr. Allison, Mr. Holton, Mr. Lupul, Mr. Panschar, Mr. Revzan, Mr. Preston, Mr. Allison, Mr. Holton, Mr. Lupul, Mr. Panschar, Mr. Revzan, Mr. Preston,
The evolution of markets and marketing; market structure, organization and behavior; marketing functions; pricing and price policy, marketing problems of producers of raw materials, agriculturists, manufacturers, wholesalers and retailers; marketing costs and efficiency; public and private regulations.

161. Foreign Marketing. (3) I and II. Mr. Holton, Mr. Li
Prerequisite: course 160.
The marketing functions in foreign trade; organization and structure of import and export markets; export selling; foreign market analysis; price policies and price quotations; shipping procedure; customs requirements; government control; settlement of commercial disputes.

162. Retail Store Management. (3) I and II. Mr. Duncan, Mr. Panschar
(Formally numbered 162A-162B.)
Prerequisite: course 160.
A study of retailing including: history and development of major management types; the geographical structure of retail trade; assortments of goods and services in various stores; the internal structure and problems of store management for the important types; important trends; and forms of government regulation.

163. Advertising. (3) I and II. Mr. Preston, Mr. Preston,
The basic concepts of advertising dealing with the preparation and execution of copy for various types of media. Study of the English used in advertising, illustration, and other elements of copy. The evaluation of principal types of media. Study of underlying psychology in copy and the psychology of the consumer as developed through product and market research.

165. Sales Analysis and Sales Management. (3) I and II.
Prerequisite: course 160.
Sales analysis and forecasting; organization of sales department; planning and policy determination; selection, training, compensating and supervising sales force; territorial analysis; cost analysis, business and economic appraisal of selling.
166. Wholesaling. (3) II.  
Mr. Revzan  
Prerequisite: course 160.  
The meaning and importance of wholesaling; its place in the marketing structure; functions of wholesaling; the agency structure of wholesaling; internal managerial aspects; government regulations; trends, and costs, profits, and efficiency.

169. Marketing Policies and Problems. (3) I and II.  
Mr. Allison, Mr. Balderston, Mr. Holton, Mr. Panschar  
Prerequisite: senior standing with marketing as field of emphasis, and with 6 units in the marketing field (beyond course 160) already completed, or taken concurrently. Not open to graduate students. 
Integration of the marketing field at top management level through case studies of marketing programs of extractive, manufacturing, wholesale, and retailing organizations. Includes: product determination; market potential; location; channels; advertising and sales promotion; price; and integration of policies.

170. Transport Economics. (3) I and II.  
Mr. Carter  
The demand for transportation; cost behavior of the important transport technologies, including private transportation; rate structures; government regulation; duties and responsibilities of carriers; government subsidies and promotional policies; growth rates and profit rates. Several field trips to be arranged.

171. Ocean Transportation. (3) I.  
Mr. Tyndall  
Historical development of ships and shipping; ocean routes, ports, and terminals; rates, documents; legislation; current problems of American shipping.

173. Air Transportation. (3) II.  
Mr. Carter  
A survey of civil aviation: physical characteristics of aircraft, airports, and airways; government aviation agencies; air-carrier operations, services, rates, costs and finances; airport management; legal problems arising from the use of the airspace; international air transport; evaluation of employment opportunities.

*174. Traffic Management. (3) I.  
A technical survey of the purchase and sale of transportation; selection of routing; tariffs and their interpretation; rate structures and rate construction; rate claims and commission proceedings; analysis of bills of lading, loss and damage claims; plant and warehouse location.

175. Public Utilities. (3) I.  
The basis of control, administrative and judicial machinery employed, problems of service, price, competition, and monopoly.

176. Problems of Highway Transport. (3) II.  
Mr. Tyndall  
The movement of goods and people on highways; the organization, rates, and practices of the for-hire branch of the industry; the general economic effects of highway transport developments; important problems in regulation, taxation, and public policy.

180. Introduction to Real Estate and Urban Land Economics. (3) I and II.  
Mr. W. Smith, Mr. Schaaf  
The nature of real property; the principles of urban land utilization; classification of property rights; urban development; real property valuation; the real estate market and its functions; the organization of the real estate business; government regulation of real estate practices.

* Not to be given, 1959–1960.
181. Valuation of Real Property. (3) I.  Mr. Wendt
Prerequisite: course 180.
The concepts, methods, and principles of land valuation; the factors influencing real estate values and income; trends in real property values and appraisal procedures in the urban real estate market.

*182. Economics of the Building Industry. (3) I.  
Prerequisite: course 180 or consent of the instructor.
Building as a problem in industrial organization; the variety, size, and instability of the market for buildings; the industry as presently constituted, contracting, subcontracting, financing; and problems of costs and efficiency.

183. Real Estate Financing. (3) II.  Mr. Schaaf
Prerequisite: course 180.
The nature of real estate markets and their financing. Emphasis is on allocation of financial resources; market structure; problems of equity financing; mortgage lending; construction lending; institutional practices and authority; financing risks; and government activity in real estate financing.

185. Foreign Exchange. (3) I.  Mr. Hensley
Prerequisite: Economics 135.
Comparison of foreign and domestic exchange operations and problems; import-export banking; structure and operation of the free and controlled exchange markets; exchange rate policies and problems; payments arrangements; monetary areas; gold markets; and similar institutions and arrangements.

190. Organization and Administration. (3) I and II.
Mr. Feldman, Mr. Marschak, Mr. Stekler, Mr. Wheeler
Organizational environment and other influences; choice and balancing of objectives. Formal organization structures; organization planning and control. Informal organizations, and their relationship to formal structures; groups, leaders, and behavior standards; communication. Theoretical considerations, and the relevance of various social sciences.

191. Management Problems and Policies. (3) I and II.
Mr. Rogers, Mr. St. Hill
Prerequisite: senior standing and courses 100, 140, 160.
Integration of the subject matter of the required courses in business administration through the study of the problems of top management organization, administrative techniques, and policy formulation. The case method supplements extensive reading. Written reports are required.

193. Introduction to Operations Research. (3) I.  Mr. Churchman
Prerequisite: Mathematics 3A–3B, Statistics 130A–130B, or equivalent and junior standing.
Introduction to the history, practice, and nature of operations research; applications to business and industry; formulation of the problem; measuring costs; forecasting by probabilities. Models. Inventory, waiting line, and allocation models; sampling; recommendations; implementation and control; organization of operations research groups.

198A–198B. Directed Group Study. (1–3; 1–3) Yr.
The Staff (Mr. Votaw in charge)

199A–199B. Special Study for Advanced Undergraduates. (1–3; 1–3) Yr.
The Staff (Mr. Votaw in charge)
Designed for senior students with at least a B average.

* Not to be given, 1959–1960.
FIRST-YEAR COURSES FOR GRADUATE STUDENTS

Designed for graduate students who did not have an undergraduate major in business administration. For information concerning the graduate curriculum in business administration, see the ANNOUNCEMENT OF THE SCHOOL OF BUSINESS ADMINISTRATION.

100G. Quantitative Methods and Their Use in Business Operation. (6) I. Mr. Doyle, Mr. Stuart
The development of statistical data and its use in managing a business enterprise; the economic theory of the firm and the place and use of quantitative methods in applying theory to business operations; the relation between the individual firm and the economy as a whole.

101G. Analytical Techniques and Their Use in Business Operation. (4) I and II. Mr. Alhadeff, Mr. Margolis, ———
An intensive development of the economic analysis necessary for decision-making in the firm. Topics covered are: decision theory; output, scale and price decision under conditions of certainty, uncertainty, and different market structures; forecasting; asset preferences; complementary relations through income effects.

103G. Statistical Analysis. (2) I and II. Mr. Hoggatt
Prerequisite: Mathematics D or the equivalent.
A general introduction to statistical analysis, as used in managerial and other business problems. Covers frequency distributions and their analysis, sampling theory and problems of inference, linear correlation, index numbers, and analysis of time series.

118G. Legal Aspects of Business Administration. (3) I and II. Mr. M. Smith, Mr. Votaw
Legal problems of organizing, operating, and terminating a business.

120G. Managerial Accounting. (3) I and II. Mr. Doyle, Mr. Vatter
(Formerly included in course 100G.)
The measurement and recording of financial events; the reporting and analysis of these events; the use of accounting data in the management of an enterprise.

131G. Financial Policies of Business. (3) I and II. Mr. Longstreet, Mr. D. Smith
Prerequisite: course 100G or consent of the instructor.
A study of business finance, with emphasis upon financial problems and policies of corporations; attention is given also to the role of commercial banks and that of institutional and other investors in supplying funds for corporations.

140G. Production Organization and Management. (3) I and II. Mr. Malm, Mr. Vatter,
Prerequisite: course 100G or consent of the instructor.
A study of the principles of organization and production management. Emphasis is placed on the theory of business organization and the principles of planning, directing, and controlling product development, plant layout and location, equipment selection, inventory, and production standards.
160G. Industrial and Personnel Relations. (3) II.  
Mr. Galenson, Mr. Garbarino  
Prerequisite: course 100G or consent of the instructor.  
Objectives and problems of management and labor in the modern industrial enterprise. Historical development of American industrial relations, unionism, collective bargaining, and industrial conflict. Elements of personnel administration.

160G. Marketing Organization and Policies. (3) I and II.  
Mr. Panschar, Mr. Revzan  
Prerequisite: course 100G or consent of the instructor.  
The evaluation of marketing, markets, and theory of marketing; market structure, organization, and behavior; marketing functions; pricing and price policies; marketing problems of extractive industry producers, manufacturers, wholesalers, retailers; trends; marketing costs and efficiency; public and private regulations.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

222A. Seminar in Controllership. (3) I and II.  
(Formerly numbered 222.)  
Mr. Vatter  
Prerequisite: courses 121A–121B, 122.  
A critical review of cost accounting practice from the viewpoint of the theory and objectives of cost analysis. Attention is given to the relations between cost accounting, statistics, economic theory and management philosophy.

222B. Seminar in Controllership. (3) II.  
Mr. Doyle  
Prerequisite: courses 121A–121B, 122.  
An intensive study of the nature and scope of controllership, as related to organization, policy, strategy and evaluation. Cases and literature deal with various aspects of financial controls and reports which serve to implement managerial objectives.

223A. Public Accounting Practice and Problems. (3) II.  
(Formerly numbered 223.)  
Mr. Vance  
Prerequisite: courses 121A–121B, 122.  
Historical background of the public accounting profession; development and current status of auditing standards; prominent recent and current professional problems; application of statistical sampling theory to auditing procedure.

223B. Public Accounting Practice and Problems. (3) I.  
(Formerly numbered 226.)  
Mr. Kettler, Mr. Vance  
Prerequisite: course 123.  
Accounting methods used by governmental and nonprofit institutions and concerns in particular lines such as banks, stock and grain brokers, insurance companies, and regulated public utilities.

228A. Income Taxation. (3) I and II.  
Mr. Cerf  
Prerequisite: course 1A–1B, or the equivalent.  
Income determination; sources of law; rates and returns; personal, corporation, estate and gift taxes; tax planning.
228B. Income Taxation. (3) I and II.  
(Formerly numbered 228.)  
Mr. Smith
Prerequisite: courses 121A–121B, 228A.  
More intensive professional study of tax accounting practice, including gross income, deductions, depreciation, capital gains and losses, estates and trusts, corporate problems, and administrative procedure.

229A–229B. Seminar in Accounting Theory. (3–3) Yr.  
Prerequisite: course 121A–121B. Mr. Anton, Mr. Moonitz, Mr. Staubus
229A. A survey of accounting literature, with emphasis upon development of accounting theory. Includes early history, formal statements of principles, special depreciation problems, relation of economics and accounting, and the effect of price-level changes upon financial statements.
229B. Intensive study of current issues in accounting theory, e.g., asset valuation and income determination, with emphasis upon controversial issues, special problems of regulated industries, consolidated financial statements.

230. Seminar in Financial Intermediaries. (3) II.  
Mr. Alhadeff
Prerequisite: Economics 135.
Structure and operations of commercial banks and other financial intermediaries. Impact of money and capital market developments and of monetary authorities upon interest rates and financial institutions.

232. Money Markets and Capital Markets. (3) I and II.  
Mr. Schwartz
Prerequisite: course 131 and Economics 135.
The organization and functions of, and the important influences upon, money and capital markets in the United States. Primarily concerned with private institutions operating in these markets. The influence of government financing operations and regulations is also considered.

233A. Securities Markets and Investment Policies. (3) I.  
Mr. Wendt
Prerequisite: course 133 or consent of the instructor.

233B. Security Analysis and Selected Investment Problems. (3) II.  
Mr. Wendt
Prerequisite: 233A or consent of the instructor.
Consideration of selected investment problems. Cases and readings in analysis of railroad, public utility, municipal, industrial, bank, insurance, and investment companies' securities.

234. Problems in Business Finance. (3) I and II.  
Mr. Longstreet
Application of principles of finance to the financial management of corporate enterprises, with special emphasis upon the financing of expansion. Program includes reading assignments on principles and methods of finance, and individual student reports on financial problems of particular corporations.

239. Seminar in Insurance. (3) II.  
Mr. Cowee, Mr. Ehrenzweig

241. Facilities Planning and Production Control. (3) I.  
Mr. Kelsey, Mr. Trull
Prerequisite: course 140 or 140G, and graduate standing.
Nature of production planning and control; factory planning and its relationship to production planning. Functions of production-control organizations; types of manufacturing and associated control systems. Layout, equipment selection, and building construction decisions. Trends in production control and factory planning.
242. Analysis of Production Management Problems. (3) II. Mr. Rogers
Prerequisite: graduate standing.
Decision-making in production planning; types of decisions and variables involved; possibilities for quantification of variables; criteria for decision; methods of analysis. Emphasis is placed on applications of modern analytical methods in the solution of practical production problems.

248. Seminar in Production Management. (3) II. Mr. Malm
Open to graduate students in business administration, economics, and engineering.
Analysis of selected topics in production management, especially those involving recent developments and important trends.

255. Seminar in Industrial Relations. (3) II. Mr. Garbarino, Mr. Ulman
Prerequisite: two industrial relations courses and consent of the instructor.
Theoretical background for advanced study of collective bargaining and personnel administration. Wage determination; structure and operation of labor markets; origin and direction of labor movements; theory of industrial peace and conflict.

256. Seminar in Collective Bargaining. (3) I and II. Mr. Garbarino, Mr. Ross
Prerequisite: course 152 or the equivalent. Open to a limited number of senior students with consent of the instructor.
Studies of the bargaining process; the legal and factual basis of collective bargaining; the provisions of collective agreements; administration of agreements, including negotiation and arbitration of grievances; processes of disputes settlement; influence of the larger environment, particularly mobilization and war.

257. Managerial Policies and the Labor Factor. (3) I and II. Mr. Burgess, Mr. Malm
Sources and objectives of managerial policies. Analysis of specific problems in terms of general situations. Selection of tools of personnel administration, procedures and special policies which are most appropriate and effective. Unconscious changes in or departures from broad policy.

259. Wage Policies and Wage Behavior. (3) I and II. Mr. Kerr, Mr. Galenson, Mr. Ross, Mr. Ulman

260. Advanced Marketing. (3) I and II. Mr. Revzan, ———
Prerequisite: course 160 and graduate standing. Intended primarily for graduate students in business administration who are candidates for the professional M.B.A. degree but are not qualified for course 269A–269B.
Readings, case, problem, and special report work.

261. Seminar on Foreign Marketing. (3) II. Mr. Li
Prerequisite: courses 161 and 185, or consent of the instructor.
Study of managerial and operational problems in foreign trade, including (1) the development of international trade theory and discussion of national commercial policies from the standpoint of a firm, and (2) case studies of foreign business operations and researches on topics of current interests.

262. Retailing Policies and Problems. (3) I. Mr. Duncan
Does not duplicate 262 offered prior to fall semester, 1958.
Prerequisite: courses 160 (or 160G), 162, 260, or their equivalent. Course 260 may be taken concurrently.
Case studies of executive determination of: organizational structure; nature and scope of policies; merchandising policies; advertising and sales promotion; personnel management; operating policies; accounting and control policies; and general management problems. Study of the nature of competition at the retail level.

264. Advertising Policies and Problems. (3) II.
Prerequisite: courses 160 (or 160G); 163; 260, or their equivalent. Course 260 may be taken concurrently.
Case studies of executive determination of: basic strategy; promotional programs; advertising administration; selection of media; determination of appropriations; physical and psychological aspects; determination of effectiveness; coordination aspects. Special problems of government regulation, ethics, and economic justification.

266. Marketing Organization. (3) I and II.  
Mr. Revzan
Offered prior to fall semester 1958 as 262.
Meanings and evolutionary aspects of market organization; marketing organization at the wholesale and retail levels and of the marketing channel; spatial aspects; general marketing strategy at each level and throughout the channel; specialization and integration in marketing organization; problems of “orderly” marketing.

268. Marketing Investigation. (3) II.  
Mr. Allison
Prerequisite: courses 160, 260, 290, Economics 2, and Psychology 180.
Nature and significance of marketing research; development of marketing research methods; investigation and analysis of specific marketing research projects including class research problems involving punch-card analysis; presentation of marketing research results; and evaluation of the effectiveness of marketing research.

269A-269B. Seminar in Marketing. (3-3) Yr.  
Mr. Grether
269A. Critical review of the literature of marketing, including background and historical materials, market organization (the marketing channel, agency structure and vertical integration), marketing functions.
269B. Prices and price policies, area structure, costs and efficiency, commodity marketing, and public and private regulation.

270. Transportation Management and Government Regulations. (3) I.  
Mr. Carter
Management attitudes toward restrictive and promotional legislation. Restriction and promotion contrasted: entry and price control; forms of subsidies. A critical analysis of transportation demand and cost behavior. Interpretation of statistical evidence; comparison with management and commission positions. Aspects of national policy.

279. Seminar in Transportation. (3) II.  
Mr. Carter
Analyses in selected topics of importance in the transportation field.

280. Real Estate and Urban Land Economics. (3) I.  
Mr. Schaaf
Intensive review of literature in theory of land utilization and urban growth; property rights and valuation; commercial, residential, and industrial real estate markets; government housing policy; and public controls over land use.

289. Seminar in Real Estate and Urban Land Economics. (3) II.  
Mr. Wendt
Analysis of selected problems and special studies; cases in residential,
commercial, and industrial real estate financing, investment, and develop­
ment, urban redevelopment, real estate taxation, housing, market analysis,
mortgage market developments, valuation, and zoning.

290. Seminar in Organization and Administration. (3) I and II.
Mr. Balderston, Mr. Feldman, Mr. Jastram, Mr. Wheeler
Prerequisite: graduate standing.
An intensive inquiry into the techniques of business administration, such
as the determination of business objectives, policy formulation, planning,
executive staffing, organization, direction, and management controls. Special
emphasis is placed upon the theory of organization, business leadership, and
decision-making.

291. Seminar in Business Policy. (3) I and II. Mr. Jastram
A study of business problems and the formulation of policies to meet these
problems from the viewpoint of a top-management executive committee. The
objective is to develop skill in the formulation of policy in particular func­
tions and for enterprises as a whole.

*292. Development of a Scientific Approach to Management. (3) II.
Mr. Churchman
Critical study of the historical development and current content of a
scientific approach to management. Examination and critical appraisal of
both early and recent literature dealing with various concepts and prin­
ciples of administration.

293. Seminar in Operations Research. (3) II. Mr. Churchman
Prerequisite: course 193.
An advanced seminar. Discussion of the problems of mathematical models,
measurement, organization of research, and implementation. This seminar
relates research and top-level organizational decision-making. The student will
report on a topic of major interest selected by him.

294. Measurement of Decision Criteria. (3) I. Mr. Churchman
This seminar is essentially a study of models for measuring the values of
objectives, and a critical discussion of the problems involved.

295. Inventory and Waiting Line Theory. (3) II. Mr. Churchman
Prerequisite: consent of the instructor.
Application of mathematical models of inventory and waiting lines to busi­
ness problems: in production, in financial control, in planning facilities, in
maintenance, in marketing. Emphasis is placed on practical problems occur­
ing in business.

298. Business Research Methods. (3) I and II.
Mr. Balderston, Mr. Churchman, Mr.
(Formerly numbered 290.) Mr. Feldman, Mr. Hoggatt, Mr. Jastram
Meaning of research and scientific method. Forms of scientific method
applicable to business research. Types of business research problems, and
available types of materials. Actual research procedure, and application by
student to his Business Administration 299 research project.

299. Research in Business Problems. (1-6) I and II.
The Staff (Mr. Moonitz in charge)
Primarily for candidates for the degree of Master of Business Admin­
istration.

* Not to be given, 1959–1960.
CHEMICAL ENGINEERING

(Department Office, 211 Gilman Hall)

LeRoy A. Bromley, Ph.D., Professor of Chemical Engineering.
Donald N. Hanson, Ph.D., Professor of Chemical Engineering.
Theodore Vermeulen, Ph.D., Professor of Chemical Engineering and Research Professor in the Institute for Basic Research in Science.
Charles R. Wilke, Ph.D., Professor of Chemical Engineering (Chairman of the Department).
Andreas Acrivos, Ph.D., Associate Professor of Chemical Engineering.
Eugene E. Petersen, Ph.D., Associate Professor of Chemical Engineering.
Charles W. Tobias, Ph.D., Associate Professor of Chemical Engineering.
Donald R. Olander, Sc.D., Assistant Professor of Chemical Engineering.
John M. Prausnitz, Ph.D., Assistant Professor of Chemical Engineering.
Douglas J. Wilde, M.S., Instructor in Chemical Engineering.

E. Morse Blue, M.S., Lecturer in Chemical Engineering for the fall semester.
Thomas H. Chilton, Ch.E., D.Sc., Regents’ Professor of Chemical Engineering.
David N. Lyon, Ph.D., Lecturer in Chemical Engineering.
Charles F. Oldershaw, M.S., Lecturer in Chemical Engineering.

Degree Requirements.—For curriculum for the Bachelor of Science degree in chemical engineering, see under College of Chemistry, CIRCULAR OF INFORMATION.

Higher Degrees.—See the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION.

Upper Division Courses

143. Introduction to Chemical Engineering. (3) I and II.
Mr. Hanson, Mr. Wilde
Prerequisite: Chemistry 109 or 110A or Mechanical Engineering 105A (may be taken concurrently).
Principles of material and energy balances and their use in chemical industry. Introduction to thermodynamic concepts and their application to chemical engineering problems.

144. Chemical Engineering Thermodynamics. (3) I and II.
Mr. Bromley, Mr. Lyon
Prerequisite: course 143 (with a grade of C or higher); Chemistry 110B (may be taken concurrently); or Mechanical Engineering 103 and 105A.
Thermal and volumetric properties of liquids and gases; interrelations of thermodynamic functions; power and refrigeration cycles; solutions and phase equilibria of multicomponent systems; critical phenomena; reaction energetics and equilibria.

145A. Unit Operations Laboratory. (1) I and II.
Mr. Prausnitz, Mr. Olander
Prerequisite: course 146A, 146B (may be taken concurrently) and Mechanical Engineering 107 (may be taken concurrently).
Material and energy measurements and performance analysis on separation equipment of representative industrial types.
**Chemical Engineering**

145B. Unit Operations Laboratory. (1) I and II.  
Mr. Prausnitz, Mr. Olander  
Prerequisite: course 146B; 145A (may be taken concurrently); and Mechanical Engineering 107.
Continuation of course 145A.

145C. Unit Operations Laboratory. (1-2) I and II.  
(Formerly numbered 145B.)  
Mr. Prausnitz, Mr. Olander  
Prerequisite: course 145B (may be taken concurrently). An elective course for second-semester seniors and graduate students in chemical engineering.  
Additional experiments in unit operations.

146A. Chemical Engineering Unit Operations. (4) I and II.  
Mr. Chilton, Mr. Acrivos, Mr. Tobias  
Prerequisite: Chemistry 110B (may be taken concurrently); course 143 (with a grade of C or higher), or consent of the instructor.

146B. Chemical Engineering Unit Operations. (4) I and II.  
Mr. Hanson, Mr. Olander, Mr. Wilke  
Prerequisite: Chemistry 110B, courses 143 and 146A or the equivalent. Open to seniors in the College of Engineering concurrently enrolled in course 144 or Mechanical Engineering 154, or with honor standing.
Separation operations: distillation, absorption, humidification, extraction, crystallization, adsorption, and drying.

147. Chemical Kinetics of Industrial Processes. (2) I and II.  
Mr. Prausnitz  
Prerequisite: Chemistry 110B; 112 or 112C; course 143 or Chemistry 114H (may be taken concurrently).
Interpretation and prediction of reaction rates under flow conditions in tubular and stirred systems, with and without catalysis. Applications to economic reactor design for typical processes, especially in the organic-chemical industry.

148. Industrial Kinetics Laboratory. (2) I and II.  
Mr. Petersen, Mr. Wilde  
Prerequisite: course 147 (with a grade of C or better), 146A; or consent of the instructor.
Bench-scale determination of reaction rates and other process variables in industrially important flow and nonflow systems. Design of experiments for scale-up of reaction equipment.

149-149H. Design of Chemical Process Plants. (2-3) I and II.  
Mr. Bromley, Mr. Oldershaw, Mr. Blue  
Prerequisite: courses 144 and 146A, 146B.
Class discussion of sources of data and of design principles, with individual and team study of selected plant design and process evaluation problems. Students with honor standing will be permitted to enroll for 3 units and will complete a comprehensive design project.

152. Principles of Inorganic and Electrochemical Processes. (3) I and II.  
Mr. Tobias, Mr. Bromley  
Prerequisite: courses 143 and 144 with a grade of C or better.
Discussion of typical processes of the inorganic chemical industry, with emphasis on equilibrium considerations. Introduction to electrode processes and their applications in inorganic and metallurgical industries.
180H. Research in Chemical Engineering. (2-6) I and II.
The Staff (Mr. Pitzer in charge)
Prerequisite: course 146B. The consent of the instructor must be obtained.
Students with honor standing may prosecute original research under the direction of one of the members of the instructing staff.

199. Special Study for Advanced Undergraduates. (1-3) I and II.
The Staff (Mr. Bromley in charge)
Any properly qualified student who wishes to pursue a problem of his own choice, through reading or nonlaboratory study, may do so if his proposed project is acceptable to the member of the staff with whom he works.

GRADUATE COURSES

Chemical Engineering 146B or its equivalent is prerequisite to all courses in this group.

243. Theoretical Methods in Chemical Engineering. (3) I. Mr. Acrivos
Prerequisite: course 146B or consent of the instructor.
Treatment of certain fundamental operations primarily in the fields of heat and mass transfer, fluid mechanics, and reaction kinetics. Particular emphasis on the mathematical formulation and rigorous solution of chemical engineering problems.

244. Multistage Operations. (3) II.
Mr. Hanson
General theory and application of multistage separation processes. Particular consideration to design methods for binary and multicomponent distillation.

245. Diffusional Operations. (3) I.
Mr. Wilke
Modes of mass transfer, diffusion in gases and liquids, material transfer in static and flow systems, momentum-mass transfer analogies, prediction of mass transfer coefficients for packed column separations, plate efficiency, diffusion and chemical reaction, equipment-design methods.

246. Phase Equilibria. (2) I.
Mr. Prausnitz
Prerequisite: Chemical Engineering 146B or equivalent.
Thermodynamics of multicomponent systems. Application to separation operations such as extraction, high-pressure absorption, and azeotropic distillation.

247. Chemical Reactor Design. (2) II.
Mr. Petersen
Prerequisite: courses 146A, 146B, 147, and 243 or Mathematics 122A, or consent of the instructor.
The application of the principles of reaction kinetics, heat and mass transfer to the design of chemical reactors. Particular emphasis on heterogeneous reactions in fixed and fluidized beds.

249. Special Study for Graduate Students in Chemical Engineering. (2-4) I and II.
The Staff (Mr. Acrivos in charge)
Properly qualified graduate students who wish to pursue independent study may work on the development of new calculation methods for a single unit operation or the application of existing design data to a single process.

250. Research in Chemical Engineering. (1-6) I and II.
The Staff (Mr. Wilke in charge)
Research facilities will be provided for graduate study in the unit physical operations and the unit chemical processes.
252. Principles of Electrochemical Engineering. (2) II. Mr. Tobias
Prerequisite: courses 144, 146B, Chemistry 104 or course 152.
Application of the principles of current distribution, electrode kinetics, and unit operations to the design of electrochemical processes.

255. Nuclear Chemical Engineering. (2) II. Mr. Olander
Prerequisite: unit operations and Chemistry 123 or Physics 124 (may be waived by consent of the instructor). Open to undergraduates with consent of the instructor.
Brief review of nuclear chemistry: decay chains and neutron reactions; fuel cycles in nuclear reactors and neutron balances; chemical processing techniques, including solvent extraction and pyrometallurgical methods; isotope and other special separations.

257A. Seminar in Petroleum Processing. (2 or 3) I. Mr. Wilke
(Formerly Petroleum Engineering 209A.)
Prerequisite: course 146B or consent of the instructor.

257B. Seminar in Petroleum Processing. (2 or 3) II. Mr. Wilke
(Formerly Petroleum Engineering 209B.)
Prerequisite: course 257A or consent of the instructor.
Evaluation of crude oils, raw stocks, and finished products. Study of factors which determine plan of processing in a petroleum refinery.

260. Seminar in Chemical Engineering. (2-4) I and II.
The Staff (Mr. Wilke in charge)
Open to properly qualified graduate students.
Reports, discussions, and group design studies in advanced fields of chemical engineering. Topics offered previously include: applications of thermodynamics; technology of high temperature; isotope-separation processes; mathematics in chemical engineering; transport properties of fluids; selected topics in chemical engineering unit operations.

RELATED COURSES IN OTHER DEPARTMENTS
Mechanical Engineering 163. Flow Problems of the Process Industries. (3)
II.
Mechanical Engineering 266. Heat Convection. (3) II.
Process Engineering 100. Project Engineering of Process Plants. (3) II.

CHEMISTRY
(Department Office, 102 Gilman Hall)
Leo Brewer, Ph.D., Professor of Chemistry.
Melvin Calvin, Ph.D., Sc.D., Professor of Chemistry.
†James Cason, Jr., Ph.D., Professor of Chemistry.
Robert E. Connick, Ph.D., Professor of Chemistry (Chairman of the Department).
Burris B. Cunningham, Ph.D., Professor of Chemistry.
William G. Dauben, Ph.D., Professor of Chemistry.
William F. Giauque, Ph.D., Sc.D., Professor of Chemistry.
William D. Gwinn, Ph.D., Professor of Chemistry.
Harold S. Johnston, Ph.D., Professor of Chemistry.
George Jura, Ph.D., Professor of Chemistry.

* Not to be given, 1959–1960.
†Edwin Orlemann, Ph.D., Professor of Chemistry.
Isadore Perlman, Ph.D., Professor of Chemistry and Associate Director of the Lawrence Radiation Laboratory.
George C. Pimentel, Ph.D., Professor of Chemistry.
Kenneth S. Pitzer, Ph.D., Professor of Chemistry.
Richard E. Powell, Ph.D., Professor of Chemistry.
Henry Rapoport, Ph.D., Professor of Chemistry.
Glenn T. Seaborg, Ph.D., Sc.D., Professor of Chemistry.
Kenneth Street, Jr., Ph.D., Professor of Chemistry.
David H. Templeton, Ph.D., Professor of Chemistry.
Walter C. Blasdale, Ph.D., Professor of Chemistry, Emeritus.
George E. Gibson, Ph.D., Professor of Chemistry, Emeritus.
Joel H. Hildebrand, Ph.D., Sc.D., LL.D., Professor of Chemistry, Emeritus.
Charles W. Porter, Ph.D., Professor of Chemistry, Emeritus.
William L. Jolly, Ph.D., Associate Professor of Chemistry.
Rollie J. Myers, Ph.D., Associate Professor of Chemistry (Acting Chairman of the Department, July 1 to September 11, 1959).
Donald S. Noyce, Ph.D., Associate Professor of Chemistry.
Chester T. O’Konski, Ph.D., Associate Professor of Chemistry.
John O. Rasmussen, Ph.D., Associate Professor of Chemistry.
*Andrew Streitwieser, Jr., Ph.D., Associate Professor of Chemistry.
Jon B. Applequist, Ph.D., Assistant Professor of Chemistry.
Dudley R. Herschbach, Ph.D., Assistant Professor of Chemistry.
Frederick R. Jensen, Ph.D., Assistant Professor of Chemistry.
Bruce H. Mahan, Ph.D., Assistant Professor of Chemistry.
Samuel S. Markowitz, Ph.D., Assistant Professor of Chemistry.
Norman E. Phillips, Ph.D., Assistant Professor of Chemistry.
Charles H. Sederholm, Ph.D., Assistant Professor of Chemistry.
*T. Darrah Thomas, Ph.D., Assistant Professor of Chemistry.
Ignacio Tinoco, Jr., Ph.D., Assistant Professor of Chemistry.
George P. Wiley, Ph.D., Assistant Professor of Chemistry.

Charles W. Koch, Ph.D., Lecturer in Analytical Chemistry.

Letters and Science List.—All undergraduate courses in chemistry are included in the Letters and Science List. For regulations governing this list, see page 11.

Entrance with Advanced Standing.—All undergraduate students entering the University with advanced standing who desire to take courses in chemistry more advanced than course 1B, must present themselves on or before the date of their registration to Mr. Noyce, 110 Gilman Hall, who will determine from their credentials or by an informal examination which courses they may undertake.

Choice of College.—A student may pursue the study of chemistry by enrolling either in the College of Chemistry (see the CIRCULAR OF INFORMATION) or in the College of Letters and Science with a major in chemistry. In order to decide between the two alternatives, the student may note that the College of Letters and Science has certain general requirements (see the CIRCULAR OF INFORMATION) outside the preparation for the major, while the curriculum of the College of Chemistry has somewhat different requirements (see page 86 of the CIRCULAR OF INFORMATION) and allows the election of professional courses in the upper division.

Letters and Science Upper Division Major Adviser: Mr. Giauque.

Preparation for the Major in the College of Letters and Science.—The recommended preparation is as follows: course 1A-1B, and one or more of

courses 5, 12; Physics 4A, 4B, 4C; Mathematics 3A, 3B, 4A, 4B; and a reading knowledge of German.

The above-mentioned courses, though recommended, are actually required only in so far as they constitute prerequisites for courses included in the major. Prospective major students should familiarize themselves with such prerequisites, and the possible course sequence governed by them. Thus, Mathematics 4A is prerequisite to Chemistry 110A, which in turn is a requirement of the major and is prerequisite to many upper division courses in chemistry.

High school students should note that the preparation for the major is simplified if their high school programs include chemistry, physics, four years of mathematics, and two years of German.

The Major.—The major consists of from 24 to 30 units of upper division work in chemistry and allied subjects, taken in accordance with a plan approved by the departmental adviser. Normally at least 18 units of the major must be taken in the department, and must include courses 112 and 110A–110B, and one of courses 105, 106, 111, and 120. If one year of quantitative analysis has been completed elsewhere, course 104 may be substituted for course 105.

All units in chemistry in excess of 13 are counted as upper division units toward the major; all units in chemistry in excess of 13, taken in the upper division, will count as upper division credit toward the 36-unit requirement. An average of at least 2.0 grade points per unit undertaken is required for admission to, or retention in, the major.

Honor Students in the Upper Division.—Upper division students in the College of Letters and Science who propose to make chemistry their major, are placed on the honors list when they have attained a scholarship average of at least grade B. Honor students are given a larger share of personal instruction and a greater opportunity to choose courses, and work within courses, in the manner best suited to individual needs and aims. Students not in the honors group are not, except in unusual circumstances and with the express permission of the instructor, permitted to enroll for honors courses (marked H) nor for undergraduate research. Students will not ordinarily be recommended for honors in chemistry at graduation unless their work includes courses 114H and 180H or other advanced courses approved by the Committee on Honors.

Higher Degree.—See the Announcement of the Graduate Division.

LOWER DIVISION COURSES

1A. General Chemistry. (5) I and II.
Mr. Applequist, Mr. Brewer, Mr. Connick, Mr. Gwinn, Mr. Herschbach, Mr. Johnston, Mr. Jura, Mr. Mahan, Mr. Markowitz, Mr. O'Konski, Mr. Perlman, Mr. Phillips, Mr. Powell, Mr. Rasmussen, Mr. Sederholm, Mr. Templeton, Mr. Tinoco
Lectures (I: Mr. Powell, Mr. Markowitz; II: Mr. Rasmussen).
Prerequisite: high school chemistry or high grades in high school physics and mathematics. Admission will be determined by the student's high school grade, and by proficiency in arithmetic and first-year algebra, which will be tested by the examination in elementary mathematics given during the week of enrollment.

1B. General Chemistry, Qualitative Analysis. (5) I and II.
Mr. Applequist, Mr. Brewer, Mr. Connick, Mr. Gwinn, Mr. Herschbach, Mr. Johnston, Mr. Jura, Mr. Mahan, Mr. Markowitz, Mr. O'Konski, Mr. Perlman, Mr. Phillips, Mr. Powell, Mr. Rasmussen, Mr. Sederholm, Mr. Templeton, Mr. Tinoco
Lectures (I: Mr. Rasmussen; II: Mr. Pimentel, Mr. Powell).
Prerequisite: course 1A.
5. **Quantitative Analysis.** (3) I and II.  
   Mr. Cunningham, Mr. Koch, Mr. Orlemann, Mr. Myers  
   Lectures and laboratory. Prerequisite: course 1B with a grade of C or higher.  
   In the fall semester a special section (lecture section 1) will be organized for chemistry majors.

8. **A Short Survey of Organic Chemistry.** (3) I and II. Mr. Calvin, ——  
   Three lectures and one discussion section per week.  
   Prerequisite: course 1A. Primarily for students not majoring in chemistry.

9. **Organic Chemistry—Laboratory.** (3) I and II. Mr. Jensen, Mr. Wiley  
   Lectures and laboratory. Prerequisite: course 1B with a grade of C or higher and course 8 (may be taken concurrently).

12. **Organic Chemistry.** (5) I and II.  
   Mr. Dauben, Mr. Jensen, Mr. Noyce, Mr. Rapoport, Mr. Wiley  
   (Formerly numbered 12A.)  
   Lectures (I: Mr. Wiley; II. Mr. Jensen).  
   Lectures and laboratory work designed for students whose major is chemistry. Prerequisite: course 1B with a grade of C or higher. Students with previous credit in course 8 may receive only 2 units of credit for course 12.  
   Introduction to the general theory of organic chemistry and the chemistry of aliphatic compounds.

**UPPER DIVISION COURSES**

104. **Inorganic Chemistry.** (3) I.  
   Mr. Jolly  
   Prerequisite: course 5.  
   The interpretation and correlation of inorganic reactions.

105. **Advanced Quantitative Analysis.** (3) I and II.  
   Mr. Myers, Mr. Cunningham  
   Lectures and laboratory. Prerequisite: course 5.

106. **Synthetic Inorganic Chemistry.** (3) I.  
   Mr. Jolly  
   Lecture and laboratory. Prerequisite: course 5.

109. **Physical Chemistry—Brief Course.** (3) I.  
   Mr. O'Konski  
   Prerequisite: course 5 and one year of college physics. Primarily for non-chemical majors.  
   Selected topics in physical chemistry.

110A–110B. **Physical Chemistry.** (3–3) Yr. Beginning each semester.  
   Mr. Gwinn, Mr. Jura, Mr. Phillips, Mr. Johnston,  
   Mr. Templeton, Mr. Street, Mr. Tinoco  
   110A. I: Mr. Johnston, Mr. Street; II: Mr. Templeton, Mr. Phillips, Mr. Tinoco.  
   110B. I: Mr. Jura, Mr. Templeton; II: Mr. Johnston, Mr. Gwinn, Mr. Street.  
   Prerequisite: Mathematics 4A, Physics 4B, and course 5 or junior standing in a curriculum in physical science or engineering.  
   The general principles of physical chemistry and elementary thermodynamics.
111. Physical Chemistry—Laboratory. (3) I and II.
   Mr. Phillips, Mr. Tinoco, Mr. Jura.

   Prerequisite: courses 5 and 110A (with a grade of C or higher), and
   110B (which may be taken concurrently), or 109 with consent of the in-
   structor; also calculus.

112. Organic Chemistry. (5) I and II.
   Mr. Jensen, ----------, ----------

   (Formerly numbered 12B.)

   Prerequisite: course 12 or 8 and 9.

   Introduction to the chemistry of aromatic and heterocyclic compounds.
   Simple enolate condensations.

112C. Organic Chemistry. (3) I and II.
   Mr. Jensen, ----------

   (Formerly numbered 12B.)

   Prerequisite: open only to students who receive grade C or higher in
   course 12, taken at this University. Equivalent to the lecture part of 112.

   Primarily for students in the chemical engineering curriculum of the Col-
   lege of Chemistry, but open to students from other colleges with consent
   of the instructor.

114H. Physical Chemistry—Thermodynamics. (3) I and II.
   Mr. Giauque, Mr. Pitzer, Mr. Brewer

   Prerequisite: courses 5, 110A–110B; Physics 4C or the equivalent; famil-
   iarity with differential and integral calculus; and honors standing.

115. Microchemistry. (3) II.
   Mr. Cunningham, Mr. Koch

   Prerequisite: beginning courses in quantitative analysis, organic chem-
   istry and physical chemistry.

   Principles of chemical experimentation on the milligram and microgram
   scale. Students may select laboratory exercises to emphasize either bio-
   organic or inorganic chemistry.

118. Chemistry of Surfaces and Colloids. (2) II.
   Mr. Jura

   Before enrolling, the student must satisfy the instructor that he has
   sufficient preparation in chemistry and physics to be able to read the liter-
   ature in this field intelligently.

120. Advanced Inorganic Chemistry. (3) I and II.
   Mr. Connick

   Lecture and laboratory. Prerequisite: courses 5, 104 or 105, and 109 or
   110B.

122. Heterogeneous Equalibria. (2) I.
   Mr. Brewer

   Prerequisite: course 109 or 110B.

   Application of modern solution theory to the quantitative prediction of
   binary and ternary phase diagrams.

123. Nuclear Chemistry. (2) I.
   Mr. Perlman

   Prerequisite: senior standing.

125. Chemical Instrumentation. (1) II.
   Mr. O'Konski

   Prerequisite: course 111.

   A lecture course dealing with the principles of instrumentation as ap-
   plied to chemistry. Special attention will be given to electronic instru-
   mentation.

*125L. Chemical Instrumentation Laboratory. (1-3) II.

   Mr. O'Konski

   Prerequisite: course 111 and consent of the instructor. Course 125 must
   be taken concurrently.

* Not to be given, 1959–1960.
Laboratory work to accompany course 125. Continuation of course 111, with special emphasis on the application of instruments to chemical problems. Laboratory work to include basic electronic systems and optical and spectrographic equipment.

127. Advanced Organic Chemistry. (3) II. Mr. Noyce
(Formerly numbered 103.)
Prerequisite: courses 112, 109 or 110A; and a reading knowledge of German.
Applications of electron structures and resonance to the chemical and physical properties of organic compounds, kinetics and mechanism of organic reactions.

128. Organic Chemistry—Analytical Methods. (3) I and II. Mr. Noyce, Mr. Dauben
(Formerly numbered 100.) Lecture and laboratory. Prerequisite: courses 5 and 112.

129H. Organic Chemistry—Synthetic Methods. (3) I and II. Mr. Dauben, Mr. Rapoport
(Formerly numbered 101.) Lecture and laboratory. Prerequisite: a reading knowledge of German; course 128 and honors standing, or consent of the instructor.

180H. Research. (2-15) I and II. The Staff (Mr. Pitzer in charge)
Prerequisite: course 110B, honors standing, and consent of the instructor.
Students who have completed with high credit a satisfactory number of advanced courses may prosecute original research under the direction of one of the members of the instructing staff.

185. Chemical Preparations. (2-5) I and II. The Staff (Mr. Pitzer in charge)
Prerequisite: consent of the instructor.
Special laboratory work for advanced undergraduates.

199. Special Study for Advanced Undergraduates (1-3) I and II. The Staff (Mr. Pitzer in charge)
Any properly qualified student who wishes to pursue a problem of his own choice, through reading or nonlaboratory study, may do so if his proposed project is acceptable to the member of the staff with whom he works.

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 18)

206. Organic Chemistry. (3) I. Mr. Cason
(Formerly numbered 207A.)
Emphasis is placed on typing of reactions according to mechanism, and the application to synthetic studies of current knowledge of reaction mechanism, molecular structure, and steric factors. Particular attention is given to displacement reactions, enolate condensations, and the Grignard reaction.

207B. Organic Chemistry. (3) I. Mr. Rapoport
Prerequisite: course 206 (or 207A).
The chemistry of heterocyclic compounds, with emphasis on those of natural origin.
*207C. Organic Chemistry. (3) I.  Mr. Dauben
Prerequisite: course 206 (or 207A).
The chemistry of polycyclic compounds of biological interest, with emphasis on sterols and related compounds.

*208. Organic Chemistry. (3) II.  Mr. Noyce
Prerequisite: course 206 (students with previous credit in Chemistry 207D may receive only 1 unit of credit for Chemistry 208).
Kinetics and mechanism of organic reactions; mechanism of rearrangements.

216. Physical Chemistry—Advanced. (3) II.  Mr. Giauque
Prerequisite: courses 111 and 114H. Open to senior honor students with consent of the instructor.
Selected topics. Use of variables other than pressure, temperature, and composition. Third Law of Thermodynamics. Evaluation of thermodynamic quantities from spectroscopic and other molecular data. Interionic attraction theory of electrolytic solutions.

217. Quantum Theory. (3) II.  Mr. Pitzer
Recommended preparation: differential equations or advanced calculus, atomic physics and thermodynamics. Open to senior honor students with consent of the instructor.

223. Advanced Nuclear Chemistry. (2) II.  Mr. Perlman
Prerequisite: course 123. Primarily for chemistry students.
Advanced survey of nuclear theory and experimentation.

280. Research. (1-9) I and II.  The Staff (Mr. Connick in charge)
Students limited to a program of 4 units may be allowed to enroll for 1 unit.
The laboratory is open at all times to a limited number of qualified graduate students who wish to pursue original investigations. Students who wish to enroll for this work should communicate with the chairman of the department well in advance of the opening of the semester in which the work is to be done. Such work will ordinarily be under the direction of some member of the instructing staff who will determine the credit value. A list of publications indicating the types of problems now under investigation in the laboratory will be sent on request.

290. Seminar. (1-4) I and II.  The Staff (Mr. Connick in charge)
Open to properly qualified graduate students.
As a rule, several seminars are offered each semester. The subjects will vary from year to year and will be announced at the beginning of each semester. The following subjects have been studied in recent seminars: Mechanisms of chemical reactions; X-ray diffraction in crystals; group theory and its applications to chemistry; spectroscopy; nuclear chemistry; high temperature reactions; organic synthesis; determination of structures of natural products.

299. Special Study for Graduate Students. (1-4) I and II.  The Staff (Mr. Connick in charge)
Any properly qualified graduate student who wishes to pursue a problem of his own choice, through reading or nonlaboratory study, may do so if his proposed project is acceptable to the member of the staff with whom he works.

* Not to be given, 1959–1960.
CHILD DEVELOPMENT

An undergraduate Group Major in Child Development is offered in the College of Letters and Science. There is also an undergraduate major in child development in the Department of Nutrition and Home Economics. Information concerning these majors is presented in the CIRCULAR OF INFORMATION.

Graduate work leading to the master's and Ph.D. degrees is offered in the field of child development and also in education, nutrition and home economics, and psychology. Requirements for the field are given in the Graduate Division bulletin entitled ANNOUNCEMENT IN THE SOCIAL SCIENCES.

Students interested in undertaking professional preparation as teachers, psychometrists, school psychologists, social welfare or public health workers, or home demonstration agents will be helped by consulting faculty advisers in the professional schools indicated as early as possible in their undergraduate careers.

Upper division offerings relevant to the interests of students in child development and related fields are listed below:

- Anatomy 102.
- Anthropology 118, 120, 125, 153, 170.
- City and Regional Planning 110.
- Criminology 100A-100B.
- Economics 180.
- Education 116, 153, 181.
- Genetics *100, 103A-103B.
- Geography 176.
- History *175A–175B.
- Philosophy 104, *108.
- Physical Education 105, 140.
- Physiology 102, 104, 107.
- Public Health 125.
- Social Welfare 100.
- Sociology and Social Institutions *104, 130, 132, 178.
- Zoology 100.

CITY AND REGIONAL PLANNING

(Department Office, 101 City and Regional Planning Building)

T. J. Kent, Jr., M.C.P., Professor of City Planning.
Francis Violich, B.S., Professor of City Planning (Chairman of the Department of City and Regional Planning) and Professor of Landscape Architecture.
Donald L. Foley, Ph.D., Associate Professor of City Planning and of Architecture.
Jesse Reichek, Associate Professor of City Planning and Architecture.

* Not to be given, 1959–1960.
City and Regional Planning

Melvin M. Webber, M.C.P., Associate Professor of City Planning.
†Barclay Jones, M.R.P., Assistant Professor of City Planning.

Catherine Bauer (Catherine Bauer Wurster), A.B., Lecturer in City and Regional Planning.
Mellier G. Scott, Jr., Lecturer in City Planning.

Letters and Science List.—All undergraduate courses in city and regional planning are included in the Letters and Science List of Courses. For regulation governing this list, see page 11.

The Department of City and Regional Planning offers a two-year graduate program of professional training in the field of city and metropolitan regional planning leading to the degree of Master of City Planning.

The program includes courses in the theory and practice of urban planning offered by the department, and courses in related fields of study offered by members of other departments. Some of these courses may be open to qualified undergraduate and graduate students in related fields.

**UPPER DIVISION COURSES**

100. City Planning for Architects and Landscape Architects. (4) I and II.

Mr. Jones, ______

Prerequisite: Architecture 102, advanced standing in landscape architecture, or consent of the instructor.

Survey of the physical, social, economic, and governmental considerations involved in the planning of cities and metropolitan areas; the development of the urban planning function and profession; the roles of the architect and landscape architect in city planning and community development.

110. Introduction to City Planning. (3) I.

Mr. Scott

Prerequisite: open to majors in all fields except Architecture. Not open to students who have taken course 100.

Survey of city planning as it has evolved in United States since 1800 in response to serious physical, social, and economic problems; examination of major concepts and procedures used by contemporary city planners and local governments to improve the urban environment.

111. Introduction to Housing. (3) II.

Mr. Scott

Lectures and five field trips. Open to majors in all fields.

Survey of historical development of housing problems in Western Europe and the United States; local, state, and federal housing programs in the United States; critical issues and the future of housing.

*121. Urban Aesthetics. (2) I.

Mr. Jones

Open to majors in all fields.

Preception of the city in concept and actuality through both vicarious and direct experience; development of the form of the urban environment; influence of utopian and ideal concepts; current criticisms of, and proposals for, the design of urban areas.

199. Special Study for Advanced Undergraduates. (1–3) I and II.

The Staff (Miss Bauer in charge)

Prerequisite: consent of the instructor.

* Not to be given, 1959–1960.
GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

222. Housing and Urban Redevelopment Policy. (2) I.
   Prerequisite: consent of the instructor.
   Social, economic, and civic aspects of the housing problem. The development of federal and local policies with respect to private home building, public housing, slums, and blight. Current trends and issues. Lectures, student research and reports, field trip.

223. Visual Aspects of the Urban Environment. (2) II. Mr. Reichek
   Prerequisite: open to graduate students from all departments upon consent of the instructor.
   Seminar and laboratory designed to develop deeper awareness and understanding of the visual components of the contemporary urban environment. Recording, analysis, and communication of visual experiences; impact of increased visual sensitivity to urban form upon individuals in various disciplines.

226. The Metropolitan Region. (2) II. Mr. Webber
   The functional and spatial organization of the metropolitan community. Population trends; the location of the linkages among economic activities; governmental organization; transportation and communication systems; local versus metropolitan functions; decentralization questions; public policy formation and future metropolitan structure.

231. Seminar in City and Metropolitan Planning. (2) I. Mr. Scott
   Prerequisite: graduate standing in a social science department or professional school or consent of instructor.
   Survey of history of American city planning; role of physical planning in local government; the urban general plan and its effectuation; relations between city planners and other professionals.

232. City and Metropolitan Planning for Engineers. (2) II. Mr. Webber
   Prerequisite: graduate standing in transportation or civil engineering or consent of the instructor.
   Survey of contemporary city and metropolitan planning theory and method; role of physical planning in local government; function and nature of the long-range, general plan; analytic and design methodologies of plan preparation and effectuation; relationships to transportation and municipal engineering.

251. Introduction to City Planning Theory and Practice. (3) I. Mr. Webber, Mr. Violich
   Historical background of contemporary city planning; introduction to the theory and practice of city planning; principles, standards, and procedures of physical urban planning. Laboratory problems.

252. Seminar in City Planning Function and Organization. (3) II. Mr. Kent
   The general physical planning function in municipal government, in county government, and at the metropolitan regional level; relationships between the city planning program and staff organization; general problems of agency organization.

253. City Planning Analysis. First Course. (3) I.
   The urban community context within which city planning operates. Community structure, values, and decision-making. Laboratory problems.

* Not to be given, 1959–1960.
254. City Planning Analysis. Second Course. (3) II.
  Analytical methods in urban planning. Land use surveys, population and
  economic analyses, and circulation studies. Laboratory problems.

255. Seminar on the Urban General Plan. (2) I.
  Mr. Kent
  The legislative, administrative, and technical functions of the urban gen­
  eral plan; general-plan characteristics suggested by these functions; organi­
  zation and presentation of general-plan reports.

256. The Urban General Plan—Laboratory. (4) I. Mr. Kent, Mr. Webber
  Steps involved in developing and maintaining a general plan; field prob­
  lems in each major phase of general-plan work; preparation or revision of
  a general plan for a selected community; problems of group work and staff
  organization.

257. Principles and Methods of Plan Effectuation. (3) II.
  Methods by which general-plan policy may be effectuated. Precise plans,
  zoning, subdivision control, capital improvement programs and other methods.

258. Urban Design. (3) II. Mr. Violich
  The three-dimensional design of specific development projects within the
  context of general-plan policy. The process of collaboration among the city
  planner, the architect, the landscape architect and others in large-scale site
  planning and urban design. Laboratory problems.

299. Individual Study or Research. (1-5) I and II.
  The Staff (Miss Bauer in charge)

Prerequisite: consent of the instructor.

CLASSICS

(Department Office, 5218 Dwinelle Hall)

Murray B. Emeneau, Ph.D., Professor of Sanskrit and General Linguistics
  (Chairman of the Department of Classics).
Joseph Fontenrose, Ph.D., Professor of Classics.
†Arthur E. Gordon, Ph.D., Professor of Latin.
William C. Helmbold, Ph.D., Professor of Classics.
Louis Alexander MacKay, M.A. (Oxon.), Professor of Latin.
William Kendrick Pritchett, Ph.D., Professor of Greek.
Ivan M. Linforth, Ph.D., LL.D., Professor of Greek, Emeritus.
Leon J. Richardson, A.B., LL.D., Professor of Latin, Emeritus.
H. R. W. Smith, Ph.D., Professor of Latin and Classical Archaeology and
  Associate Curator of Classical Archaeology, Emeritus.
Elroy L. Bundy, Ph.D., Associate Professor of Classics.
*William M. Green, Ph.D., Associate Professor of Latin.
W. Gerson Rabinowitz, Ph.D., Associate Professor of Greek (Vice-Chairman
  of the Department of Classics).
John K. Anderson, M.A. (Oxon.), Assistant Professor of Classical Archae­
  ology and Associate Curator of Classical Archaeology, Museum of Anthro­
  pology.
Anne R. Amory, Ph.D., Associate in Classics.

John H. Collins, Ph.D., Lecturer in Latin.

† Sabbatical leave in residence, fall semester, 1959-1960.
Ronald Syme, M.A. (Oxon.), F.B.A., Litt.D. (New Zealand), D.Litt. (Durham), Sather Professor of Classical Literature for the fall semester.

*Letters and Science List.*—All undergraduate courses in Classics, Greek, Latin, and Sanskrit are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

*Departmental Major Adviser:* Mr. Fontenrose.

**Preparation for the Major in Classics.**—Required: Greek 1 or 1A–1B; Latin 1A–1B or 1, 2, 3 (or the corresponding courses in the high school), 4. The Major in Classics.—Required: Greek 100, 101, 102, 103; Latin 105, 106, 107, 108.

**GREEK**

*Major Adviser:* Mr. Fontenrose.

**Preparation for the Major.**—Required: Greek 1 or 1A–1B. Recommended: Latin 1A–1B or 1, 2, 3, 4.

The Major.—The following courses must be included in the major of 24 units: (a) Greek 100, 101, 102, 103, unless they have been taken in the lower division; (b) at least 6 units in advanced upper division courses in Greek. The remaining units of the 24 should be chosen, with the advice of the department, from the following: upper division courses in Classics, Greek, Latin, Sanskrit, and in the History of Ancient Art; History 111A.

**LATIN**

*Major Adviser:* Mr. Fontenrose.

**Preparation for the Major.**—Required: Latin 1A–1B or 1, 2, 3 (or the corresponding courses in the high school), 4. Recommended: Greek 1 or 1A–1B.

The Major.—The following courses must be included in the major of 24 units: (a) Latin 105, 106, 107, 108, unless they have been taken in the lower division; (b) at least 6 units in advanced upper division courses in Latin. The remaining units of the 24 should be chosen, with the advice of the department, from the following: upper division courses in Classics, Latin, Greek, Sanskrit; Art 153 (Aegean); Art 154A–154B (Greek); Art 159 (Roman); History 111B; but the department will consider as well other courses which the student may suggest.

**CLASSICS**

*Courses Which Do Not Require a Knowledge of the Greek or the Latin Language*

(Courses in this group are designated Classics 10A, Classics 10B, etc.)

**LOWER DIVISION COURSES**

10A*–10B. Ancient Greek and Roman Civilization. (3–3) Yr. Mr. Collins
10A: Greek. 10B: Roman.

Two lectures and one weekly section meeting. Against a background of Greek and Roman history, the reading of several literary masterpieces, in whole or in part, in translation. 10A is not prerequisite to 10B.

17A–17B. Elementary Course in Classical Archaeology. (3–3) Yr.

Mr. Anderson

A. The development of Greek civilization from the Late Bronze Age to the fourth century B.C., as illustrated by the monuments, with particular reference to the life of the citizen.

* Not to be given, 1959–1960.
B. Monuments of Western civilization from the Hellenistic Age to the Age of the Antonines, with particular reference to urban development and provincial organization. Both parts illustrated with slides. 17A is not prerequisite to 17B.

23. The Classic Myths. (3) I.  
A study of the Greek and Roman myths and legends which have an important place in European and American literature and art.  
Mr. Fontenrose

34. Epic Poetry: Homer and Vergil. (2) I.  
A study of the Iliad, Odyssey, and Aeneid with reference to content, structure, significance, and influence.  
Mr. Bundy

35. Greek Tragedy. (2) II.  
The reading of twelve Greek tragedies, with lectures on them.  
Mr. Helmbold

36. Plato. (2) II.  
Lectures and readings. Selected dialogues.  
Mr. Rabinowitz

**Upper Division Courses**

100A–100B. Greek and Latin Literature in Translation. (3–3) Yr.  
100A. Greek.  
100B. Latin.  
Lectures, essays, and group discussions. Limited to fifteen students. 100A is not prerequisite to 100B.  
Mr. MacKay

§128. Problems of Government: Tiberius to Nero. (2) I.  
Mr. Syme

*138. The Greek and Roman Historians. (2) II.  
The five historians, Herodotus, Thucydides, Polybius, Livy, and Tacitus, are read in English translation. The lectures take up the intellectual background of each historian, the documentary sources available to him, and his philosophy of history.  
Mr. Pritchett

151. Ancient Greek Religion. (3) I.  
The worship of the gods in ancient Greece; cults and religious ideas.  
Mr. Fontenrose

170. Classical Archaeology. (2) I and II.  
*170A. Vase-painting in Greece and Italy to 600 B.C.  
170B. Vase-painting in Greece and Italy in the sixth century. I.  
170C. Vase-painting in Greece and Italy from 500 B.C. II.  
Mr. Anderson

*175. Pausanias, Book I. (2) II.  
An ancient description of the topography of Athens as illustrated by modern archaeological discoveries.  
Mr. Anderson

178. Mythology. (3) II.  
An introduction to the study of mythology based upon Greek mythology and its relations to Near Eastern and Indo-European mythologies.  
Mr. Fontenrose

*185. Political and Social Thought of the Ancient Greeks. (2) II.  
A study of Greek ideas about society and the State, from Homer to Aristotle.  
Mr. Fontenrose

For the Group Major in Classical Civilization, see the CIRCULAR OF INFORMATION.  
For graduate courses in Classics, see page 94.

* Not to be given, 1959–1960.  
‡ To be given, 1959–1960 only.
GREEK

(Courses in this group are designated Greek 1, Greek 1A, Greek 1B, etc.)

Language and Literature

LOWER DIVISION COURSES

1. Greek for Beginners. Double Course. (5) II.
   Mr. Fontenrose

1A–1B. Greek for Beginners. (3–3) Yr.
   Mr. Pritchett, Mr. Rabinowitz

UPPER DIVISION COURSES

Greek 100, 101, 102, 103 should be completed before the other courses are undertaken.

100. Xenophon, Anabasis, and Attic Prose Writing. (3) I.
   Mr. Rabinowitz

101. Homer. (3) II.
   Mr. Pritchett

102. Plato: Apology and Crito. (3) I.
   Mr. Rabinowitz

103. Drama. (3) II.
   Mr. Bundy

115. Senior Course in Greek Drama. (3)
   *115A. Aristophanes.
   115B. Sophocles. II.
   *115C. Aeschylus.

   Mr. Helmbold

120. Senior Course in Greek Prose Authors. (3)
   *120A. Demosthenes.
   *120B. Thucydides.
   120C. Herodotus. I.

150A–150B. Greek Prose Composition. (2–2) Yr.
   Mr. Bundy
   Prerequisite: Greek 100.

199. Special Study for Advanced Undergraduates. (1–5) I and II.
   Mr. Pritchett in charge

LATIN

(Courses in this group are designated Latin 1, Latin 2, etc.)

Language and Literature

LOWER DIVISION COURSES

1. Elementary Latin. Double Course. (5) I and II.
   Mr. Mackay

1A–1B. Elementary Latin. Beginners' Course. (3–3) Yr.
   Mr. Fontenrose, Mr. Gordon, Mr. Bundy

2. Elementary Latin (continuation of 1A–1B or 1). (4) I and II.
   Mrs. Amory
   Prerequisite: two years of high school Latin or Latin 1 or consent of the instructor.
   * Not to be given, 1959–1960.
Classics

3. Latin Prose Readings. (4) I and II. Mr. Collins, Mrs. Amory
   Prerequisite: Latin 2 or the equivalent.

4. Introduction to Vergil. (4) I and II. Mr. Helmbold, Mr. Collins
   Prerequisite: Latin 3 or the equivalent.

9A–9B. Latin Composition. (2–2) Yr. Mr. Anderson
   Prerequisite: at least completion of Latin 2. Recommended to accompany
   Latin 3 and 4.

20A–20B. Introduction to Latin Literature. (3–3) Yr. Mrs. Amory
   Prerequisite: Latin 1A–1B or Latin 1 or the equivalent.
   Reading and translation of representative selections, prose and poetry;
   planned as a terminal course for those having only one year to give to Latin
   in the University beyond the elementary stage. 20A is not prerequisite to 20B.

UPPER DIVISION COURSES

Prerequisite: Latin 4. Latin 105, 106, 107, 108 should be completed before
the other courses (except 109A–109B) are undertaken.

105. Livy. (3) I. Mr. Gordon

106. Horace: Odes and Epodes. (3) II. Mr. Gordon

107. Cicero. (3) II. Mr. Collins

108. Roman Comedy. (3) I. Mr. Collins

109A–109B. Composition and Sight Reading. (2–2) Yr. Mr. MacKay

§128. Problems of Government: Tiberius to Nero. (1) I. Mr. Syme
   Reading in the sources. To accompany Classics 128.

145. Senior Course in Latin Poetry. (3) Mr. Helmbold
   *145A. Lucretius.
   145B. Augustan Poets. I.
   *145C. Juvenal.

150. Senior Course in Latin Prose Authors. (3) Mr. MacKay
   *150A. Sallust.
   150B. Seneca. II.
   *150C. Tacitus.

*166. Latin Verse Composition. (1) I.

199. Special Study for Advanced Undergraduates. (1–5) I and II.
   Mr. MacKay in charge

SANSKRIT

(Courses in this group are designated Sanskrit 190A, Sanskrit 190B, etc.)

Language and Literature

UPPER DIVISION COURSES

190A–190B. Elementary Sanskrit. (3–3) Yr. Mr. Emeneau

199. Special Study for Advanced Undergraduates. (1–5) I and II.
   Mr. Emeneau

* Not to be given, 1959–1960.
§ To be given, 1959–1960 only.
CLASSICS

GRADUATE COURSES

All graduate courses in this department are designated Classics (Classics 200, etc.).

(Concerning conditions for admission to graduate courses, see page 18)

200. Proseminar. (3) I. Mr. Helmbold
   An introduction to the general literature of classical philology, to methods of research, and to textual criticism.

§215. Seminar in Greek History: Aristotle's Constitution of Athens. (3) I. Mr. Pritchett

§220. Greek Choral Poetry. (3) I. Mr. Bundy

226. The Homeric Hymns. (3) II. Mr. Fontenrose

230. The Pre-Socratics. (3) II. Mr. Rabinowitz

242. Caesar. (3) I. Mr. Collins

248. Propertius. (3) II. Mr. Helmbold

260. Latin Epigraphy. (3) II. Mr. Gordon

270A-270B. Seminar in Classical Archaeology. (2-2) Yr. Mr. Anderson

290. Advanced Sanskrit. (1-5) I and II. Mr. Emeneau
   Such texts are read as are suited to the students' needs. Pali and Prakrit also will be studied as the occasion arises.

298. Special Study. (1-4) I and II. Mr. MacKay in charge
   This course is normally reserved for students writing the doctoral dissertation.

299. Special Study. (1-5) I and II. Mr. MacKay in charge

The Medieval Mind. (English 220A-220B). (3-3) Yr. Mr. Jones, Mr. Caldwell

*Linguistic History of the Roman Empire. (Roman Philology 200). (2) I. Mr. Malkiel

Late Latin Language and Literature. (Roman Philology 201). (2) I.

Humanistic Literature in Latin. (Roman Philology 204). (1) II. Mr. Scaglione

Medieval Latin and Romance Learning. (Roman Philology 206). (2) II. Mr. Carmody

* Not to be given, 1959–1960.
§ To be given, 1959–1960 only.
COMPARATIVE LITERATURE

Committee in Charge:

Marianne Bonwit, Ph.D., Associate Professor of German.
Bertrand H. Bronson, Ph.D., Professor of English.
Yuen Ren Chao, Ph.D., Litt.D., Agassiz Professor of Oriental Languages and Literature.
Assar G. Janzon, Ph.D., Professor of Scandinavian.
Waclaw Lednicki, Ph.D., Professor of Slavic Languages and Literatures.
Louis Alexander MacKay, M.A. (Oxon.), Professor of Latin.
Warren Ramsey, Ph.D., Professor of French and Comparative Literature (Chairman of the Committee)
David W. Reed, Ph.D., Associate Professor of English.
Alain Benoir, Ph.D., Assistant Professor of English.
Aldo Scaglione, Dottore in Lettere, Associate Professor of Italian.
Arturo Torres-Riosseco, Ph.D., Professor of Latin American Literature.

Instruction in comparative literature is not organized as a single administrative unit in the University, but the relevant courses are offered by a number of departments. The degree of Master of Arts will be conferred upon qualified graduate students who complete the requirements. Prospective candidates for the degree should consult the chairman of the committee in charge.

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Preparation for the Major.—Required: an adequate knowledge of two foreign languages; 12 upper division units in each of two literatures, read in the original, or an equivalent competence, tested by examination. Recommended: further study in courses dealing with more than one literature, such as Modern European Drama; Dramatic Art 160A, 160B, Analysis of the Content and Structure of Dramatic Composition; English 44A–44B, Masterpieces of Literature; English 125B, The Novel in Western Civilization; English 247, Theory of Poetry; English 257B, Methods and Assumptions of Recent Literary Critics; English 269, Theory of Fiction; Philosophy 136A–136B, Aesthetics; 137, Aesthetic Theories; Philosophy 146, Philosophy in Literature; Slavic 170, Survey of South Slavic Literatures.

The Major.—Twenty units of upper division or graduate courses and a thesis, in accordance with Plan I of the requirements for the degree of Master of Arts. A subcommittee will be in charge of the candidate's program and will be responsible for approving and directing the work on the thesis.

UPPER DIVISION COURSES

*121. Romanticism in Western Europe. (3) II. Miss Bonwit
Prerequisite: knowledge of French or German (preferably both) required.
The movement in France and Germany, with references to English Romanticism.

151A–151B. The Literature of the Renaissance in Western Europe. (2–2) Yr.
Mr. Scaglione
A course in the ramifications of the Renaissance movement in the Western European countries, with special reference to Italy, including discussions of the different phases of the movement and the contribution of various great writers to it.

* Not to be given, 1959–1960.
Comparative Literature; Criminology

Russian Novelists of the Nineteenth Century and Western European Literatures (Slavic Languages and Literature 133A.) (3) II. Mr. Lednicki

GRADUATE COURSES

200. Methods of Study in Comparative Literature. (2) II. Mr. Ramsey
201A—*201B. The Symbolist Movement in European Literature. (2—2) Yr. Mr. Ramsey

A study of Symbolism, especially in French, German, English, and Spanish literatures.

*202A—202B. The French Heritage in Spanish-American Literature. (2—2) Yr. Mr. Torres-Rioseco

Studies in the Parnassian, Symbolist, and Modernist movements.

298. Special Study for Graduate Students. (1—4) I and II. Mr. Ramsey in charge

Humanistic Literature in Latin. (Romance Philology 204.) (1) II. Mr. Scaglione

Prerequisite: graduate standing and consent of the instructor.

A study of the growth of Humanism through the reading and interpretation of selected Latin texts, from Petrarch to Erasmus.

The Medieval Mind. (English 220A—220B.) (3—3) Yr. Mr. Jones

220A. Readings in Medieval Latin. Prerequisite: course 120 or 220A or the equivalent.

An introduction to the central language and literature of the Middle Ages.

220B. Dominant Themes in Medieval Literature. Prerequisite: course 120 or 220A or the equivalent.

Bibliography and special problems. Accent upon medieval European literature without geographical or linguistic distinctions.

The Popular Ballad. (English *225A—225B.) (3—3) Yr. Mr. Bronson

CRIMINOLOGY

(Department Office, 218 Building T-2)

Paul L. Kirk, Ph.D., Professor of Criminalistics.
Austin H. MacCormick, A.B., M.A., Professor of Criminology (Vice-Chairman of the Department).
Arthur H. Sherry, A.B., LL.B., Professor of Criminology and Law.
*Orlando W. Wilson, A.B., Professor of Criminology (Chairman of the Department).
M. Edwin O'Neill, M.S., Associate Professor of Criminalistics.

* Not to be given, 1959—1960.

Herbert S. Breyfogle, M.D., Lecturer in Criminology for the fall semester.
George W. Harman, B.S.E., Lecturer in Criminology for the spring semester.
John D. Holstrom, A.B., Lecturer in Criminology.
Robert D. Shaner, A.B., Lecturer in Criminology.
Victor D. Vieira, A.B., Lecturer in Criminology for the spring semester.
David H. Wilson, M.D., LL.B., Lecturer in Criminology.

The requirements for the curricula in the School of Criminology are listed in the CIRCULAR OF INFORMATION.
UPPER DIVISION COURSES

Prerequisite: junior standing, except sophomore students scheduled to attain junior standing in midyear who may enroll in basic courses in the fall semester.

100A-100B. Crime Causation, Prevention, and Correction. (3-3) Yr.
100A is not prerequisite to 100B. Mr. MacCormick
Orientation survey of the causes of juvenile delinquency and adult crime, methods of prevention, and current practices in the correctional treatment of offenders in institutions and on probation and parole.

101. Crime Investigation. (2) I. Mr. O'Neill
Principles involved in the investigation of crimes; police organization and procedures for the investigation of crime.

103. Psychological Aspects of Criminology. (3) I. Mr. D. H. Wilson
Prerequisite: Psychology 1A.
Analysis of personality is undertaken, with emphasis on constitutional, personal, social, and cultural components, and relationships to criminal behavior are surveyed. Methods of personality measurement are presented as potential tools for the criminologist.

105A-105B. Police Administration. (3-3) Yr. Mr. O. W. Wilson
105A is not prerequisite to 105B for criminalistic majors.
Introduction to the principles of police organization and administration, discussion of police statistics, criminal identification, and investigation; educational methods for combating crime and vice, and controlling traffic.

107. Personal Identification. (3) II. Mr. O'Neill
A study of methods used in the identification of persons, living and dead; fingerprint identification; Bertillonage; sight recognition; portrait parle; anatomical bases, including skeletal remains to ascertain sex, race, age, size, and identity.

111. Physical Evidence. (2) I. Mr. O'Neill
Lecture and laboratory. Prerequisite: course 101 (may be taken concurrently). Enrollment limited to criminology majors.
Search at crime scenes for physical evidence and photographing, recording, preserving, and transporting it to the laboratory. Cast preparation and tests conducted at crime scenes.

113. Legal Medicine. (3) I. Mr. Breyfogle
Prerequisite: Physiology 1.
Effect of impact of criminal actions upon the human body; physical, chemical, and other traumatic influences. Survey of body fluids, tissues, different classes of poisons, their recognition, and untoward effects. Pathological changes in death and their significance in criminology.

115A-115B. Legal Relations Involved in Criminology. (3-3) Yr.
Enrollment restricted to criminology majors. Mr. Sherry
Basic principles of the law of crimes, criminal procedure and evidence; the enforcement processes of the criminal law; the legal relation of the police function to the prosecuting function, the judicial function and the administration of justice; constitutional limitations of the police power.
151A-151B. Microscopy and Microchemistry of Physical Evidence. (4-4) Mr. Kirk
(Yr. Formerly numbered 151.)
Lectures and laboratory. Prerequisite: Chemistry 5, 12, 112C (112C may be taken concurrently) with a grade of C or higher.
Principles and practice of identification through the use of chemical microscopy, physical constants, and microchemical tests. Identification and testing of physiological fluids, poisons, and other inorganic and organic materials significant as physical evidence.

153A-153B. Quantitative and Instrumental Techniques. (2-2) Yr. Mr. Kirk
(Laboratory. Formerly numbered 153.)
Prerequisite: Chemistry 5, 12, 112C with a grade of C or higher.
Advanced identification methods through the use of quantitative microchemistry and special instruments, including the spectrophotometer, spectrograph, comparison microscope, and chromatographic and electrophoretic equipment.

155. Comparative Microscopy. (3) II. Mr. O'Neill
Lecture, demonstrations, and laboratory. Prerequisite: course 111. Recommended: Botany 1 and Zoology 400.
Comparative studies of gross and microscopic characteristics of crime exhibits, including glass, metal, wood, cloth, paper, string, and rope; examinations of tools and tool marks; principles of comparison of bullets and cartridge cases; reproduction by impressions, casts, and photographs.

*157. Questioned Documents. (3) II. Mr. O'Neill
Lecture, demonstrations, and laboratory. Prerequisite: course 111 and consent of the instructor.
Problems of handwriting, handprinting, and typewriting in the examination of questioned documents, including studies of erasures, alterations, and obliterations; methods of restoring and deciphering effaced writing; document photography; investigation of anonymous letters.

161. Psychiatric Aspects of Criminology. (3) II. Mr. D. H. Wilson
Prerequisite: course 103.
Abnormal personalities are examined from a clinical diagnostic viewpoint in relation to anti-social activities; the etiology, psychopathology, prognosis, and treatment of the common mental disorders are considered in their medicolegal aspects.

162. Therapy in Criminology. (3) II. Mr. D. H. Wilson
Prerequisite: course 161 (may be taken concurrently) or satisfactory equivalent.
Study of various theories and techniques useful in the treatment of criminal behavior and in the prevention of its development.

163. Interrogation and Detection of Deception. (4) I. Mr. D. H. Wilson
Three lectures and one three-hour laboratory section per week. Prerequisite: course 161.
All phases of interrogation, including techniques for deception detection, are studied from an historical, psychological, physiological and psychiatric point of view. Laboratory experiments and techniques designed to uncover attempts at deception in unlawful situations, together with theory and practice of report writing, are presented.

* Not to be given, 1959-1960.
164. Instrumental Detection of Deception. (2) II.
One lecture and one three-hour laboratory section per week. Prerequisite: course 163.
Advanced evaluation is undertaken of instrumental methods studied in their physiological, psychological, and legal aspects. Past and present techniques are surveyed through study with various apparatus, and from this experience theoretical postulations for future development are evolved and appraised.

171. Police Planning. (2) I and II.
Mr. O. W. Wilson
Prerequisite: course 105B or consent of the instructor.
Considerations in discovering and analyzing needs, formulating policies, developing plans and procedures, and evaluating their effectiveness. Analysis of distribution of personnel, measures of performance and service, selection, training and discipline, M. O., operating programs, procedural manuals, and tactics.

*172. Plant Security. (2) I.
The prevention of losses to private enterprises and government establishments from sabotage, other crimes, and accidents. Problems related to national defense, the organization and operation of security forces, and the use of protective devices.

180. Juvenile Delinquency Control in Law Enforcement. (2) II.
Mr. Vieira
A survey of the development and present status of juvenile delinquency control in law enforcement agencies. The organization, function, and methods used in modern law enforcement to control juvenile delinquency in relation to the courts, schools, and other community agencies are studied and evaluated.

182. Institutional Treatment of the Criminal and Delinquent. (2) I.
Mr. MacCormick
Modern philosophy and methods in the treatment of adult criminals and juvenile delinquents in correctional institutions.

184A–184B. Noninstitutional Treatment of the Criminal and Delinquent.
(2–2) Yr.
Mr. MacCormick, Mr. Shaner
184A is not prerequisite to 184B.
Modern philosophy and methods in the noninstitutional treatment of adult criminals and juvenile delinquents through probation, parole, and community services.

*186. Theory of Rehabilitation Techniques for the Actual Criminal. (2) I.
Prerequisite: course 162.
Proper evaluation of the manifestations of already established criminal behavior is considered in view of potential rehabilitation through theoretical methods of counseling, with emphasis on techniques of supervision and control.

199. Research and Special Study for Advanced Undergraduates. (1–4) I and II.
The Staff

GRADUATE COURSES
(Concerning conditions for admission to graduate courses, see page 18)

290A–290B. Seminar in Crime Investigation. (2–2) Yr.
Mr. O’Neill
* Not to be given, 1959–1960.
Criminology; Decorative Art

291A–291B. Seminar in Police Administration. (2–2) Yr.
Mr. O. W. Wilson

292. Seminar in Problems in Criminal Law Enforcement. (2) I.
Open also to students in the School of Law.
Mr. Sherry

293A–293B. Seminar in the Administration of Criminal Justice. (2–2) Yr.
Mr. Holstrom

294. Seminar in Advanced Psychologic Theory of Criminality. (2) II.
Mr. D. H. Wilson

295A–295B. Seminar in Criminalistics. (2–2) Yr.
Mr. Kirk

296A–296B. Seminar in the Correctional Treatment of Offenders. (2–2) Yr.
Mr. MacCormick

298. Directed Group Study. (1–4) I and II.
The Staff

299. Individual Research and Special Study. (1–4) I and II.
The Staff

DECORATIVE ART

(Department Office, 104 Decorative Art Building)

Anna Hadwick Gayton (Anna Gayton Spier), Ph.D., Professor of Decorative Art and Curator of Textiles, Museum of Anthropology.

Lea Van Puymbroeck Miller, M.F.A., Professor of Decorative Art.

Lucretia Nelson, M.A., Professor of Design (Chairman of the Department of Decorative Art).

Herwin Schaefer, Ph.D., Professor of Decorative Art and Curator of the University Art Collections.

Winfield Scott Wellington, M.A., Gr.Arch., Professor of Design, Associate Curator of Art, Museum of Anthropology, and Director of the Art Gallery.

Hope M. Gladding, Professor of Decorative Art and Design, Emeritus.

Mary A. Dumas, M.A., Associate Professor of Decorative Art.

Willard V. Rosenquist, M.A., Associate Professor of Decorative Art.

Charles E. Rossbach, M.F.A., Associate Professor of Decorative Art.

Imogene B. Gieling, M.F.A., Assistant Professor of Decorative Art.

William R. McIntyre, M.S., Assistant Professor of Design.

Mae L. Gruber, M.F.A., Instructor in Design.

Alan R. Meisel, M.F.A., Instructor in Design.


Lenore C. Erik-Alt (Lenore Alt Erickson), Associate in Design.

Letters and Science List.—All undergraduate courses in decorative art are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Wellington, Mrs. Miller.

Entrance with Advanced Standing.—All undergraduate transfer students requesting advanced standing are required to present examples of their work for evaluation by the staff.

Preparation for the Major.—Required: courses 1A or 1B, 6A–6B, 7A–7B; Art 2A and 1B or 1C; History 4A–4B. Recommended: Anthropology 2A–2B; Art 1A, 1D, 3A–3B, 14A–14B; Classics 10A–10B; History 8A–8B; Philosophy 6A–6B; Sociology and Social Institutions 1. Prospective major students should familiarize themselves with course prerequisites and sequences of the major.
The Major.—Required: (1) courses 180A, 190; Philosophy 136A. (2) 8 to 10 units selected from at least two of the following history-theory groups, including one year-sequence: (a) 130A–130B, 195A–195B; (b) 175A–175B, 193A–193B; (c) 180B; (d) 167; (e) 140A–140B; (f) 127A–127B–127C. (3) 2 units selected from each of the following practice-theory groups: (a) 160A, 176A†; (b) 141A†, 166B; (c) 196A†, 166A. (4) 5 units chosen from the remaining upper division courses in the department (of which 3 may be taken in related upper division subjects in other departments).

Honors Program in the Major.—The general requirements and privileges of the honors program are those of the College of Letters and Science. As a special requirement, the honor student must satisfactorily complete a thesis which may be scholarly research or creative design. The latter must be accompanied by a written statement of aim and method. As a special privilege (subject to the consent of the instructors), the honor student may write one term paper in satisfaction of the requirements of two related courses taken concurrently. As a further privilege, the honor student will be furnished materials for courses in advanced experimental design.

Exhibits.—Students' work may be retained by the department as exhibit material.

Lower Division Courses

1A–*1B. Decorative Art Survey. (3-3) Yr. Beginning each semester.

Mr. Schaefer

From the beginning of civilization in the ancient Near East to the present time, emphasizing the development of style and the evaluation of form.

1A is not prerequisite to 1B.

6A–6B. Theory of Design. (2-2) Yr. Beginning each semester.

Mrs. Gieling, Miss Gruber, Mr. McIntyre, Mr. Meisel, Mr. Rosenquist, Mr. Rossbach, Miss Erik-Alt, Mr. Pugliese

Laboratory survey of the basic elements of space and color in both two- and three-dimensional design.


Miss Dumas, Mr. McIntyre, Mr. Meisel, Mrs. Miller

Prerequisite: course 6A–6B; 7A is not prerequisite to 7B.

7A. Laboratory problems emphasizing line and space, based upon calligraphy and the history of the alphabet from Pre-Roman times.

7B. Laboratory problems in three-dimensional design; the nature and use of materials, such as paper, wood, plastic.

Upper Division Courses

*101. Reading Course in the Decorative Arts. (2) I.

Prerequisite: courses 6A–6B and 7A–7B. Enrollment limited to twenty students.

A course designed to acquaint students majoring in decorative art with the significant literature of the decorative arts. To know the important artists' work of the past and its effect on the present time. Required reading, museum reports, and discussion.

127A–127B–127C. Primitive Art. (3-3-3) Miss Nelson

Analysis of salient art styles in their cultural contexts.

127A. Paleolithic West Europe, South and West Africa. I.

* Not to be given, 1959–1960.
† Prerequisites for this course should be noted, as they must be included in the maximum of 30 upper division units offered for the degree.
127B. Oceania and South America. II.
*127C. Middle and North America. II.
127A is not prerequisite to 127B or 127C.

130A-130B. Interior Design. (2-2) Yr. Mr. Wellington
Lectures: the design, selection, and arrangement of furniture, with special consideration for its relation to the architectural background.

140A-140B. A Survey of Ceramic Forms. (3-3) Yr. Mr. Pugliese
A study of ceramic form and decoration as expressions of aesthetic and social values.
140A. Classic Mediterranean; the Near East; Medieval and Renaissance Europe.
140B. The Far East; Pre-Columbian America; Modern Europe and the United States.
140A is not prerequisite to 140B.

141A-141B. Advanced Design: Ceramics. (2-2) Yr. Beginning each semester.
Prerequisite: upper division standing in decorative art or the equivalent, and course 140A or 140B. Course 140A or 140B may be taken concurrently.
A study of processes of construction and glazing, especially in relation to their influence upon design.

Miss Dumas
Prerequisite: upper division standing in decorative art or the equivalent. Laboratory problems in printed textiles, emphasizing the development of pattern through the processes of stencil, screen, block, and batik.

166A-166B. Advanced Design: Principles of Three-Dimensional Design. (2-2) Yr. Beginning each semester. Mr. Rosenquist, Mrs. Gieling
Prerequisite: upper division standing in decorative art or the equivalent.
166A. The visual interrelation of space and material as problems of abstract design, emphasizing color, light, and motion.
166B. Studies of volume and spatial relationships in metal.
166A is not prerequisite to 166B.

167. History of Design since the Industrial Revolution. (3) II. Mr. Schaefer
The theory and practice of design from the Industrial Revolution to the present; the problem of adjustment from preindustrial handcrafts to mechanical production, and the evolution of a machine aesthetic.

175A-175B. History of the Textile Arts. (2-2) Yr. Miss Gayton
Textile arts in their historical and cultural settings.
175A. The New World: Native America; Oceania.
175B. The Old World: Europe, India, Asia.
175A is not prerequisite to 175B.

176A-176B. Advanced Design: Woven Textiles. (2-2) Yr. Beginning each semester. Mrs. Miller, Mr. Rossbach
176B. II.
Prerequisite: upper division standing in decorative art or the equivalent, and course 175A or 175B. Course 175A or 175B may be taken concurrently.
Laboratory survey of basic elements of woven design, emphasizing structure in relation to color, texture, and pattern.

* Not to be given, 1959-1960.
*179. Textile Analysis. (2) II. Miss Gayton
Prerequisite: courses 175A, 176A-176B, or consent of the instructor. Enrollment limited by laboratory facilities; preference will be given to students majoring in decorative art.
Basic problems in the construction and design of ethnic and historic textiles.

180A–180B. Survey of Expression in Materials. (3-3) Yr. Mr. Wellington
A study of form as exemplified by significant objects made from metals, wood, glass, clay, etc.
180A is not prerequisite to 180B.

190. Proseminar in Decorative Art. (2) I and II.
The Staff (Mr. Rossbach in charge, fall semester; Mrs. Gieling in charge, spring semester)
Prerequisite: senior standing in decorative art or the equivalent.
Systematic analysis of contemporary developments in the decorative arts, emphasizing the dependence upon historical antecedents and the interrelationships with other areas of the visual arts.

193A*–193B. Historic Costume. (3-3) Yr. Miss Gayton
Costumes of various times and places with reference to design, material, cultural factors, and contemporary arts.
193A. Native America; Indonesia; Asia.
193B. Classic Mediterranean; Medieval to Modern Europe.
193A is not prerequisite to 193B.

195A. The History of Interior Design. (3) I. Mr. Schaefer
The interior as an aesthetic composition and as an expression of domestic culture from the Middle Ages to the present.

*195B. American Decorative Art from the First Colonial Periods to 1850. (3) II.
Spanish, English, Dutch Colonial periods, and the Federal Period. Lectures, with slides, from material in museum collections and private houses showing the work of the more significant artists, housewrights, and craftsmen.

196A–196B. Interior Design. (2-2) Yr. Beginning each semester.
Mr. Wellington
Prerequisite: upper division standing in decorative art or the equivalent; courses 130A–130B, 195A, and some mechanical drawing. 130A and 130B may be taken concurrently with 196A and 196B, respectively.
Drawn problems. Individual criticism and discussion of theory involved.

197. Special Study in the Practice of Design. (2) I and II. The Staff
Prerequisite: senior standing and at least a grade B average in upper division design courses basic to the special study, subject to the consent of the instructor.

*197A. Enamel design. (2) I. Mr. Rosenquist
*197B. Metal design. (2) II. Mrs. Gieling
*197C. Design of woven textiles. (2) II. Mr. Rossbach
197D. Design of printed textiles. (2) I. Miss Dumas

199. Special Study for Advanced Students. (1-4) I and II.
The Staff (Mr. Rossbach in charge)
Open to senior and graduate students only. Prerequisite: consent of the department and at least a B average in all decorative art courses undertaken.

* Not to be given, 1959-1960.
GRADUATE COURSES

Concerning conditions for admission to graduate courses, see the Announcement of the Graduate Division, Northern Section. Candidates for the master's degree will be expected to consult with the graduate adviser concerning specific requirements.

Seminars in Decorative Art.

*294A. American Decorative Art. (2) II.

294B. Textiles. (2) II.
   Miss Gayton
   Studies based upon textiles in the collections of the Department of Decorative Art and in the Museum of Anthropology.

294C. Decorative Motifs in Oriental Art. (2) I.
   Mr. Wellington

294D. Components of Costume. (2) I.
   Miss Gayton
   Analysis of the tangible and intangible determinants of style in ethnic or historic costume.

294E. Form in Primitive Art. (2) II.
   Miss Nelson
   Studies in form and style based upon selected material from the collections of the Museum of Anthropology.

*294F. Industrial Design. (2) II.
   Mr. Schaefer
   Analytic and critical studies of selected phases of industrial design.

294G. Ceramic Design. (2) II.
   Mr. Pugliese
   Analytic and critical studies of selected periods and phases of ceramic design.

299. Directed Research. (2-4) I and II.
   The Staff (Mr. Wellington in charge)

RELATED COURSES IN OTHER DEPARTMENTS

Anthropology 101A-101B, 103, and courses on specific culture areas; Architecture 121, 122; Art; Business Administration 163; City and Regional Planning 110, *121; Classics 170; Geography 176; History 122, 131A-131B, *176A-176B; Philosophy 136B; Psychology 131, *180.

For detailed descriptions see the announcement section of the respective departments.

DRAMATIC ART

(Department Office, 1205 Dwinelle Hall)

Fred O. Harris, M.F.A., Professor of Dramatic Art (Chairman of the Department).

Marvin Rosenberg, Ph.D., Associate Professor of Dramatic Art.

Robert W. Goldsby, M.F.A., Assistant Professor of Dramatic Art.

Henrietta G. Harris, A.B., Assistant Professor of Dramatic Art.

William I. Oliver, Ph.D., Assistant Professor of Dramatic Art.

George Angelo Marchi, M.A., Instructor in Dramatic Art.


Frederick Thon, M.F.A., Lecturer in Dramatic Art.

Garff B. Wilson, Ph.D., Professor of Speech.

* Not to be given, 1959-1960.
Letters and Science List.—All undergraduate courses are included in the Letters and Science List, except the following: courses 190, 191, 192, 193. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Harris.

Preparation for the Major.—Required: courses 10A-10B (3-3), Theory of Acting; 20A-20B (3-3), Great Plays, Reading and Analysis.

The Major.—Required: 24 units of upper division courses, including not more than 15 units in dramatic art theory and practice, with not more than 6 units of Dramatic Art 190, 191, 192, 193, and with not less than 9 units in dramatic literature, history of drama, and history of theater. In addition, students with a major emphasis in acting and directing will be required to complete 6 units of supervised laboratory work in the University Theater without credit. The department will certify to the completion of a major program for graduation only on the basis of at least a C average in courses taken in the department.


(B) Dramatic Art courses: Practice. Courses 190, 191, 192, 193, not more than 6 units of which will apply to the major.


The University Theater

Under the direction of the Department of Dramatic Art, the University Theater presents a major and a studio series of play productions. These presentations have a twofold purpose: (1) to present to the University community a program of distinguished dramas of all times and all countries; (2) to afford the students in the University an effective experience in dramatic art. Participation in the presentations is open to all students.

LOWER DIVISION COURSES

10A–10B. Theory of Acting. (3-3) Yr. Beginning each semester.

10A: Resources for Acting. Mr. Harris, Mr. Marchi, Mr. Thon
10B: Methods of Acting. Mr. Marchi, ________

20A–20B. Great Plays, Reading and Analysis (3-3) Yr.

20A is not prerequisite to 20B.

A study of masterworks of drama from the Greek classic period to the present in terms of their values for the theater.

20A. The tragic vision.

20B. The comic vision.
UPPER DIVISION COURSES

Group A. Dramatic Art: Theory and Practice

Not more than 6 units from courses 190, 191, 192, and 193 will be credited toward the major.

110. Approaches and Problems in Play Directing. (3) I and II. Mr. Harris


115A is not prerequisite to 115B. Mr. Dreier

A study of the visual and physical aspects of dramatic performance: the functions and values, the scenic techniques, and the historical development.


Prerequisite: courses 10A–10B, 20A–20B, 407 or consent of the instructor.

*130A. Acting in Greek Plays and Plays of Classical Derivation. (2).

130B. Acting in Plays in the European Tradition. (2) I. Mr. Goldsby

130C. Acting in Twentieth-Century Plays. (2) II. Mr. Goldsby

*130D. Acting in Plays in the Major Modes. (2).

159A–159B. History of Dramatic Theory and Criticism. (3–3) Yr.

Mr. Oliver

Prerequisite: course 20A–20B or consent of the instructor. 159A is not prerequisite to 159B.

159A. A study of the major texts in dramatic criticism from Aristotle to the twentieth century.

*159B. A study of contemporary dramatic theory, as it is reflected in the major critics and dramatists.

160A–160B. Analysis of the Content and Structure of Dramatic Composition. (3–3) Yr.

Mr. Rosenberg, Mr. Thon

180A–180B. Creative Playwriting. (3–3) Yr. Beginning each semester.

Mr. Rosenberg, Mr. Oliver

Prerequisite: course 160A–160B and consent of the instructor. Practice in the fundamentals of dramatic composition. Group readings and discussions of written work.

190. Laboratory Projects in Acting. (1–6) I and II. Mr. Goldsby

Prerequisite: course 10A–10B, 20A–20B, 407, and consent of instructor.

191. Laboratory Projects in Directing. (1–6) I and II. Mr. Harris

Prerequisite: course 10A–10B, 110, 115A–115B, and consent of instructor.

192. Laboratory Projects in Stagecrafts. (1–6) I and II. Mr. Dreier

Prerequisite: course 115A–115B and consent of the instructor.

193. Laboratory Projects in Playwriting. (1–6) I and II.

Mr. Rosenberg, Mr. Oliver

Prerequisite: course 180A–180B and consent of instructor.

199. Special Study for Advanced Undergraduates. (1–5) I and II.

The Staff (Mr. Harris in charge)

407. Speech for the Stage. (3) I and II. Miss Harris

A study of the fundamentals of speech for acting: support, resonance, variety of tone, clarity of diction and pronunciation. A phonetic analysis of speech sounds. Lectures, exercises, and scene studies.

* Not to be given. 1959–1960.
Group B. Dramatic Literature and History of Drama

The attention of the student is directed to the Group Major in Dramatic Literature described in the Circular of Information.

Lower Division Courses

40A-40B. Twentieth-Century World Theater. (3-3) Yr. Mr. Thon
40A is not prerequisite to 40B.
Characteristic forms of the various kinds of theater within the twentieth century. A survey of the present condition of the major theatrical modes.
40A: Drama, opera, ballet.
40B: Film, television, radio, musical comedy.

Upper Division Courses

*120. History of Greek Drama and Drama of Classical Derivation. (3) II.
123A-123B. History of Drama in the European Tradition. (3-3) Yr. Mr. Goldsby
Prerequisite: course 20A-20B. 123A not prerequisite to 123B.

*125. History of the Twentieth-Century Drama. (3) I.

*140A-140B. The Theater in Western Civilization. (3-3) Yr.
Prerequisite: course 20A-20B.

145A-145B. History of the American Theater. (3-3) Yr. Mr. Wilson
Prerequisite: course 20A-20B or consent of the instructor. 145A is not prerequisite to 145B.
The development of the American Theater from Colonial times to the twentieth century: the actors and playwrights; the playhouses and stagecraft; the motion picture, radio and television. The relationship of these elements to the social and cultural history of the country.
145A. From Colonial times to the theater of Edwin Booth.
145B. From the time of David Belasco to the present.

Related Courses in Other Departments

Classics 28. The Classic Myths. (3) I.
(Given in English.)
Classics 35. Greek Tragedy. (2) II.
(Given in English.)
Classics 178. Mythology. (3) II.
(Given in English.)
English 114A. The English Drama to 1642. (3) I.
English 114B. The English Drama from 1660 to 1850. (3) II.
English 117A-117B. Shakespeare. (3-3) Yr.
English *117E. Shakespeare. (3) I.
French 115A-115B. Modern French Drama. (2-2) Yr.
French 120A-120B. The Seventeenth Century. (2-2) Yr.
Greek 103. Drama (3) II.
German 104B. Nineteenth-Century German Drama. (3) II.
German 106. The Early Works of Goethe and Schiller. (3) II.
Latin 108. Roman Comedy. (3) I.
Scandinavian 106. History of Scandinavian Drama up to 1900. (2) I.
(Given in English.)
Scandinavian 107. The Plays of Ibsen. (3) I.
(Given in English.)

* Not to be given, 1959-1960.
**Dramatic Art; Economics**

Scandinavian 109. Scandinavian Drama of the Twentieth Century. (2) II.
Slavic 135. The Russian Drama. (2) I.
(Given in English.)
Spanish 105. Modern Peninsular Drama: From the Romantic Movement to the Present. (3) I.
Spanish 109A–109B. The Spanish Drama of the Sixteenth and Seventeenth Centuries. (2–2) Yr.
Spanish 111A–111B. Cervantes. (3–3) Yr.

**ECONOMICS**

(Department Office, 119 South Hall)

Joe S. Bain, Jr., Ph.D., Professor of Economics.
Carlo M. Cipolla, Laurea, Professor of Economics for the fall semester.
Malcolm M. Davison, J.D., Ph.D., Professor of Economics.
Howard S. Ellis, Ph.D., LL.D., Flood Professor of Economics.
Walter Galenson, Ph.D., Professor of Industrial Relations.
Robert A. Gordon, Ph.D., Professor of Economics (Chairman of the Department).
Ewald T. Grether, Ph.D., LL.D., Flood Professor of Economics.
Charles A. Gulick, Ph.D., Professor of Economics.
Sidney S. Hoos, Ph.D., Professor of Economics and Agricultural Economics.
Emily H. Huntington, Ph.D., Professor of Economics.
Clark Kerr, Ph.D., LL.D., Professor of Industrial Relations.
Frank L. Kidder, Ph.D., Professor of Economics.
George M. Kuznets, Ph.D., Professor of Economics, Agricultural Economics, and Statistics.
David S. Landes, Ph.D., Professor of History and Economics.
Sanford A. Mosk, Ph.D., Professor of Economics.
*Andreas G. Papandreou, Ph.D., Professor of Economics.
Earl R. Rolph, Ph.D., Professor of Economics.
Tibor Scitovsky, M.Sc., J.D., Professor of Economics.
Paul S. Taylor, Ph.D., Professor of Economics.
Lloyd Ulman, Ph.D., Professor of Economics and Industrial Relations.
Robert A. Brady, Ph.D., Professor of Economics, Emeritus.
Ira B. Cross, Ph.D., LL.D., Flood Professor of Economics, Emeritus.
Melvin M. Knight, Ph.D., Professor of Economics, Emeritus.
Carl Landauer, Ph.D., Professor of Economics, Emeritus.
Philip W. Bell, Ph.D., Associate Professor of Economics.
George F. Break, Ph.D., Associate Professor of Economics.
*Richard E. Caves, Ph.D., Associate Professor of Economics.
Gregory Grossman, Ph.D., Associate Professor of Economics.
Harvey Leibenstein, Ph.D., Associate Professor of Economics.
John M. Letiche, Ph.D., Associate Professor of Economics.
Hyman P. Minsky, Ph.D., Associate Professor of Economics.
Roy Radner, Ph.D., Associate Professor of Economics.
Henry Rosovsky, Ph.D., Associate Professor of Economics (Vice-Chairman of the Department).
Dale W. Jorgenson, Ph.D., Assistant Professor of Economics.
Benjamin N. Ward, Jr., Ph.D., Assistant Professor of Economics.
Irwin Bernhardt, A.B., Associate in Economics.

1 In residence fall semester only, 1959–1960.
Letters and Science List.—All undergraduate courses in economics are included in the Letters and Science List. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Rolph (chairman), Mr. Gulick, Mrs. Flanders, Mr. Schneider, Mr. Ward.

Preparation for the Major.—Required: either (A) Economics 1A–1B and 2, with a minimum average grade of C; or (B) Social Science 1A–1B and Economics 2, with a minimum average grade of C. Recommended: Business Administration 1A–1B, and at least an introductory course in another social science (6 units in Political Science, History, or Sociology and Social Institutions preferred).

The Major.—Required: 24 units of upper division economics. For students electing alternative (A) above, Economics 100A–100B and either Economics 112A, 112B, or 113 are required and should be taken in the junior year. For students electing alternative (B) above, Economics 103A–103B, 100B, and either 112A, 112B, or 113 are required and should be taken in the junior year. The remaining courses shall be selected by the student with the advice and approval of the departmental major adviser. The selection shall contain one two-semester sequence of courses. A course (3 units) in another department may be included if it is approved by the Chairman of the Major Advisers’ Committee.

It is strongly recommended that each student elect upper division courses in other related social sciences. Students interested in improving their mathematical background should consider Mathematics 190A–190B, a course designed for their needs.

Seniors who have an average of at least three grade points for each unit of work undertaken in the University of California are invited to request enrollment in course 198 or to seek permission from instructors to enroll in graduate courses of the department.

Except under extraordinary circumstances, no more than 9 units of economics and business administration combined may be taken in one semester. The department will approve study lists and certify to the completion of the major program for graduation only if at least a C average is maintained in the upper division courses taken in satisfaction of the major requirement.

LOWER DIVISION COURSES

1A–1B. Elements of Economics. (3–3) Yr. Beginning each semester.

Mr. Kidner, Mr. Ross, Mr. Cheit

1A. I: Mr. Kidner; II: Mr. Ross; 1B. I: Mr. Cheit; II: Mr. Kidner.

Two lectures and two recitation sessions per week to be arranged. 1A is prerequisite to 1B. Credit will not be given for both 1A–1B and 103A–103B.
2. Economic Statistics. (4) I and II. Mr. Break (in charge), Mr. Bernhardt
Three lectures and one two-hour laboratory section per week to be arranged. Credit is limited to 2 units for students who have received credit for Education 114 or Psychology 5, Sociology and Social Institutions 106, Statistics 2 or 12.
Introduction to modern methods of analyzing numerical data, including descriptive statistics, sampling and statistical inference, index numbers, correlation, and time series. Emphasis is on the logic of procedures, interpretation, and application. Illustrative material from economics and business.

*10. Economic History. (3) I.
Survey of the development of the economic institutions of the Western World.

UPPER DIVISION COURSES
Primarily for undergraduates. Prerequisite: for major students in economics, courses 1A-1B, 2, and junior standing; for others, 1A-1B and junior standing except where course 2 is prerequisite for a specific course.

100A–100B. Economic Analysis and Economic Policy. (3–3) Yr. Beginning each semester.
Mr. Minsky (in charge), Mr. Bernhardt, Mrs. Flanders, Mr. Schneider, Mr. Ward
100A. I: Mr. Minsky, Mr. Bernhardt, Mr. Schneider; 100A. II: Mrs. Flanders; 100B. I: Mrs. Flanders; 100B. II: Mr. Minsky, Mr. Bernhardt, Mr. Schneider.
Not open to students who have completed Business Administration 100 or 101.
100A. The problem of economic stability; the problem of economic progress; and problems in the foreign economic relations of the United States.
100B. The problems of monopoly and power, economic opportunity, motivation, efficiency, and freedom.

The classical school and its antecedents, beginning with the Greeks, through Adam Smith and down to Keynes, historical and doctrinal analysis.
101A. Through Ricardo.
101B. After Ricardo.

*102. Advanced Economic Theory. (3) II.
Prerequisite: course 100A–100B.
Analysis of the determinants of the aggregate level of output and employment, and of the allocation of resources. Includes advanced value and distribution theory, and a brief review of modern monetary theory.

103A–103B. Introduction to Economic Principles, Institutions, and Policies. (3–3) Yr. Mr. Rolph
Prerequisite: Social Science 1A–1B.
103A. Income and employment theory and its applications.
103B. Price theory and its applications. Credit will not be given for both 1A–1B and 103A–103B.

*104. Economic Policy. (3) II.
An analysis of important issues of public policy on economic affairs, such as consequences of government interference with the price mechanism; tariff protection versus unhampered foreign trade; effects of “cheap money” policy. Primarily for nonmajors.

* Not to be given, 1959–1960.
105. Economics of Consumption. (3) II. Miss Huntington
A general survey of consumption in the United States, with an analysis of the determination of consumer demands, and of the relation of the consumer to the price systems.

*106A-106B. Social Reform Movements. (3-3) Yr.
106A. European and American movements for social reform prior to 1914.
106B. European and American movements for social reform since 1914.

112A-112B. Economic History of Europe. (3-3) Yr.
Mr. Cipolla, Mr. Landes
Survey of the development of the economic institutions of Europe; analysis of economic problems and policies in their historical setting.

113. Economic History of the United States. (3) I and II. Mr. Mosk
Survey of trends in main components of the American economy; emphasis on factors making for economic growth and on the analysis of economic problems and policies in their historical setting.

114. Economic Development and Problems of Latin America. (3) I. Mr. Mosk
Evolution of Latin-American economy in terms of basic institutions and international influences; standards of living; problems of mono-economies; land tenure systems; problems of improving agricultural methods; foreign investment; industrialization and related problems.

115. Economic Development and Problems of the Far East. (3) I. Mr. Li
Resource allocation and economic organization of an underdeveloped economy; certain problems of carrying through a self-generative process of economic growth, with particular reference to China, India and Pakistan, Japan, and Southeast Asia.

Mr. Ward, Mr. Grossman
Economic organization and institutions, and their impact on economic variables.

118A. The Soviet economy. Mr. Grossman, Mr. Ward
118B. The Soviet economy (advanced topics); other East European economic systems of the instructor.

118A-118B. Economic Development, Institutions, and Problems of the Soviet Union and Eastern Europe. (3-3) Yr.
118A. The Soviet economy. Mr. Grossman, Mr. Ward
118B. The Soviet economy (advanced topics); other East European economies; the communist bloc as a whole. Prerequisite: course 118A or consent of the instructor.

121A-121B. Industrial Organization. (3-3) Yr. Mr. Sosnick, Mr. Collins
The organization and structure of industries and their markets in the American economy, competitive behavior, price policy, and market performance in such industries; public policy in the regulation of industry.

122. Theory of Domestic Trade. (3) II. Mr. Holton
Primarily for seniors. Prerequisite: course 100A, Business Administration 101, or their equivalent.
The theory of interregional and intraregional movements of trade; the nature of competition in the channels of distribution; an evaluation of the economic consequences of selected marketing activities; the regulation of trade.

* Not to be given, 1959-1960.
125. Economics of Regulation and Control. (3) II.
The role of government in the regulated sectors of the American economy; economic criteria for efficient control of prices, production, and the flow of investment funds.

126. Economics of Extractive Industries. (3) II. Mr. Bain
Structure, social performance, and special economic and public policy problems of industries engaged in extraction or use of basic natural resources, including agricultural, forest, fishery, mining, and coal and petroleum industries.

130. Government Finance. (3) I. Mr. Davisson
(Formerly numbered 130A.)
A general survey, at federal, state, and local levels, of budget-making, expenditures, public debt, taxation, fiscal policy, and the effects of government programs on income distribution. Primarily for students not majoring in economics. Credit will not be given for both course 130 and 131A.

131A-131B. Economics of Public Finance. (3-3) Yr. Mr. Break, Mr. Rolph
(Formerly numbered 130B-130C.)
Prerequisite: course 131A, or 130 and consent of the instructor, is prerequisite to course 131B. Credit will not be given for both course 130 and 131A.
A comprehensive analysis of fiscal theory and policy and of the incidence and effects of taxation, governmental expenditure programs, and public debt operations. Some attention will be paid to fiscal problems of underdeveloped areas.

133. Dynamic Economics and Business Fluctuations. (3) II.
Prerequisite: courses 135 and 100A or Business Administration 101. It is recommended that this course be taken in the senior year.

135. Money and Banking. (3) I and II. Mr. Ellis, Mr. Kidner, Mrs. Flanders
Commercial banks, the Federal Reserve, and the supply of money; monetary theory and monetary policy in the American economy. Credit will not be given for both course 135 and 136A. Primarily for students not majoring in economics.

136A-136B. Money, Banking, and the Monetary Policy. (3-3) Yr. Mr. Minsky
(136B formerly numbered 137.)
136A: The monetary economy; survey of types of monetary theory and theories of interest; commercial and central banks, the Treasury, and the supply of money. Credit will not be given for both course 136A and 135.
136B: Prerequisite: course 136A, or 135 and consent of the instructor. Monetary standards and international finance; competing objectives of monetary policy; recent monetary experience; current issues.

138. Economic Accounting. (3) I. Mr. Mattessich
A simultaneous introduction to micro- and macro-accounting. Accounting statements; the link between business and national income accounting; input-output tables; flow of funds accounting.

142. Economic Statistics. (3) II. Mr. Jorgenson
Prerequisite: course 2 or the equivalent.

150. Labor Economics. (3) I and II. Mr. Gulick, Mr. Cheit
Students will not receive credit for both course 150 and Business Administration 150.
The social background of labor legislation and trade unionism.

* Not to be given, 1959-1960.
152. Labor Economics. (3) II. Mr. Gulick
Comparative survey of American and foreign labor movements.

153. Wage Theory and Policy. (3) I. Mr. Ulman
Prerequisite: course 150 or consent of the instructor.
Theoretical analysis and empirical description of wage issues, both at the micro- and macro-economics level; national wage and employment policy.

180. Problems of Poverty. (3) I. Miss Huntington
Facts, conditions, and current explanations of poverty; public and private action to prevent destitution; theories concerning minimum standards of living.

185. Social Insurance. (3) II. Miss Huntington
An analysis of the theories underlying social insurance and social insurance legislation throughout the world.

188. Population and Migration. (3) I.
(Formerly numbered 188A–188B.)
Social and economic consequences of population change, with special reference to economic opportunities, employment, investment, and problems of international trade; population trends, theories, and problems, methods of population measurement and population forecasting. Population and migration problems in economic development.

190A–190B. International Economic Relations. (3–3) Yr. Mr. Scitovsky, Mr. Letiche
The theory of international economic relations developed within the context of modern history.

H195. Junior Honors Course. (3) I and II. The Staff
H196. Senior Honors Course. (3) I and II. The Staff

197. Advanced International Economics. (3) I. Miss Huntington
Prerequisite: course 100A–100B or consent of instructor.
Problems of international economic theory and policy.

*198. Directed Group Study for Advanced Undergraduates. (3) II.
Prerequisite: consent of the instructor. Primarily for students on the Honors List of the College of Letters and Science.
Designed to afford opportunity for seminar-type instruction and individual research. Topics to be decided upon at the beginning of the course.

199. Special Study for Advanced Undergraduates. (1–3) I and II.
The Staff (Mr. Bell in charge)

GRADUATE COURSES

Admission to graduate courses requires, in all cases, the consent of the instructor. Undergraduate courses are not prerequisite to graduate courses, except where indicated.

200A–200B. Fundamentals of Economic Theory. (3–3) Yr. Mr. Hahn, Mr. Leibenstein, Mr. Minsky, Mr. Scitovsky
200A. Micro-economics: the behavior of firms and households, and the determination of prices and resource allocation patterns in a decentralized economy. Mr. Hahn, Mr. Scitovsky, Mr. Leibenstein.

* Not to be given, 1959–1960.
200B. Macro-economics: general interdependence and the behavior of aggregates in a decentralized economy. National income and employment determination. The impact of fiscal and monetary policies on employment, national income and its distribution. Mr. Hahn, Mr. Scitovsky, Mr. Minsky.

201A–201B. History of Economic Thought. (3–3) Yr. Mr. Letiche
Analysis of the classical system of value and distribution theory; neoclassical thought; contributions of eclectics, socialists, and institutionalists.

Prerequisite: course 200A–200B.
A review and critical analysis of contemporary and traditional literature on these subjects.

203. Advanced Topics in Economic Theory. (3) I and II.
Mr. Bain, Mr. Hoos
I: Market structures, firm behavior, and the theory of price. Mr. Bain.
II: Contemporary trends and problems in the theory of the firm. Mr. Hoos.

*204A–204B. Advanced Theory of Interest, Capital, and Employment. (3–3) Yr.
Prerequisite: course 200A–200B.

205A–205B. Theory of Economic Development and Institutional Change. (3–3) Yr. Mr. Leibenstein, Mr. Rosovsky
Theory of economic change; relation of such theories to general economic theory. Institutional patterns of development; changes in resource and product composition.

*206A–206B. Social Reform Movement. (3–3) Yr.

207A–207B. Mathematical Economics. (3–3) Yr. Mr. Radner, Mr. Jorgenson
Prerequisite: course 200A–200B, Mathematics 4, 111A, Statistics 113; or consent of the instructor.
207A. Theories concerning individual economic agents: decision under uncertainty, planning through time; investment, production, inventory control, other applications.
207B. Groups of agents: organization and game theories; equilibrium, stability, welfare aspects of various price systems and of other processes of economic adjustment.

*208. Seminar in Economic Theory. (3) I.
Prerequisite: course 200A–200B or equivalent and consent of the instructor.
A course devoted to the presentation of research papers by students on topics to be decided in consultation with the instructor.

210A–210B. Advanced Study in Economic History. (3–3) Yr.
Mr. Cipolla, Mr. Landes, Mr. Mosk
Prerequisite: consent of the instructor.
The purpose of this course is to enable graduate students with special interest in economic history to carry out advanced study in some phase of the field. Topics will be announced annually.
210A. Sec. 1: Early Modern Economic History. Mr. Cipolla
Sec. 2: The Industrial Revolution. Mr. Landes

* Not to be given, 1959–1960.
210B. Sec. 1: Comparative Study of Plantation Economies in the Americas.  
Mr. Mosk

211. Economic History of Japan. (3) I.  
Mr. Rosovsky  
The economic development of Japan, with emphasis on the modern period.

212A–212B. Topics in Economic History. (3–3) Yr.  
Mr. Landes, Mr. Rosovsky  
A course devoted to the historical treatment of some of the following analytical categories: population, consumption patterns, income distribution, geographical extension of markets, the role of government, entrepreneurship, capital, technology, and resources.

215. Seminar on the Chinese Economy. (3) II.  
Mr. Li  
A study of the Chinese economy: national income, capital formation, public finance, industry, agriculture, internal and external trade, population, labor force, and consumption.

216. Comparative Economic Systems. (3) II.  
Mr. Grossman  
Comparative study of economic systems in terms of their organization and institutions, their prevailing values and goals, and various aspects of their economic performance.

Mr. Ward  
Prerequisite: course 100A–100B or consent of the instructor.  
217A. The theory and techniques of economic planning.  
217B. Studies of planning in selected countries.

218. Seminar on the Soviet Economy. (3) I.  
Mr. Grossman  
Population and labor force, national income, investment, structure of the economy, financial system, prices, planning. Problems in research and analysis.

221A–221B. Industrial Organization. (3–3) Yr.  
Mr. Bain  
The organization and structure of the American enterprise economy, with special reference to manufacturing and processing industries. Competitive behavior, price policy, and workability of competition in such industries.

Mr. Rolph, Mr. Break  
Public finance and taxation theory; public debt and fiscal policy; public policy with respect to taxation.

233A–233B. Dynamic Economic and Business Fluctuations. (3–3) Yr.  
Mr. Gordon

235A–235B. Advanced Money and Banking. (3–3) Yr.  
Mr. Ellis  
Analysis of banking institutions and money, monetary theory, and monetary policy.

*236. Seminar in Monetary and Fiscal Theory, and Policy. (3) II.  
Prerequisite: course 233A–233B, 235A–235B, or 230A–230B.  
Analysis of fiscal monetary devices under varying conditions, with particular reference to the United States and Western Europe.

* Not to be given, 1959–1960.
238. Theory and Measurement of the National Income. (3) II. 
Mr. Mattessich
Prerequisite: courses 2 and 100A–100B. Recommended: some knowledge of accounting.
Survey of the theory underlying alternative methods of measurement and review of the methods used in the United States and other countries.

Prerequisite: Statistics 131 or equivalent. Mr. Radner, Mr. Jorgenson
Special problems in the application of statistical methods to economics, illustrated by a representative selection of empirical studies.

243. Introduction to Econometrics. (3) II. 
Mr. Lee
Prerequisite: course 242; Mathematics 190A–190B or equivalent.

250A–250B. Advanced Labor Economics. (3–3) Yr. Mr. Gulick, ———
Prerequisite: two courses in labor, including some European labor history, and consent of the instructor. 250A is not prerequisite to 250B.
An intensive reading course covering classic and current material.

252A–252B. Seminar in Labor Economics. (3–3) Yr.
Mr. Galenson, Mr. Kerr, Mr. Ross, Mr. Ulman

254A–254B. Seminar in Agricultural Labor in Advanced and in Underdeveloped Countries. (3–3) Yr. Mr. Taylor
Prerequisite: consent of the instructor.
Agricultural workers of wage and lower tenure status, in advanced and underdeveloped countries, including such aspects as status, collective bargaining, social legislation, land reform, productivity, impact of mechanization, and role in politics.

*288. Population and Economic Development. (3) II.
Population and migration problems in economic development.

290A–290B. International Economics. (3–3) Yr. Mr. Bell, Mr. Scitovsky
The world economy as a general equilibrium system; growth, short-run disturbances, and adjustment in the balance of payments of member countries; restrictions, welfare, and policy.

291. Research in International Economic Relations. (3) I and II.
Open to graduate students in any department. Mr. Letiche, Mr. Bell
Research on current problems of international economic interest.

*292. International Finance. (3) I.
Balance of payments analysis; national and international currencies; variations of exchange rates, prices and national incomes and international equilibrium; capital movements and investments; exchange controls, international payment systems and institutions; United States foreign policy.

293. Economic Development and Industrialization. (3) II. Mr. Ellis
Prerequisite: course 290A–290B or consent of the instructor.
Problems of capital accumulation, foreign borrowing, saving, inflation, patterns of industry, economic development and trade, improved efficiency in labor and land utilization, etc., in relation to deliberate development efforts in low income areas.

* Not to be given, 1959–1960.
Economics; Education

298. Research. (1-6) I and II. The Staff (Mr. Minsky in charge)
Open to candidates for the Ph.D. degree who have passed the qualifying
examination and who are engaged in research for the thesis, and in special
cases, with consent of the instructor in charge, to graduate students who de­
sire to do special work in a particular field.

299. Individual Study. (3) I and II. The Staff (Mr. Minsky in charge)
Economics of Agricultural Production and Consumption (Agricultural
Economics 200A–200B). (3–3) Yr. Mr. Hoos, Mr. Bressler
Rural Sociology (Agricultural Economics 112A–112B). (2–2) Yr.
Mr. Taylor
Introduction to Social Science (Social Science 1A–1B). (3–3) Yr.
Mr. Feuer, Mr. Burdick, Mr. Tangri
Statistical Inference for Social Scientists. (Statistics 131.) (3) I and II.
Mr. Barankin
Laboratory Course in Statistical Inference for Social Scientists. (Statistics
131L.) (1) I and II.
Mr. Barankin
Survey of Algebra and Analysis. (Mathematics 190A–190B.) (3–3) Yr.
Mr. Lehman, Mr. Woll
Seminar on Statistical Problems in Economics and Agricultural Economics
(Statistics 290W). (2–4) I.
Mr. Kuznets

EDUCATION

(Department Office, 207 Haviland Hall)

- William A. Brownell, Ph.D., LL.D., Professor of Education (Chairman of the Department.)
- Harold D. Carter, Ph.D., LL.D., Professor of Education.
- Clifford P. Froehlich, Ed.D., D.L., Professor of Education.
- Jack A. Holmes, Ph.D., Professor of Education.
- Mary C. Jones, Ph.D., Professor of Education and Lecturer in Psychology.
- Frederic Lilge, Ph.D., Professor of Education.
- Thomas R. McConnell, Ph.D., LL.D., D.H.L., Professor of Education.
- John U. Michaelis, Ph.D., Professor of Education.
- Edgar L. Morphet, Ph.D., Professor of Education.
- J. Cecil Parker, Ed.D., Professor of Education.
- Theodore L. Reller, Ph.D., Professor of Education.
- David H. Russell, Ph.D., Professor of Education.
- J. Chester Swanson, Ph.D., Professor of Education.
- Frederick T. Tyler, Ph.D., Professor of Education (Vice-Chairman of the Department).
- Edna W. Bailey, Ph.D., Professor of Education, Emeritus, and Associate Di­
rector of Supervised Teaching, Emeritus.
Guy T. Buswell, Ph.D., LL.D., Professor of Education, Emeritus.
Frank N. Freeman, Ph.D., LL.D., D.Sc., Professor of Educational Psychology, Emeritus.

‡ In residence fall semester only, 1959–1960.
§ In residence spring semester only, 1959–1960.
Luther C. Gilbert, Ph.D., Professor of Education, Emeritus.
Frank W. Hart, Ph.D., LL.D., Professor of Education, Emeritus.
Merton E. Hill, Ed.D., Professor of Education, Emeritus.
George C. Kyte, Ed.D., Professor of Education, Emeritus.
George A. Rice, Ed.D., Professor of Education, Emeritus, and Director of Supervised Teaching, Emeritus.
Lester A. Williams, Ph.D., Professor of Education, Emeritus.
Lars H. Peterson, Ph.D., Associate Professor of Education, Emeritus.
Thomas Bentley Edwards, Ph.D., Associate Professor of Education.
Robert B. Howsam, Ed.D., Associate Professor of Education.
Walter D. Loban, Ph.D., Associate Professor of Education.
Jack London, Ph.D., Associate Professor of Education.
S. E. Torsten Lund, Ph.D., Associate Professor of Education.
Richard D. Mosier, Ph.D., Associate Professor of Education.
Lawrence H. Stewart, Ed.D., Associate Professor of Education.
James C. Stone, Ed.D., Associate Professor of Education and Director of Teacher Education.

Val E. Arnsdorf, M.A., Acting Assistant Professor of Education.
Arthur R. Jensen, Ph.D., Assistant Professor of Education.
Jack E. Kittell, Ph.D., Assistant Professor of Education and Coordinator of Laboratory Schools.
Aubrey H. Roden, Ph.D., Assistant Professor of Education.
Lloyd F. Scott, Ph.D., Assistant Professor of Education.
Walter R. Stellwagen, Ph.D., Assistant Professor of Education.
Martin A. Trow, Ph.D., Assistant Professor of Education and Sociology.

†Stanley B. Brown, Ed.D., Lecturer in Education and Supervisor of Audio-Visual Education.
Enoch Dumas, Ed.D., Lecturer in Education, Associate Director of Supervised Teaching, and Supervisor of Elementary Education.
Leah Hirsch, M.D., Lecturer in Education.
M. Ray Hitch, M.A., Lecturer in Education and Supervisor of the Teaching of Business Education.
Barbara Kirk, M.A., Lecturer in Education.
George II. Kyme, Ph.D., Associate in Music and Supervisor of the Teaching of Music.
Anthony H. McNaughton, M.A., Lecturer in Education.

Neva Aubin, M.A., Supervisor of Elementary Education.
Donetta C. Brainard, A.B., Assistant Supervisor of the Teaching of English.
George J. Burkhard, M.A., Principal of the University Elementary School.
Marilyn H. Crichton, M.A., Supervisor of Elementary Education.
Barbara J. Grant, M.A., Supervisor of Elementary Education.
Robert F. Hogan, A.B., Supervisor of Secondary Education.
James W. Hoge, M.A., Supervisor of the Teaching of Mathematics.
Katharyn Hole, Supervisor of the Teaching of Art.
Rana J. Hussey, A.B., Acting Supervisor of Secondary Education.
Margaret C. Jackson, M.A., Supervisor of the Teaching of Social Studies.
Lena S. Jaggard, A.B., Supervisor of the Teaching of Social Studies.
Mark C. Luca, Ph.D., Supervisor of Elementary Education.
Eugene McCready, M.A., Supervisor of Secondary Education.
† Grace M. Maertins, M.A., Supervisor of Secondary Education.

† Absent on leave, 1959-1960.
2 In residence spring semester only, 1959-1960.
Anne F. Merrill, M.A., Elementary Supervisor.
Heber A. Newsom, M.A., Supervisor of Physical Education and Supervisor of the Teaching of Physical Education for Boys.
Arnold R. Pagano, M.A., Supervisor of Elementary Education.
Claire N. Pedano, Ed.D., Supervisor of the Teaching of Social Studies.
T. Clyde Polson, Ph.D., Supervisor of the Teaching of Science.
Margaret Ryan, M.A., Supervisor of the Teaching of English and Speech.
Karl E. Schevill, Ph.D., Supervisor of the Teaching of Foreign Languages.
Philip J. Sinnott, M.A., Supervisor of Elementary Education.
Josie W. Stewart, M.A., Supervisor of the Teaching of Kindergarten Work.
Mary K. Stiles, M.S., Supervisor of Secondary Education.
Staten W. Webster, M.A., Supervisor of the Teaching of Social Studies.
Rosalie V. Zari, M.A., Supervisor of Junior High School and Elementary Education.

Letters and Science List.—Course 100A, and not more than 3 units from 101, 102, and 105 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Brownell, Mr. Tyler.

Preparation for the Major.—Psychology 1A and Zoology 10, and not less than 6 units in economics (preferably 1A-1B) or political science (preferably 1, 2) or sociology and social institutions (preferably 100A-100B) or philosophy (preferably 6A-6B),

The Major.—The major here described is the 24-unit major for the A.B. degree in the College of Letters and Science. A major in education is not an acceptable major for a Certificate of Completion of the teacher-education curricula.

Required: 18 units in education, including the following 12 units: Education 101, 106, 100A, 119, and a sequence of courses consisting of one of the following groups with additional courses from the remaining groups sufficient to make a total of 6 units.

I. History of Education: courses 102; 105.
II. Educational Psychology: courses 115 or 116 or 117.
III. Elementary Education: courses 100B, 130C, 130D.
IV. Vocational Education: courses 160; 164.
V. Secondary Education: courses 100B; 117 or 172.

The remaining 6 units may be chosen, with the approval of the department, from upper division courses in the Letters and Science List in the following departments: Economics, Education, History, Philosophy, Political Science, Psychology, or Zoology. Students who transfer from normal schools or teachers colleges will not be permitted to elect courses in education for these 6 units. It is recommended that students include Philosophy 104 in the major program. Courses numbered in the 300 series are not accepted toward the major for the A.B. degree.

The department will certify to the completion of a major for graduation only on the basis of at least a C average in the upper division courses taken in the department. Students who cannot maintain this average may be required at any time to withdraw from the major in education.

TEACHER-EDUCATION CURRICULA

Special provision is made for the professional education of teachers of two classes:
A. Those preparing to become teachers in elementary and secondary schools or in colleges.
B. Those preparing to engage in school administration or supervision, to become principals or superintendents of public schools, or to teach in teachers colleges or in college departments of education.

For detailed requirements, see the Announcement of the School of Education.

For courses offered at Davis, see the General Catalogue, Davis.

**Upper Division Courses**

Prerequisite: junior standing and Psychology 1A or the equivalent.

100A. Learning and the Learner. (4) I and II.

Prerequisite: Psychology 1A. Mrs. Jones, Mr. Roden, ----

Individual differences and their measurement; physical and mental growth; learning and the evaluation of learning; personality development and mental hygiene. Systematic observations of children in the public schools.

100B. The School in American Society. (3) I and II.

Mr. Lund, ----, Mr. Edwards, Mr. Kittell, Mr. Loban, ----, Mrs. Zari

The school as a social institution; historical development of current purposes and programs of education; the role of the teacher. Systematic observations in schools and other social agencies. Ordinarily to be taken after 100A, but may be taken concurrently. Sections 1–5 elementary, sections 6–10 secondary.

*101. The History of Education—General Course. (3) II. Mr. Mosier

The development of educational thought and practice viewed as a phase of social progress.

*102. The History of American Education. (2) I. Mr. Mosier

The leading ideas and ideals of American education and the institutions in which they have been embodied.

105. Education in Foreign Countries. (2) I. Mr. Lilge

Education as an instrument of political power and propaganda; its dependence on national cultural traditions. Especially valuable to students pursuing the study of a specific region.

106. Philosophy of Education. (2) I and II. Mr. Lilge

The great educational classics and their meaning for modern man.

109. Problems in the Sociology of Education. (3) I. Mr. Trow

The basic perspectives and methods of contemporary sociology as applied to selected problems in education. Readings in significant sociological theory and research, with a critical examination of their usefulness to the field of education.

112. The Improvement of Reading in Schools. (2) I.

Psychology of learning as it relates to effective reading readiness programs, development of word meaning, organization and analysis, improvement of comprehension, recall, skimming and speed reading, study skills and higher mental processes, provision for individual differences in ability and interest, place of skills in modern reading program.

* Not to be given, 1959–1960.
114. **Statistical Methods in Education.** (3) I and II. Mr. Stellwagen
   Prerequisite: 100A or former course 110. Mathematics D is also recommended.

*115. **Objective Tests and Measurements.** (2) II.
   Prerequisite: 100A or former course 110 or the equivalent, and 114.
   Principles and functions of measurement in education; varieties of measurement in common use; the construction and validation of objective examinations; the improvement of school marks.

116. **The Exceptional Child.** (2) I.
   Prerequisite: 100A or former course 110 or a course in psychology in addition to Psychology 1A.

*117. **Psychology of High School Subjects.** (2) I.
   Prerequisite: 100A or former course 110.
   A psychological analysis of the various subjects of the high school curriculum, with a survey of psychological experiments.

119. **Standard Tests in Education.** (3) I and II. Mr. Carter
   A critical survey and evaluation of standard tests, including achievement and psychological tests available for school purposes; practice in giving and scoring tests, and interpreting results for the improvement of instruction; organization of a testing program.

127. **Principles of Teaching the Slow Learner.** (2) II.
   Prerequisite: teaching experience. This course may be counted toward the special credential for working with mentally retarded children.
   Principles of adapting the curriculum, materials, and methods of teaching to the needs of the mentally handicapped child.

130. **The Elementary School Curriculum.**
   Prerequisite: course 100A and 100B, except by special permission of the teacher education adviser.
   Selection and placement of content; organization of program; analysis of instructional materials; evaluation. 130A, B, C, and D may be taken in any sequence.

130A. **Arithmetic.** (2) I and II. Mr. Dumas, Mr. Scott
   (Formerly numbered 131.)

130B. **Art and Music.** (2) I and II. Mrs. Aubin, Mr. Kyme, Mr. Luca
   (Formerly numbered 132.)
   Prerequisite: Decorative Art 6A, Music 10.

130C. **Reading and the Other Language Arts.** (3) I and II.
   (Formerly numbered 134.) Mr. Russell

130D. **Social Studies and Science.** (3) I and II. Mr. McNaughton
   (Formerly numbered 138.)

151. **Administration of the School Health Program.** (2) I and II.
   Mrs. Hirsch
   Organization and administration of school health work; public health aspects of school hygiene in relation to school physician, nurse, principal, and teachers.

*152. **Health Problems in the Secondary Schools.** (2) I.

* Not to be given, 1959-1960.
153. Mental Hygiene—Elementary. (2) I.  
Prerequisite: 100A or former course 110.  
A basic course concerned with problems of childhood.

*Mental Hygiene—Advanced. (2) I.  
Prerequisite: course 153 or the equivalent.

160. Vocational Education. (2) I.  
Philosophy and organization of vocational education of less than college grade, with particular reference to principles underlying education for industry, agriculture, commerce, homemaking, and continuation education.

164. Pupil Personnel, Counseling, and Guidance. (2) I and II.  
Mr. Froehlich, ———
This course is for nonmajors in student personnel and counseling psychology.
Nature, scope, organization, and administration of personnel services in educational institutions. Basic guidance techniques.

165. Business Education in Secondary Schools. (3) I and II.  
Mr. Hitch, ———
This course is prerequisite to 320E, Section 13.

167. Personality Theory in Counseling. (2) I and II.  
Prerequisite: consent of the instructor.  
Critical analysis of personality theories and their relationships to counseling theories.

172. Junior High School Education. (2) I.  
Mr. Loban, ———
Prerequisite: 100A or former course 110 (may be taken concurrently).

174. Reading and Literature at the Secondary Level. (2) II.  
Mr. Loban, ———
A survey of the literature read by adolescents, together with an examination of their reading problems and interests; an analysis of reading as employed in subject-matter areas other than English; an evaluation of relevant research with application to the classroom.

181. Adult Education. (3) I and II.  
Mr. London, ———
The functions and possibilities of adult education in our society. The resources available to those who do educational work with adults in public schools and other community agencies. The role of the public schools in facilitating cooperation among these agencies.

182. Problems of Adulthood. (3) II.  
Mr. London, ———
The examination of certain general psychological and sociological problems of adults. This course will be primarily concerned with physical growth, mental abilities, interests, attitudes, adjustments, and scope of activities in adulthood and old age.

*186. Laws Relating to Schools and to Children. (2) I.  
Mr. Morphet, ———
School laws and those aspects of labor and welfare laws applicable to school children.

199. Special Study for Advanced Undergraduates. (1-5) I and II.  
The Staff (Mr. Brownell in charge)

Graduate Courses
As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation

* Not to be given, 1959–1960.
for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division work basic to the subject of the graduate course.

The admission of undergraduates to graduate courses is limited to seniors who have an average grade of at least B in the basic courses; the study-list limits in such cases are the limits imposed by the rules of the Graduate Division.

200A. Social Foundations of Education. (3) I and II. Mr. Mosier
A study of the interrelations of the school and society, of the complexity of the culture in which education functions, and of the political and social relations of the school to contemporary American society.

200B. Psychological Foundations of Education. (3) I. Mr. Brownell
(Formally numbered 210A.)
A systematic course designed to organize and to integrate the field of educational psychology at an advanced level.

200C. Foundations of Curriculum Development. (3) I and II. Mr. Parker
A basic course in the general concepts, principles, and practices of curriculum development, and the construction and evaluation of specific curricula.

200D. Public School Organization and Administration. (3) I and II. Mr. Morphet
Enrollment restricted to nonmajors in administration.

The principles and practices of educational administration with respect to the teacher and the administrative personnel, state and local administrative organization, finance and business procedures, public relations.

*201A–201B. History of Education. Seminar. (2–2) Yr. Mr. Mosier
The theory and practice of historical inquiry as applied to research in the history of education.
Admission on consultation with the instructor.

*203. Problems in the History of Education. (2) II. Mr. Mosier
Admission on consultation with the instructor.
An analytic and critical consideration of the literature in the history of education relating to selected issues in educational theory and practice.

206A–206B. Philosophy of Education. Seminar. (2–2) Yr. Mr. Lilge
Admission on consultation with the instructor.

209. Philosophical Issues in Contemporary Education. (2) II. Mr. Lilge
Admission on consultation with the instructor. For graduate nonspecialists and majors in the history and philosophy of education.
A critical analysis of educational issues and their relation to major philosophical positions. Readings principally from significant current publications.

210. The Learning Process. (2) I. Mr. Jensen
Prerequisite: consent of the instructor. Doctoral candidates in educational psychology may not register for this course.
Limited to human learning and directed particularly to problems of school learning in the areas of skills, concept formation, problem solving, and aesthetic appreciation.

* Not to be given, 1959–1960.
211B. Children's Thinking. (2) II.  
Prerequisite: consent of the instructor.  
A study of children's learning and thinking from the developmental point of view, with particular reference to the influence of the home and the school; the role of perceptual and emotional factors in children's thinking; the development of children's concepts, problem-solving abilities, and creative thinking.

2112. Analysis of Difficulties in Reading and Language Arts. (2) II.  
Clinical procedures in the study of pupils who are failing in reading, spelling, and oral and written composition; various types and causes of failures; use of educational and psychological tests and informal analyses; corrective methods.

2113. Individual Intelligence Tests in Guidance. (2) I and II. Mr. Jensen  
Prerequisite: courses 100A, or former course 110, 111, 114 or their equivalent.  
A critical analysis of the history and techniques of individual intelligence testing. While the theory of individual intelligence testing is emphasized, some supervised practice in administering, scoring, and interpreting both the 1937 Revised Stanford-Binet and the Wechsler-Bellevue scales is a regular requirement of the course.

2114A. Advanced Statistics with Application to Methods of Educational Investigation. (2) I. Mr. Stellwagen  
Prerequisite: a course in elementary statistics and consent of the instructor. For students conducting investigations involving statistical analysis, or expecting to teach tests and measurements and statistical methods in colleges.

2114B. Factor Analysis. (2) II. Mr. Stellwagen  
Prerequisite: Education 114, 2114A.  
The theory and application of factor analysis to educational and psychological data.

2115. Advanced Educational Psychology.  
Prerequisite: consent of the instructor.  
A systematic and critical appraisal of the scientific literature of the field.

2115A. Principles and Theories of Psychological Measurement. (4) I. Mr. Carter  
Primarily for doctoral candidates in educational psychology.  
The development and application of methods of measuring human behavior, including intelligence, interests, attitudes, adjustments, etc.

2115B. Psychology of Learning. (4) I. Mr. Jensen  
Primarily for doctoral candidates in educational psychology.  
Learning and learning theory.

2115C. Human Development: Individual Differences. (4) II. Mr. Tyler  
Primarily for doctoral candidates in educational psychology.  
The facts, principles, and generalizations concerning the nature of, and the factors related to, individual differences in human growth and development.

2115D. Human Development: Factors in Personal and Social Development. (4) II. Mrs. Jones  
Primarily for doctoral candidates in educational psychology.
A survey of recent research in the field of child development, with special reference to the literature on early childhood experiences, peer relationships, cultural influences, determinants of self-concepts.

217A. Experimental Education. (2) I. Mr. Holmes
Admission on consultation with the instructor.
Laboratory experiments, with special reference to the more elaborate techniques applied to the various school subjects. The course includes voice recording, photographing eye movements in reading and spelling, analysis of rhythm in reading, arithmetic, and writing, and studies of the motor responses accompanying appreciation. Each member of the class will participate in all experiments.

217B. Experimental Education. (2) II. Mr. Holmes
Prerequisite: course 217A.
Students will be expected to complete an advanced laboratory project.

218A. The Psychological Bases of the Curriculum in Elementary Schools. (2) I. Mr. Russell
(Formerly numbered 118.)
Psychological problems in the use of materials and methods in the elementary school program. Part of the students’ work will be a special study of psychological research in a selected area.

218B*-218C. Investigations in the Curriculum of the Language Arts. (2–2) Yr. Mr. Russell
(Formerly numbered 218A–218B.)
Prerequisite: consent of the instructor.
A study of available and needed research in selected areas of the language arts. Some emphasis will be given to topics such as communication in modern life, child development in language abilities, language and thought, interrelationships of language and personality and curricular problems in the language arts. Students will work intensively in one area of special interest.

218D. Investigations in the Curriculum of Arithmetic. (2) II. Mr. Brownell
(Formerly numbered 219.)
Prerequisite: consent of the instructor.
A critical analysis of selected research reports relating to the teaching and learning of arithmetic, with comprehensive reading and evaluation of research on problems of special interest to individual students.

226. Curriculum Construction. (2) II. Mr. Parker

*227. Problems in Curriculum Development Practicum. (2) I. Mr. Parker
Prerequisite: two courses in elementary and/or secondary curriculum, teaching experience, graduate standing, and consent of the instructor. Designed especially for teachers, principals, and superintendents who wish to make specific plans and develop materials for specific curriculum problems in their schools.

229. In-Service Programs for School Personnel. (2) I. Mr. Parker
Prerequisite: school experience. Designed for principals, directors, supervisors, superintendents, and for teachers with interest or responsibility for in-service education.
Current practices, problems, principles, and procedures in in-service education programs for public school personnel, with emphasis upon evaluation.

* Not to be given, 1959–1960.
231. Administration of Elementary Education Practicum. (2) I.
   Prerequisite: consent of the instructor.                   Mr. Kittell

233A–233B. Supervision of Elementary Education Practicum. (2–2) Yr.
   Prerequisite: consent of the instructor.

235. The Elementary School Curriculum. (2) II.                Mr. Scott
   Prerequisite: consent of the instructor.

236A*–236B. Evaluation of Elementary Education. (2–2) Yr. Mr. Kittell
   236B. I.
   Prerequisite: consent of the instructor.
   Critical analysis of theories and principles of evaluation applied to elementary education; review of pertinent research studies in evaluation dealing with all aspects of elementary education.

*237. Trends in Elementary Education. (2) I.                   Mr. Michaelis
   Prerequisite: graduate standing and completion of at least 12 units in education.
   A survey of current practices descriptive of the emerging elementary school in the United States, with special attention to their implications for the student's own professional needs.

241A–241B. Introduction to Educational Administration. (4–4) Yr.
   Mr. Howsam, Mr. Morphet, Mr. Swanson
   Prerequisite: consent of the instructor. Required for the master's degree in educational administration and for various administrative credentials.
   A comprehensive introduction to the principles, practices, and literature of educational administration.

   Prerequisite: course 241A–241B and consent of the instructor.
   Designed to provide opportunity for advanced study in the theory and practice of educational administration at elementary, secondary, and adult education levels. Opportunity will be provided for exhaustive study of the basic related disciplines and problems in the respective areas.

242A. Local, State, and Federal Organization; Education and Government; Education Law. (2–4) II.    Mr. Reller

242B. Administration of Educational Programs and Services; Pupil Personnel Services. (2–4) II.        Mr. Swanson

242C. Administrative Behavior and Organization; Personnel Administration. (2–4) I and II.  Mr. Howsam, Mr. Reller

242D. Finance and Business Administration. (2–4) I.        Mr. Morphet

242E. School-Community Relations and Schoolhousing. (2–4) I.    Mr. Reller

261. Student Personnel and Counseling Psychology.          Mr. Froehlich, Mr. Stewart
   Prerequisite: courses 213 or 100A, or former course 110, 111 and 114. Primarily for students working for graduate degrees in the field or for credentials in pupil personnel and counseling or child welfare and attendance work.
   A systematic course designed to organize and integrate the field of student personnel and counseling psychology at an advanced level.

* Not to be given, 1959–1960.
261A. Principles and Theories of Guidance. (2) I and II. Mr. Stewart
The development and scope of guidance work as a profession; critical
analysis of basic philosophies, ethics, and professional responsibilities.

261B. Environmental Factors in Counselee Adjustment. (2) I.
Mr. Stewart
Theories of environmental interaction in personal adjustment and the
counseling process. Also includes labor market dynamics, occupational sur­
veys and studies, investigation of training opportunities. Sources and
interpretation of data.

261C. Group Guidance. (2) II. Mr. Froehlich
A critical analysis of the literature on group dynamics and social psy­
chology applicable to group procedures in counseling and personnel work.
Theory, function, and operation of group guidance activities in an edu­
cational setting.

261D. Individual Appraisal in Counseling. (2) II. Mr. Stewart
Prerequisite: courses 114, 119, and consent of the instructor.
Theory and practice of psychological evaluation of counselees. Major
emphasis upon aptitude, interest, and attitude tests; validity; reliability;
and normative data.

266A-266B. Advanced Counseling Theory. (2-2) Yr. Mr. Froehlich
Prerequisite: course 261 and consent of the instructor.
Counseling theory, schools of counseling, intensive investigation of coun­
seling techniques, diagnostic procedures and treatment, evaluation of
counseling.

272A. Secondary School Curriculum: Basic Principles. (2) I.
Prerequisite: course 100A or former courses 110, 111, 170, or their equiva­
 lent, graduate standing, and consent of the instructor.
For advanced students who wish to make a thorough study of the basic
principles of curriculum development, with special reference to the secondary
school.

(2) II. Mr. Edwards
Prerequisite: course 272A, graduate standing, and consent of the
instructor.

273. Supervision in Secondary Schools. (2) II. Mr. Edwards
Prerequisite: course 130 or 170, teaching experience, and consent of the
instructor.
The organization, function, and techniques of supervision, with special
reference to secondary schools.

275. Secondary Education: Survey. (2) I and II. Mr. Lund
Survey and critical review of secondary education literature, including
research studies, yearbooks, reports, and other documents. Admission on
consultation with the instructor.

279. The Junior College. (2-4) I and II. Mr. Medsker
The nature and role of the junior college in American education, including
a consideration of purposes, curriculum, principles of learning, development
and utilization of instructional materials, and student personnel services.
Credential candidates without teaching experience will register for 4 units
of credit. Students not seeking the junior college credential may enroll for
either 2 or 4 units.
281A–281B. Adult Education Seminar. (2–2) Yr. Mr. London
(Formally numbered 281.)
Prerequisite: course 181 or experience in adult education.
Discussion of current problems and literature in adult education, with
opportunity for members of the course to work on a solution of one of these
problems or of a problem which confronts them in their work.

285. Higher Education in the United States. (3) I and II. Mr. Stone
Prerequisite: consent of the instructor.
Analysis of trends and problems in higher education, with emphasis on
functions and educational programs of the several types and levels of insti­
tutions; admission and counseling of students; instructional problems and
the administration, control, and financing of public and private colleges
and universities.

288. Seminar in Higher Education. Mr. Stone
Prerequisite: course 285 or consent of the instructor.
Intensive study of selected problems in higher education.

288A. The Student in Higher Education. (2) II.

288B. The Curriculum of Higher Education. (2) II.

288C. The Administration of Higher Education. (2) I.

*292. Research Techniques. Seminar. (2) I. ----------
Research problems in education; historical and scientific methods; design
of investigations; bibliographical techniques, statistical methods, survey
methods, and laboratory techniques; methods of reporting results.

293. Surveys and Field Studies. (2) I and II. Mr. Howsam, Mr. Reller
The theory, techniques, procedures, and results of surveys and field studies.

294. Seminar. (2–4) I and II.
Prerequisite: consent of the instructor.
Required of all master's and doctor's candidates in connection with semi­
nar papers and dissertations.

* A. Adult Education.
B. Educational Administration. Mr. Howsam, Mr. Reller, Mr. Swanson
C. Educational Curriculum. Mr. Parker
D. Educational Psychology. Mr. Carter, Mr. Holmes
*E. Educational Sociology.
F. Elementary Education. Mr. Kittell, Mr. Russell, Mr. Scott
*G. Higher Education.
*H. History of Education.
*I. Philosophy of Education.
J. Secondary Education.
K. Student Personnel and Counseling Psychology. Mr. Lund

298. Directed Research Seminar. (2–4) I and II.
The Staff (Mr. Brownell in charge)
Admission only with consent of the instructor in charge. Open only to can­
ididates for the Ph.D. and Ed.D. degrees who have passed the departmental
qualifying examinations and who present an approved plan of research, and
in special cases, to students who present evidence of qualifications and
approved plans for carrying on a particular type of research.

* Not to be given, 1959–1960.
313. School Psychologist Internship. (4) Mr. Jensen

Prerequisite: course 213 and consent of the instructor.

Four to eight hours per week will be spent in supervised field work in which interns will make case reports and will participate in case conferences and staff meetings concerned with diagnosis and prognosis and the formulation of remedial procedures.

325. Field Work in Student Personnel and Counseling Psychology.

(2) I and II. Mr. Froehlich, Mr. Stewart

Prerequisite: consent of the instructor.

Supervised practice in selected aspects of student personnel services and counseling psychology at elementary, secondary, or college level, and in other agencies. The nature of the assignment will vary with the background and needs of students.

340. Directed Field Study and Internship in Educational Administration.

(2-4) I and II. Mr. Morphet, Mr. Swanson

Prerequisite: courses 241A-241B and 293, and consent of the instructor.

Supervised Teaching

Students must reserve a three-hour period daily. Applications for admission to these courses must have been made in 103 Haviland Hall, not later than April 6, 1959, for the fall semester, 1959; not later than November 2, 1959, for the spring semester, 1960; and not later than April 4, 1960, for the fall semester, 1960. Enrollment is limited to available facilities.


Mr. Stone, ---, and Supervisory Staff

The University of California will accept only those candidates who meet the requirements set up by the State Department of Education in health, including specifically sight and hearing.

Education 320A, 320C, 320E, 323, and 324 are scheduled as extra-session courses, to begin with the opening of the public schools and to end with the closing of the semester in the public schools. Thus, teaching assignments in the fall semester, 1959, will begin on or about September 8 and end January 29. For the spring semester, 1960, they will begin on or about February 1 and end June 10. Students should make arrangements accordingly.

A limited number of block assignments in junior or senior high schools may be made available for highly qualified students who wish to enroll only in supervised teaching and methods courses in one semester and to spend virtually all of their time during the school week in teaching and allied assignments in the public schools. These block assignments should not be regarded as a means of advancing the date for the completion of credential requirements. Applications will be accepted only from superior students who have completed all prerequisites and who desire intensive professional experience. Students should consult Mr. Squire.

320A. Secondary Supervised Teaching. (3) I and II.

Mr. Stone, Mr. Schevill, and Supervisory Staff

Lectures, conferences, observations, and supervised teaching. Prerequisite: course 100A or former courses 110, 111, 170, 320B. Course 320E (major field) must be taken concurrently with course 320A. In order to enroll in Education 320A, students should meet the grade-point requirements listed on page 123 and must have been admitted to the Graduate Division.

Note that this is an extra-session course, beginning and ending with the semester in the public schools (see above).
320B. Introduction to Teaching in Secondary Schools. (2) I and II.

Mr. Nelson

Prerequisite: course 100A. Ordinarily course 320B should be taken concurrently with course 100B.

Introduction to the curriculum of the secondary school in subject fields. It will include directed experience as teacher aides and laboratory work on utilization of instructional resources, including audio-visual materials. Students must reserve time for 15 hours of experience as teacher-aides in public school classrooms. Pre-enrollment is required.

320C. Supervised Teaching. (3) I and II.

Mr. Stone, Mr. Schevill, and Supervisory Staff

Conferences, observation, and supervised teaching. Prerequisite: course 100A or former courses 110, 111, 170, 320A, 320B. Students must reserve a three-hour period daily.

Note that this is an extra-session course, beginning and ending with the semester in the public schools (see page 129).

320E. Methods of Teaching. (2) I and II.

Mr. Stone, Mr. Schevill, and Supervisory Staff

Lectures, conferences, and laboratory.

Note that this is an extra-session course, beginning and ending with the semester in the public schools (see page 129).

All students enrolled in 320A or 324 must carry concurrently one of the following sections:

Sec. 2. Life Science and Physical Science. Mr. Polson
Sec. 3. Mathematics. Mr. Hoge
Sec. 4. English. Mr. Hogan, Mrs. Maertins, Miss Ryan
Sec. 5. Foreign Languages. Mr. Schevill
Sec. 7. Social Studies.

Miss Hussey, Mrs. Jackson, Mr. Nelson, Mrs. Pederson, Mr. Webster

Sec. 8. Physical Education for Men. Mr. Newsom
Sec. 9. Physical Education for Women.

Sec. 10. Art. Miss Hole
Sec. 11. Homemaking. Miss Stiles
Sec. 12. Music. Mr. Kyme
Sec. 13. Business Education.

Course 165 is prerequisite to supervised teaching in business education.

Sec 16. Junior College. Mr. Schevill

*Sec. 17. Special Education.

Admission on approval by the instructor. Hours to be arranged.

School Library Administration (Librarianship 206). (2) II.

This course is required of all applicants for the librarianship credential or for the general secondary credential with major in librarianship.

323. Practicum in Supervised Teaching. (2–4) I and II. Mr. Schevill

Prerequisite: a course in supervised teaching or experience as a teacher, and consent of the instructor. Candidates who are graduates of other institutions must submit transcripts of record at the time of application.

Note that this is an extra-session course, beginning and ending with the semester in the public schools (see page 129).

An opportunity to obtain more extended and varied experience under supervision.

324. Junior College Supervised Teaching. (4) I and II. Mr. Schevill

Conferences, observation, and supervised teaching. Prerequisite: course 279. Course 320E, Sec. 16, must be taken concurrently.

* Not to be given, 1959–1960.
Students should reserve a four-hour time block daily and should note that this is an extra-session course, beginning and ending with the semester in the public schools (see page 129).

330. Elementary Supervised Teaching, Professional Methods, I and II.  
Mr. Dumas, and Supervisory Staff

The University of California will accept for teacher education only those candidates who meet the requirements set up by the State Department of Education in health, including specifically sight and hearing.

Students must have not less than a grade-point average of 2.5 in the work of the upper division in order to enroll in courses 330A and 330C. Graduate standing is prerequisite to course 330C.

For students enrolled in Education 330C this is an extra-session course, beginning and ending with the semester in the public schools (see page 129).

330A. Introduction to Elementary Teaching. (2) I and II.  
Mr. Dumas, and Supervisory Staff

Lectures, conferences, laboratory, and field work.

Observations and participation in public school work. Students must reserve at least one two-hour period for field work each week.

330C. Elementary Supervised Teaching. (8) I and II.  
Mr. Dumas, and Supervisory Staff

Conferences, observation, and supervised teaching. Prerequisite: courses 100A, 100B, or former course 110, 130A, 130B, 130C, 130D, 330A or equivalents; Decorative Art 6A; Music 10; History 189A or 189B; Physical Education 26, Section on Elementary School Skills.

Note that this is an extra-session course, beginning and ending with the semester in the public schools (see page 129).

330E. Methods of Teaching in Elementary School or Junior High School.  
(2) I and II.  
Mr. Dumas, and Supervisory Staff

Restricted to candidates for the general junior high school credential or for the general elementary school credential. Must be taken concurrently with course 330C.

Special Education

*149. Administration, Organization, and Procedures in Special Education.  
(2) I.

*326. Supervised Teaching in Special Education. (4) II.

Prerequisite: course 149, which may be taken concurrently if circumstances require. Course 320E, Sec. 17, must be taken concurrently with 326. Open only to candidates for a credential in special education and only after consultation with the instructor in charge of the course.

*370. Speech Defects and Disorders with Corrective Techniques. (2) II.

Prerequisite: course 100A or former course 110.

Designed to give students, teachers, and administrators a broader understanding of the causes and treatment of speech defects and disorders. Includes classification of speech defects and disorders, theories of functional and organic disorders of voice and speech; the causes and treatment of stuttering and articulatory defects, and methods used in the speech correction classes in the public school in California.

*379. Educational Treatment of Cerebral Palsied Children. (2) II.

Admission only on consultation with the instructor.

* Not to be given, 1959-1960.
Courses in Other Departments Accepted as Electives for Teaching Credentials in Education

English 300. Problems in Teaching English Literature and Composition in Secondary Schools. (2) I and II.
Librarianship 206. School Library Administration. (2) II.
Music 328A. Methods of Teaching Vocal Techniques. (2) I.
Music 328B. Methods of Teaching Vocal Techniques. (2) II.
Music 329A. Methods of Teaching Stringed Instruments. (1) I and II.
Music 329B. Methods of Teaching Brass Instruments. (1) I.
Music 329C. Methods of Teaching Woodwind Instruments. (1) II.
Music 329D. Methods of Teaching Percussion Instruments. (1) I.
Music 329E. Ensemble: Literature for School Orchestra and Band. (1) II.
Music 330. Choral Repertory. (1) II.

Engineering

(Office, 315 Engineering Building)

Morrough P. O'Brien, B.S., D.Sc.(hon.), Professor of Engineering, Emeritus.

Civil Engineering

(Department Office, 109 Engineering Building)

Howard D. Eberhart, M.S., Professor of Civil Engineering (Chairman of the Department).

Hydraulic and Sanitary Engineering

(Division Office, 107 Engineering Building)

Hans Albert Einstein, D.S.T., Professor of Hydraulic Engineering.
Joe W. Johnson, M.S., Professor of Hydraulic Engineering and Director, Hydraulic Laboratories.
Percy H. McGauhey, M.S., Professor of Sanitary Engineering (Chairman of the Division), and Director of the Sanitary Engineering Research Laboratory.
Bernard D. Tebbens, Sc.D., Professor of Industrial Hygiene Engineering.
Sidney T. Harding, B.S., Professor of Irrigation, Emeritus.
Charles G. Hyde, B.S., LL.D., Professor of Sanitary Engineering, Emeritus.
Wilfred F. Langelier, M.S., D.Eng., Professor of Sanitary Engineering, Emeritus.
Warren J. Kaufman, Sc.D., Associate Professor of Sanitary Engineering.
William J. Oswald, Ph.D., Associate Professor of Sanitary Engineering.
Erman A. Pearson, Sc.D., Associate Professor of Sanitary Engineering.
David K. Todd, Ph.D., Associate Professor of Civil Engineering.
James A. Harder, Ph.D., Assistant Professor of Civil Engineering.
Gerald T. Orlob, M.S., Assistant Professor of Civil Engineering.
Jerome F. Thomas, Ph.D., Assistant Professor of Sanitary Engineering.
Lyle F. Mockros, M.S., Associate in Civil Engineering.

Frank M. Stead, M.S., Lecturer in Civil Engineering.
Robert L. Wiegel, M.S., Lecturer in Civil Engineering.
Engineering

Structural Engineering and Structural Mechanics
(Division Office, 202 Engineering Materials Laboratory)
Frank Baron, M.S., D.Sc., Professor of Civil Engineering.
Boris Bresler, M.S., Professor of Civil Engineering.
Howard D. Eberhart, M.S., Professor of Civil Engineering.
Joe W. Kelly, B.S., Professor of Civil Engineering.
Tung-Yen Lin, M.S., Professor of Civil Engineering.
Egor P. Popov, Ph.D., Professor of Civil Engineering (Chairman of the Division) and Director of the Structural Engineering Laboratory.
George E. Troxell, B.S., Professor of Civil Engineering.
Raymond E. Davis, E.C., D.Eng., Professor of Civil Engineering, Emeritus, and Director of Engineering Materials Laboratory, Emeritus.
Bruce Jameyson, B.S., Professor of Civil Engineering, Emeritus.
Ray W. Clough, Jr., Sc.D., Associate Professor of Civil Engineering.
Hugh D. McNiven, M.S., Associate Professor of Civil Engineering.
* Joseph Penzien, Sc.D., Associate Professor of Civil Engineering.
David Pirtz, M.S., Associate Professor of Civil Engineering.
Karl S. Pister, Ph.D., Associate Professor of Civil Engineering.
Milos Polivka, M.S., Associate Professor of Civil Engineering.
Jerome M. Raphael, S.M., Associate Professor of Civil Engineering.
Charles F. Scheffey, M.S., Associate Professor of Civil Engineering.
Alexander C. Scordelis, M.S., Associate Professor of Civil Engineering.
Jack G. Bouwkamp, C.I., Assistant Professor of Civil Engineering.
Marion M. Cottrell, M.S., Associate in Civil Engineering.
Ralph B. Matthiesen, M.S., Associate in Civil Engineering.
Robert L. Taylor, M.S., Associate in Civil Engineering.

Transportation Engineering
(Division Office, 107 Engineering Building)
Harmer E. Davis, M.S., Professor of Civil Engineering and Director of the Institute of Transportation and Traffic Engineering.
Dan M. Finch, B.S., Professor of Transportation Engineering.
Robert Horonjeff, B.S., Professor of Transportation Engineering.
* Paul F. Keim, M.Sc., Professor of Civil Engineering.
W. Norman Kennedy, B.S., Professor of Transportation Engineering (Chairman of the Division), Assistant Director of the Institute of Transportation and Traffic Engineering.
Ralph A. Moyer, M.S., C.E., Sc.D., Professor of Transportation Engineering.
Francis S. Foote, E.M., Professor of Railroad Engineering, Emeritus.
Francis H. Moffitt, M.C.E., Associate Professor of Civil Engineering.
Harry Bolton Seed, Ph.D., Associate Professor of Civil Engineering.
John Hugh Jones, M.S., Assistant Professor of Civil Engineering.
James K. Mitchell, Sc.D., Assistant Professor of Civil Engineering.
Carl L. Monismith, M.S., Assistant Professor of Civil Engineering.
Wolfgang S. Homburger, M.S., Associate in Transportation Engineering.
James H. Kell, M.S., C.E., Associate in Transportation Engineering.

Wayne H. Snowden, B.S., Lecturer in Transportation Engineering.
Richard M. Zettel, M.A., Lecturer in Transportation Engineering.

* In residence spring semester only, 1959–1960.
Leonard J. Black, Ph.D., Professor of Electrical Engineering.
*Charles F. Dalziel, E.E., Professor of Electrical Engineering.
Harry D. Huskey, Ph.D., Professor of Electrical Engineering and Mathematics.
Paul L. Morton, Ph.D., Professor of Electrical Engineering.
Burtis L. Robertson, Ph.D., Professor of Electrical Engineering.
Vicor H. Rumsey, B.A., Professor of Electrical Engineering.
Robert M. Saunders, M.S., Professor of Electrical Engineering.
Herbert J. Scott, E.E., Professor of Electrical Engineering.
Samuel Silver, Ph.D., Professor of Engineering Science and Director, Electronics Research Laboratories.
1 Otto J. M. Smith, Ph.D., Professor of Electrical Engineering.
John R. Whinnery, Ph.D., Professor of Electrical Engineering (Chairman of the Department to December 30, 1959).
Lotfi A. Zadeh, Ph.D., Professor of Electrical Engineering.
Lester E. Reukema, Ph.D., Professor of Electrical Engineering, Emeritus.
Diogenes J. Angelakos, Ph.D., Associate Professor of Electrical Engineering.
Henry C. Bourne, Jr., Sc.D., Associate Professor of Electrical Engineering.
Charles A. Desoer, Sc.D., Associate Professor of Electrical Engineering.
Albert C. English, Ph.D., Associate Professor of Electrical Engineering.
Arthur M. Hopkin, Ph.D., Associate Professor of Electrical Engineering.
Eliahu I. Jury, Sc.D., Associate Professor of Electrical Engineering.
Ernest S. Kuh, Ph.D., Associate Professor of Electrical Engineering.
Donald O. Pederson, Ph.D., Associate Professor of Electrical Engineering.
Jerome R. Singer, Ph.D., Associate Professor of Electrical Engineering.
David H. Sloan, Ph.D., Associate Professor of Electrical Engineering.
Charles Süsskind, Ph.D., Associate Professor of Electrical Engineering.
Shyh Wang, Ph.D., Acting Associate Professor of Electrical Engineering.
John R. Woodyard, Ph.D., Associate Professor of Electrical Engineering.
Thomas E. Everhart, M.Sc., Assistant Professor of Electrical Engineering.
*Allan J. Litchtenberg, M.S., Acting Assistant Professor of Electrical Engineering.
Aram J. Thomasian, Ph.D., Assistant Professor of Electrical Engineering and Statistics.
William B. Bridges, M.S., Associate in Electrical Engineering.
Jack W. Carlyle, M.S., Associate in Electrical Engineering.
Arthur Gill, M.S., Associate in Electrical Engineering.
Lawrence P. Huelisman, M.S., Associate in Electrical Engineering.
Nikita Kusnezov, M.S., Associate in Electrical Engineering.
Moshe Mano, M.S., Associate in Electrical Engineering.
Robert W. Newcomb, M.S., Associate in Electrical Engineering.
John L. Saugen, M.S., Associate in Electrical Engineering.
William J. Welch, M.S., Associate in Electrical Engineering.

Richard B. Hurley, M.S., Lecturer in Electrical Engineering.

1 In residence fall semester only, 1959–1960.
2 In residence spring semester only, 1959–1960.
INDUSTRIAL ENGINEERING
(Department Office, 3 Engineering Building)

E. Paul DeGarmo, M.S., Professor of Industrial Engineering (Chairman of the Department).

Raymond C. Grassi, M.S., Professor of Industrial Engineering.
Ronald W. Shephard, Ph.D., Professor of Industrial Engineering (Vice-Chairman of the Department).

Erich G. Thomsen, Ph.D., Professor of Metal Processing.
James S. Campbell, Jr., M.M.E., Associate Professor of Industrial Engineering.

Louis E. Davis, M.S., Associate Professor of Industrial Engineering.
Thomas H. Hazlett, M.S., Associate Professor of Industrial Engineering.

Edward C. Kenzler, Ph.D., Associate Professor of Industrial Engineering.

James T. Lapsley, Jr., M.S., Associate Professor of Industrial Engineering.
James D. Cumming, B.S., Associate in Industrial Engineering.
George P. Redman, M.S., Associate in Industrial Engineering.

MECHANICAL ENGINEERING
(Department Office, 320 Engineering Building)

Clyne F. Garland, M.S., Professor of Mechanical Engineering (Chairman of the Department).

Aeronautical Sciences
(Division Office, 212 Mechanics Building)

Edmund V. Laitone, M.A., Professor of Aeronautical Sciences.
Antoni K. Oppenheim, Ph.D., Professor of Aeronautical Sciences.
Samuel A. Schaaf, Ph.D., Professor of Engineering Science (Chairman of the Division).

Warren H. Giedt, Ph.D., Associate Professor of Aeronautical Sciences.
George J. Maslach, B.S., Associate Professor of Aeronautical Engineering.

Ernest S. Starkman, M.S., Associate Professor of Aeronautical Engineering.
Lawrence Talbot, Ph.D., Associate Professor of Aeronautical Sciences.

Gilles M. Corcos, Ph.D., Assistant Professor of Aeronautical Sciences.
Frederick S. Sherman, Ph.D., Assistant Professor of Aeronautical Sciences.

Franklin C. Hurlbut, Ph.D., Lecturer in Aeronautical Sciences.

Heat-Power Systems
(Division Office, 214 Engineering Building)

Israel I. Cornet, Ph.D., Professor of Mechanical Engineering.
Everett D. Howe, M.S., Professor of Mechanical Engineering and Director, Sea Water Conversion Laboratory.

Francis W. Hutchinson, M.S., M.E., Professor of Mechanical Engineering.
Harold W. Iversen, M.S., Professor of Mechanical Engineering.
Harold A. Johnson, M.S., Professor of Mechanical Engineering.
Ralph A. Seban, Ph.D., Professor of Mechanical Engineering (Chairman of the Division).

Yasundo Takahashi, Ph.D., Professor of Mechanical Engineering.

Carl J. Vogt, M.S., Professor of Mechanical Engineering.

Leonard Farbar, M.S., Associate Professor of Mechanical Engineering.
Alan D. K. Laird, Ph.D., Associate Professor of Mechanical Engineering.
Paul B. Stewart, Ph.D., Associate Professor of Mechanical Engineering.
Herman Thal-Larsen, M.S., Associate Professor of Mechanical Engineering.
John H. Lienhard, M.S., Associate in Mechanical Engineering.
Robert E. Rolling, M.S., Associate in Mechanical Engineering.

Mechanics and Design
(Division Office, 124 Building T-7)

Clyne F. Garland, M.S., Professor of Mechanical Engineering.
Alexander S. Levens, M.S., C.E., Professor of Mechanical Engineering.
Paul Lieber, Ph.D., Professor of Engineering Science.
James L. Meriam, Ph.D., Professor of Engineering Mechanics (Chairman of the Division).
Paul M. Naghdi, Ph.D., Professor of Engineering Science.
Reinhardt M. Rosenberg, M.S., Professor of Engineering Mechanics.
Walter W. Soroka, Sc.D., Professor of Mechanical Engineering.
G. Wayne Brown, M.S., Associate Professor of Mechanical Engineering.
Don M. Cunningham, M.S., Associate Professor of Mechanics and Design.
†Joseph Frisch, M.S., Associate Professor of Mechanical Engineering.
Werner Goldsmith, Ph.D., Associate Professor of Engineering Mechanics.
Carl W. Nelson, Ph.D., Associate Professor of Mechanics and Design.
Charles W. Radcliffe, M.E., Associate Professor of Mechanical Engineering.
William S. Rouverol, M.S., Associate Professor of Mechanical Engineering.
Robert F. Steidel, Jr., D.Eng., Associate Professor of Mechanical Engineering.

†Sabbatical leave in residence, fall semester, 1959-1960.
†In residence first semester only, 1959-1960.

George E. Davis, M.A., Lecturer in Engineering Graphics.

MINERAL TECHNOLOGY
(Department Office, 210 Hearst Memorial Mining Building)

Anders J. Carlson, C.E., Ph.D., Professor of Petroleum Engineering.
John E. Dorn, Ph.D., Professor of Engineering Science (Vice-Chairman of the Department).
Herbert E. Hawkes, Ph.D., Professor of Mineral Exploration.
Ralph R. Hultgren, Ph.D., Professor of Metallurgy.
Earl R. Parker, Met.E., Professor of Metallurgy and Director, Institute of Engineering Research.
Joseph A. Pask, Ph.D., Professor of Ceramic Engineering (Chairman of the Department).
John A. Putnam, Ph.D., Professor of Petroleum Engineering.
S. Frederick Ravitz, Ph.D., Professor of Metallurgy.
Alan W. Searcy, Ph.D., Professor of Engineering Science.
Lysle E. Shaffer, E.M., Professor of Mining.
Parker D. Trask, Ph.D., Professor of Geological Engineering.
Edward H. Wisser, B.S., Professor of Mineral Exploration.
Paul A. Witherspoon, Ph.D., Professor of Petroleum Engineering.
Lester C. Uren, B.S., Professor of Petroleum Engineering, Emeritus.
Irving Fatt, Ph.D., Associate Professor of Petroleum Engineering.
Douglas W. Fuerstenau, Sc.D., Associate Professor of Metallurgy.
Wilbur H. Somerton, Pet.E., Associate Professor of Petroleum Engineering.
Stanley H. Ward, Ph.D., Associate Professor of Mineral Exploration.
*Jack Washburn, Ph.D., Associate Professor of Metallurgy.
Richard M. Fulrath, M.S., Acting Assistant Professor of Ceramic Engineering.
Granville S. Borden, LL.B., Lecturer in Mineral Technology.
Philip R. Bradley, B.S., Lecturer in Mining.
Lawrence Himmel, Ph.D., Lecturer in Mining.
Kenneth K. Kelley, Ph.D., Lecturer in Metallurgy.
John F. McGarry, M.S., Lecturer in Process Engineering.

NAVAL ARCHITECTURE
(Department Office, 224 T-3)

Henry A. Schade, Dr.Ing., Professor of Naval Architecture (Chairman of the Department).
John V. Wehausen, Ph.D., Professor of Engineering Science.
J. Randolph Paulling, Jr., S.M., Nav.Arch., Assistant Professor of Engineering.

Tatsujiro Hanaoka, B.E., Lecturer in Naval Architecture.
Peter T. Lyman, B.S., Lecturer in Naval Architecture.
Osvald J. Sibul, M.S., Lecturer in Naval Architecture.

NUCLEAR ENGINEERING
(Department Office, 318 Engineering Building)

Paul L. Chambré, Ph.D., Associate Professor of Engineering Science and of Mathematics.
Lawrence M. Grossman, Ph.D., Associate Professor of Nuclear Engineering.
Virgil E. Schrock, M.S., M.E., Assistant Professor of Nuclear Engineering.

Joel Bengston, Ph.D., Lecturer in Nuclear Engineering.
Albert J. Kirschbaum, Ph.D., Lecturer in Nuclear Engineering.
Thomas H. Pigford, D.Sc., Lecturer in Nuclear Engineering.
Frederick J. Shon, B.S., Lecturer in Nuclear Engineering.
Richard N. Stuart, Ph.D., Lecturer in Nuclear Engineering.

Inspection trips may be a part of the academic program of any course given by the divisions of the Department of Engineering.

Lower division courses in the Department of Engineering which are of general interest to students in various curricula are listed under Engineering.

ENGINEERING

LOWER DIVISION COURSES

In addition to the prerequisites noted, engineering students must complete the Lower Division Engineering Examination.

10. Engineering Measurements. (3) I and II.

The Staff (Mr. Moffitt in charge)

Prerequisite: Mathematics 3A and 3B. Mathematics 3B may be taken concurrently.

Theory and practice of engineering measurements; laboratory exercises and demonstrations using engineering systems; analysis of errors; adjustment and evaluation of measurements; applications to surveying; measurements in various fields of engineering.

11. Engineering Surveys. (3) I and II.

Mr. Moffitt (in charge), Mr. Jones

Two lectures and three laboratory hours per week.
Prerequisite: course 10 or 21.

Control surveys, topographic surveys using transit-stadia and plane table-alidade, horizontal and vertical curves, earthwork, practical astronomy, introduction to photogrammetry.

18A-18B. Strength of Materials. (3-3) Yr. Beginning each semester.

Mr. Troxell (in charge), Mr. Kelly, Mr. Matthiesen, Mr. Bertero, Mr. Polivka

Prerequisite: Mathematics 3B, Physics 2A and 3A or 4A, and course 21, which may be taken concurrently with course 18A. For students in architecture.

Elementary analytic mechanics; application of statics and theory of elasticity to elements of structural design.

21. Plane Surveying. (3) I and II.
The Staff (Mr. Moffitt in charge)

Prerequisite: trigonometry. Not open to students in engineering.

Principles and practice of surveying, including use of tape, transit, level, alidade; calculation of traverse, areas, volumes, curves; stadia and plane table mapping.

22. Engineering Drawing. (2) I and II.

The Staff (Mr. Levens in charge)

One lecture and five laboratory hours per week. Prerequisite: course 23.

Freehand pictorials; theory of orthogonal projection; single and multiple auxiliaries; dimensioning; freehand and mechanical working drawings; graphic computations; plotting experimental data and determination of elementary empirical equations.

23. Descriptive Geometry. (2) I and II.

The Staff (Mr. Levens in charge)

One lecture and five laboratory hours per week. Prerequisite: Mathematics 3A (may be taken concurrently); plane geometry, trigonometry, and mechanical drawing.

The fundamental principles of descriptive geometry and their application to the solution of three-dimensional problems arising in the various branches of engineering.

25. Engineering Graphics. (4) I and II. The Staff (Mr. Levens in charge)

Two lectures and six laboratory hours per week. Prerequisite: plane geometry, trigonometry, mechanical drawing; Mathematics 3A (taken concurrently).

The fundamental principles of orthogonal projection and their application to the solution of three-dimensional problems arising in the various branches of engineering; freehand pictorials; dimensioning; freehand and instrumental working drawings; graphic computations; plotting experimental data and determination of elementary empirical equations.
†25D. Mechanical Drawing and Engineering Graphics. (4) I.
The Staff (Mr. Levens in charge)

Three lectures and nine laboratory hours per week. Prerequisite: plane geometry, trigonometry; Mathematics 3A (taken concurrently). Prescribed for, and limited to, students deficient in high school drawing matriculation requirement.

Course content is the same as course 25, except that it is preceded by an intensified introductory course in mechanical drawing during the first third of the semester.

26. Introduction to Engineering Graphics. (2) I.
The Staff (Mr. Levens in charge)

One lecture and five laboratory hours per week. Prerequisite: 1 unit of high school mechanical drawing; Mathematics 3A (may be taken concurrently). Course is limited to students majoring in chemical engineering.

Fundamentals of orthogonal projection; freehand technical sketching—orthographic and pictorial; design drawings—freehand details and instrumental assemblies; graphical mathematics—functional scales, empirical relations, concurrency and alignment nomograms.

†26D. Mechanical Drawing and Introduction to Engineering Graphics.
(2) I.
The Staff (Mr. Levens in charge)

Two lectures and seven laboratory hours per week. Prerequisite: Mathematics 3A (may be taken concurrently). Course is limited to students majoring in chemical engineering.

First five weeks is devoted to high school drawing—lettering, use of instruments, geometric constructions, freehand sketching, use of scales, isometric and oblique drawing. During the last ten weeks the material covered in the course includes fundamentals of orthogonal projection; freehand technical sketching, design drawings, graphical mathematics.

35. Statics (3) I and II.
The Staff (Mr. Meriam in charge)

Prerequisite: Physics 4A; Mathematics 4A and 4B (Mathematics 4B may be taken concurrently) or Mathematics 14A and 14B (Mathematics 14B may be taken concurrently); course 25 or 26, strongly recommended.

Force systems and equilibrium conditions, with emphasis on engineering problems covering structures, machines, distributed forces, and friction. Includes graphical and algebraic solutions and an introduction to the method of virtual work.

45. Properties of Materials. (3) I and II.
Mr. Ravitz (in charge), Mr. Bouwkamp, Mr. Cottrell, Mr. Dorn, Mr. English, Mr. Fuerstenau, Mr. Hauser, Mr. Hazlett, Mr. Hultgren, Mr. Parker, Mr. Pirtz, Mr. Polivka, Mr. Searcy, Mr. Wang

Two one and one-quarter hour lectures and one three-hour laboratory period every other week. Prerequisite: Chemistry 1B and Physics 4B (may be taken concurrently). Enrollment in the fall semester is open only to sophomores.

An introductory course on the properties of engineering materials. Applications of basic principles to the selection and use of engineering materials.

UPPER DIVISION COURSES

The basic prerequisite for all upper division courses is satisfaction of the lower division requirements in an engineering program of study and completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

† Not to be given after fall semester, 1959.
100. Materials and Methods Used in Manufacturing. (3) I and II.
Mr. Campbell, Mr. Grassi, Mr. Lapsley
Prerequisite: junior standing in business administration. Not open to students in engineering.
Study of the common materials (metals and nonmetals), processes, and equipment used in modern manufacturing.

101. Manufacturing Processes. (3) I and II.
Mr. Thomsen (in charge), Mr. Campbell, Mr. Cumming, Mr. L. E. Davis, Mr. Grassi, Mr. Hazlett, Mr. Keachie, Mr. Lapsley, Mr. Redman, Mr. Shephard
Prerequisite: junior standing; courses 25 and 45 or the equivalent.
Casting processes; hot and cold working; machining; measuring and gauging; welding and joining; grinding and surface finishing; general-purpose and production-type machine tools; tooling; jigs and fixtures; relation of design to production.

102. Dynamics. (3) I and II.
The Staff (Mr. Meriam in charge)
Prerequisite: course 35, Mathematics 4A-4B, Physics 4A.
Kinematics and kinetics of a particle and of rigid bodies as applied to engineering problems. Force, energy, and momentum methods of solution. Introduction to mechanical vibrations.

103. Elementary Fluid Mechanics. (3) I and II.
Mr. J. W. Johnson (in charge), Mr. Einstein, Mr. Farbar, Mr. Harder, Mr. Iversen, Mr. Sherman, Mr. Talbot, Mr. Tichvinsky, Mr. Todd, Mr. Wiegel
Prerequisite: course 102, which may be taken concurrently.
The principles of mechanics applied to the statics and to the flow of incompressible and compressible fluids.

113. Introduction to the Professional Aspects of Engineering. (2) I and II.
The Staff (Mr. Robertson in charge)
Prerequisite: senior standing in engineering. To be taken during the year of intended graduation.
Development of an understanding of the professional responsibilities of the engineer; practice in the elements of effective speaking and in the preparation of technical and nontechnical papers; study and discussion of selected topics of value to the engineer beginning his career.

120. Principles of Engineering Investment and Economy. (3) I and II.
Mr. DeGarmo (in charge), Mr. Hazlett, Mr. Keachie, Mr. Keim, Mr. Lapsley
Prerequisite: Mechanical Engineering 105A, or Physics 112, or Chemistry 110B; Electrical Engineering 100A, 101, or 109A, or Physics 110A; Civil Engineering 130 or 132.
Derivation of formulas used in the theory of investment; economy studies applied to original and alternative investments in engineering enterprise; replacement problems; relation of personnel and quality control factors to engineering economy; economy studies of governmental projects.

140. Elementary Illumination. (2) I and II.
Mr. Finch
Prerequisite: consent of the instructor; Physics 4C; Electrical Engineering 100A, 101, or 109A (may be taken concurrently).
Light: its utilitarian and engineering aspects; light, vision, and radiant energy; photometric concepts; illumination instruments and measurements; lighting calculations and design; color specification; lectures and demonstrations.
140L. Elementary Illumination Laboratory. (1) I and II. Mr. Finch
Prerequisite: course 140 (may be taken concurrently).
Laboratory experiments in the fundamental concepts and quantities used in illumination: intensity, brightness, illumination, flux, reflection, transmission, light distribution from luminaires, visibility, color, measuring instruments, measuring techniques.

141. Illumination and Radiation Sources and Effects. (2) II. Mr. Finch
Prerequisite: Physics 4C, Electrical Engineering 100A, 101, or 109A.
Light sources, luminescence, fluorescence, phosphorescence, ultraviolet radiation, thermal and infrared radiation, solar heating calculations, and design problems. Germicidal, erythemal, and fading properties of ultraviolet radiation. Special problems in infrared transmitters, receivers, and applications. Photoelectric effects and photoelectric control and measurement circuits.

141L. Illumination and Radiation Sources Laboratory. (1) II. Mr. Finch
Prerequisite: course 141 (may be taken concurrently).
Laboratory experiments on the properties and characteristics of light and radiation sources, including: fluorescent, gaseous vapor discharge, incandescent, ultraviolet and infrared sources; techniques for using special radiation measuring instruments such as radiometers, thermopiles, shape factor integrators, integrating spheres, photocells, and spectrophotometers.

142. Lighting Design. (2) II. Mr. Finch
Prerequisite: course 140; 141 recommended (may be taken concurrently).

160. Structure and Properties of Crystals. (4) I. Mr. Dorn, Mr. Pask
Three lectures and one laboratory period per week. Prerequisite: Chemistry 110A and Physics 121 (may be taken concurrently).
Relationships between atomic structure of the elements and crystal structure of elements and compounds; dependence of physical and chemical properties on structure and on crystal imperfections; laboratory measurement of solid state properties, with particular emphasis on X-ray diffraction techniques.

161. Elementary Mineral Economics. (2) II. Mr. Trask
Open to upper division and graduate students except those in ceramic, mining, petroleum or geological engineering, or metallurgy.
A survey of engineering aspects of mineral economics and water. Description of factors affecting supply and demand of mineral commodities, oil, and coal, with respect to occurrence, recovery processing, transportation, marketing, cost. Special emphasis on ground water, irrigation, water supply.

163. Physical Metallurgy. (2) I and II. Mr. Hultgren, Mr. Himmel
Prerequisite: Chemistry 1B, Physics 4B and 4C.
Relationships between microstructure, composition, heat and mechanical treatment, and physical properties of metals and alloys; the metallic state, phase diagrams and interpretation of microstructures from them; deformation and recrystallization of metals, metallography, and heat treatment of iron and steel.
163L. Physical Metallurgy Laboratory. (1) I and II.  
Mr. Himmel, Mr. Dorn  
Prerequisite: open only to students who have had or are enrolled in course 163.  
The laboratory part of course 163.

164. Plasticity and Metal Forming. (3) I.  
Mr. Dorn, Mr. Thomsen  
Prerequisite: Civil Engineering 130.  
The theory of plasticity and the plastic forming of metals.

165. Mechanical Metallurgy. (3) II.  
Mr. Dorn  
Prerequisite: courses 163 and 163L (or course 45).  
An analysis of the effects of structure on the mechanical properties of metals.

166. Metallurgy of Welding. (3) II.  
Mr. Hazlett  
Prerequisite: course 45.  
Metallurgical problems associated with welding. The influence of welding technique on the metallurgical structures and properties of welds. A study of the origin and effect of weld defects.

169. Petroleum Engineering—Short Course. (3) I.  
Mr. Somerton, Mr. Witherspoon  
Two lectures and one discussion and problem solution section per week.  
Prerequisite: upper division standing and consent of the instructor. Not open to petroleum engineering majors.  
Condensed study of the technologic and economic problems of the petroleum producing industry. Special study sessions will be arranged for the following three groups of students: (1) engineering, (2) earth sciences, (3) business administration and economics.

173. Noise Control. (3) II.  
Mr. Soroka  
Prerequisite: course 102 and course 103 or Mechanical Engineering 109.  

Graduate Courses

As a condition for enrollment in a graduate course, the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division courses basic to the subject of the graduate course, irrespective of the department in which such basic work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.

230. Engineering Analysis. (3) I.  
Mr. Schaal (in charge), Mr. Laitone  
Prerequisite: graduate standing in engineering or Mathematics 14B.  
Methods of theoretical analysis of typical engineering systems. Practice in setting up and solving engineering problems in heat transfer, fluid mechanics, electrical network, mechanical vibrations, and elasticity.

241. Radiation Sources: Ultraviolet, Visible, Infrared. (3) I.  
Mr. Finch  
Two lectures and one hour laboratory period per week. Prerequisite: course 140 and Physics 130.
Sources of ultraviolet, visible, infrared and thermal radiation considered from atomic and molecular excitation viewpoint. Luminescence, fluorescence, phosphorescence, and electroluminescence, as light-producing phenomena. Infrared and solar radiation calculations. Photoconductivity and photovoltaic effects. Laboratory experiments on the characteristics of light sources including fluorescence, gaseous discharge, incandescent and electroluminescent sources.

298. Group Studies or Seminars. (1-5) I and II. The Staff
Advanced study in engineering analysis. Topics to be selected each year will depend upon the availability of the staff and the interests of qualified students, and will be announced prior to each semester.

Courses characteristic of the various curricula offered by the College of Engineering are described under the several divisions of the department, as follows:

CIVIL ENGINEERING

UPPER DIVISION COURSES

The basic prerequisite for all upper division courses is satisfaction of the lower division requirements in an engineering program of study and completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

101. Elementary Photogrammetry. (3) I. Mr. Moffitt
Prerequisite: Engineering IB or 11, or consent of the instructor.
Geometry of single vertical photograph; stereoscopy and parallax measurement; principles of radial line plot; mosaics; oblique photographs. Laboratory includes flight planning, stereoscopic studies, topographic compilation by stereo-plotting, radial line plot, tilt determination, and orientation in multiplex.

102. Route Surveying. (3) I. Mr. J. H. Jones
Prerequisite: Engineering IB or 11.
Simple, compound, and transition curves, reconnaissance, preliminary and location surveys; calculations of earthwork and other quantities; field work.

105. Higher Surveying and Geodesy. (2) II. Mr. Moffitt
To be offered in even-numbered years.
Prerequisite: Engineering IB or 11.
Methods of geodetic surveying; adjustment of observations; geodetic positions; map projections.

107. Airphoto Analysis and Interpretation. (3) II. Mr. Moffitt
To be offered in odd-numbered years.
Prerequisite: senior standing in engineering or geology.
Principles of aerial photography and photogrammetry; the use of airphotos in identifying land forms, in locating transportation facilities, and in the interpretation of soil and drainage conditions for engineering works.

110. Engineering Materials Laboratory. (2) I and II. The Staff (Mr. Troxell in charge)
Prerequisite: Engineering 45; course 130 (may be taken concurrently).
Principles and methods of testing engineering materials. Physical tests of concrete, steel, and wood; proportioning and properties of concrete mixtures.
111. Materials Testing Laboratory. (1) I and II.  
The Staff (Mr. Kelly in charge)  
Prerequisite: for engineering students, course 130 (may be taken concurrently). For students in agricultural, mechanical, mining, geological, and petroleum engineering. Not open for credit to students who take course 112.  
Principles and methods of testing engineering materials. Physical tests of concrete, steel and wood.

112. Materials Testing Laboratory. (1) I and II.  
The Staff (Mr. Kelly in charge)  
Prerequisite: Engineering 18B. Not open for credit to students who take course 111.  
Principles and methods of testing engineering materials. Mechanical tests of concrete, steel, aluminum, and wood.

114. Soil Properties and Their Engineering Applications. (1) I and II.  
Mr. Seed  
Prerequisite: course 121 (may be taken concurrently). Selected experiments on physical and mechanical properties of soils and their application in design problems.

118. Asphalts and Asphaltic Mixtures. (1) I and II.  
Mr. Monismith  
Prerequisite: senior standing in civil engineering. Laboratory tests on asphalts and aggregates to determine suitability for use in paving mixtures. Design of asphaltic mixtures, including proportioning and preparation of specimens for tests to determine stability.

121. Soil and Foundation Engineering. (3) I and II.  
Mr. H. E. Davis (in charge), Mr. Seed  
Prerequisite: course 130; course 135 (may be taken concurrently). Lectures, discussions, and problems on physical and mechanical properties of soils; the supporting capacity of soils; lateral earth pressures on structures; piles and pile foundations; consideration in the design of substructures; cofferdams and caissons; construction problems in foundation engineering.

122. Soil Mechanics and Foundation Design. (2) I and II.  
Mr. Seed  
Prerequisite: course 121. Principles of foundation design; ultimate bearing capacity of soils; theory of consolidation and its application in predicting the settlement of structures; allowable bearing pressures; methods of minimizing settlements; effect of settlement on structures; stability of slopes; foundations on compacted fills.

125. Elements of Framed Structures. (2) I and II.  
Mr. McNiven, Mr. Bertero  
Prerequisite: Engineering 18A–18B. For students in architecture. Analytical and graphical stress analysis for framed structures.

126. Reinforced Concrete Design. (3) I and II.  
Mr. Troxell  
Prerequisite: senior standing and course 125, which may be taken concurrently. For students in architecture. Design of reinforced concrete buildings, including foundations and retaining walls.

127. Framed Structures. (3) I and II.  
Mr. Troxell  
Prerequisite: senior standing and courses 125, 126 (the latter may be taken concurrently). For students in architecture. Stress computations and design of structures in wood, steel, and reinforced concrete, particularly of buildings.
130. Mechanics of Materials. (3) I and II.
Prerequisite: Engineering 35. The Staff (Mr. Popov in charge)
Elastic and ultimate resistance of materials; stress and deformation analysis for bars, shafts, and beams; combined stresses; columns; elements of design for wood and metal members.

131. Structural Analysis. (3) I and II.
Prerequisite: course 130. Mr. Eberhart, Mr. Bouwkamp, Mr. Taylor
Analysis of determinate structures, including beams, frames, and roof and bridge trusses, by algebraic and graphical methods. Introduction to indeterminate structural analysis.

132. Elements of Mechanics of Materials. (2) I and II.
Prerequisite: Engineering 35. Open only to students in electrical engineering and to nonengineering majors.
Elastic and ultimate resistance of materials; stress and deformation analysis for bars, shafts, and beams; combined stresses; columns; vibration; energy methods.

133. Steel and Timber Design. (3) I and II. Mr. Bresler, Mr. Scheffey
Prerequisite: course 130.
Design of steel and timber structural components; structural connections, tension and compression members, and beams.

135. Reinforced Concrete Design. (3) I and II.
Prerequisite: course 130. Mr. Lin, Mr. Baron, Mr. Raphael
The analysis and design of reinforced concrete structures.

136. Analysis and Design of Bridges. (3) I and II. Mr. Scheffey
Prerequisite: courses 131, 133, 135.
Analysis and design of girder, truss, rigid frame, and continuous bridges, with special emphasis on highway bridges. Introduction to moment distribution and its application to analysis of bridges.

137. Analysis and Design of Buildings. (3) I and II. Mr. Baron
Prerequisite: courses 131, 133, 135.
Analysis and design of building structures under the action of vertical dead and live loads, and of wind and earthquake forces. Building code and structural requirements in connection with the use of timber, steel frame, reinforced concrete, and brick.

138. Analysis of Airplane Structures. (3) I and II. Mr. Clough
Prerequisite: course 131 (formerly 107A) or Mechanical Engineering 106 (formerly Engineering Design 106A).
Solution of typical stress analysis problems; load requirements; thin web beams; monocoque construction; plate stringer combinations; beam columns; space frames.

140. Water Supply Engineering. (3) I and II.
Prerequisite: Engineering 103. Mr. Pearson, Mr. Kaufman, Mr. Orlob
141. Sewerage Engineering. (3) I and II.
Mr. Orlob, Mr. Kaufman, Mr. Oswald, Mr. Pearson
Prerequisite: Engineering 103.
Hydraulic review of sewerage works; functional design of sanitary and storm sewer systems. Chemical and biological characteristics of sewage, and objectives of treatment. Analysis of unit operations and processes, functional design of treatment units. Stream pollution analysis. Solid waste disposal.

142. Sanitary Engineering Design. (2) II.
Mr. Orlob
Prerequisite: courses 140 and 141.
Functional engineering design for water purification and distribution and treatment of wastes; includes disposal or reclamation, facilities for aeration, flocculation, sedimentation, filtration, disinfection, aerobic and anaerobic decomposition, pumping, collection, and conveyance.

144. Principles of Sanitary Engineering. (3) II.
Mr. Oswald
Prerequisite: upper division standing in public health, science, or engineering.
An engineering approach to problems of municipal and rural water supply, sewerage, and waste collection and disposal.

145. Chemistry and Biology of Water Purification and Sewage Treatment. (2) I.
Mr. Thomas
Prerequisite: Chemistry 1A-1B.
The chemical and biological character of water and sewage; theory of water purification and sewage disposal processes.

146. Sanitary Chemistry Laboratory. (3) I and II.
Mr. Thomas
Prerequisite: Chemistry 1A-1B.
Chemical analysis of water and sewage and the laboratory control of purification and sewage treatment processes.

147. Sanitary Engineering Chemistry. (3) II.
Mr. Thomas
Prerequisite: Chemistry 1A-1B.
Lectures, demonstrations, and problems concerning the applications of organic chemistry and biological chemistry to water purification, sewage treatment, agricultural and industrial wastes, and sanitation of the industrial environment.

149. Municipal Engineering Services. (2) II.
Mr. Kennedy, Mr. McGauhey
Prerequisite: enrollment in a course in city and regional planning, or upper division or graduate standing in fields other than civil engineering, and consent of the instructor.
Study of engineering services from the point of view of planning, development, financing, and organization, with emphasis on the importance of engineering design as related to the comprehensive, long-range planning of urban communities.

159. Water Institutions and Economics. (2) II.
Mr. Todd
Prerequisite: senior standing.
Water rights, water users’ organizations, economics of water resources development, and public policies and laws relating to the use and conservation of water resources.

160. Hydrology. (2) I.
Mr. Todd
Prerequisite: course 140 (may be taken concurrently), Engineering 103.
Study of precipitation, evapotranspiration, stream flow and flood flow, and factors influencing the processes; ground-water flow and development; flood routing and forecasting; snow and snowmelt; and hydrometeorology.
161. **Hydraulic Laboratory.** (2) I and II.

Mr. Einstein (in charge), Mr. Harder, Mr. J. W. Johnson,

Prerequisite: Engineering 103.

Mr. Orlob

An introductory laboratory course which includes experiments on weirs, pipes and channels, spillways, hydraulic jump, model laws, turbines, pumps, and other hydraulic phenomena. Program largely optional.

166. **Advanced Hydraulics.** (3) I.

Mr. Einstein

Prerequisite: Engineering 103.

Nonuniform steady flow in open channels; open channel surges; flow in porous materials; hydraulic models and analogies; model laws.

167. **Hydraulic Engineering Design.** (3) II.

Mr. Orlob

(Formerly course 157.)

Prerequisite: Engineering 103, courses 161 and 140.

Principles of design of hydraulic structures including low dams, spillways, headworks, transitions, outlets, siphons, chutes, and energy dissipators. Applications of engineering economics to design. Consideration of seepage and uplift, flow nets, wells and drums, pumping and power generation, and other selected topics.

168. **Design of Open Channel Flow Systems.** (2) II.

Mr. Harder

(Formerly course 158.)

Prerequisite: course 166; course 167 (may be taken concurrently).

The over-all hydraulic design of open channel systems with emphasis on the selection of suitable structures and the economic evaluation of alternate plans. Will include occasional field inspection trips.

170. **Highway Engineering.** (3) I and II

Mr. Moyer, Mr. J. H. Jones

Prerequisite: Engineering 1B or 11, and Engineering 45; junior standing in engineering.

Highway planning, finance, location, design, economics, drainage, construction, and maintenance of highways, streets, and pavements.

171. **Introduction to Traffic Engineering.** (3) II.

Mr. Kennedy, Mr. Kell

Prerequisite: senior standing in engineering and course 170, which may be taken concurrently.

Street and highway traffic problems; principles of design of thoroughfares on the basis of operational characteristics; traffic regulation and control.

179. **Traffic Engineering for Police.** (2) II.

Mr. Kennedy, Mr. Homburger

Prerequisite: Upper division standing and one course in statistics or consent of the instructor. For majors in police administration and public administration.

Engineering studies of traffic volumes, speeds, parking and accidents, and analysis of data in applying traffic signs, signals, and markings, and other traffic regulations. Driver behavior and limitations. Characteristics of vehicle operations.

180. **Concrete Construction.** (2) I.

Mr. Kelly

(Formerly Structural Engineering 280.)

Lectures and seminars. Consideration of broad aspects of concrete construction; technical requirements; selection of materials; control of quality; practices in the construction of dams, highways, airfields, canals, bridges, buildings, hydraulic structures.

181. **Engineering Construction.** (3) I and II.

Prerequisite: senior standing in engineering.

A study of the construction industry: its development, components, eco-
nomic importance; fundamental principles that underlie construction prac­
tices, methods and equipment, their application and limitations; economic
factors involved in planning, organizing, and operating a construction force.

190. Engineering Reports. (2) II. Mr. Kelly
Prerequisite: junior standing in civil engineering.
Application of written and oral expression to the preparation of technical
reports and articles.

191. Engineering Relations: Contracts and Specifications. (2) I and II.
(Formerly numbered 116.) Mr. Horonjeff, ———
Prerequisite: senior standing in civil engineering.
Professional duties and privileges; principles of business law; preparation
of contracts and contract documents, including specifications and drawings.

198. Directed Group Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. Eberhart in charge)
Prerequisite: senior standing in engineering.
Group study of a selected topic or topics in civil engineering.

199. Individual Study and Research for Advanced Undergraduates.
(1–5) I and II. The Staff (Mr. Eberhart in charge)
Enrollment limited to senior students in engineering whose scholastic
records show a scholarship average of grade B or higher or whose records
indicate a capacity for independent study.
Individual study and/or investigation of a subject in civil engineering in
which the student has a special interest.

GRADUATE COURSES

As a condition for enrollment in a graduate course the student must submit
to the instructor in charge of the course satisfactory evidence of prepara­
tion for the work proposed; adequate preparation will consist normally of
the completion of at least 12 units of upper division courses basic to the
subject of the graduate course, irrespective of the department in which such
basic work may have been completed. The admission of undergraduates to
graduate courses is limited to seniors who have an average scholarship of not
lower than B in the basic courses.

Note: The graduate programs of study which are administered through
the Department of Civil Engineering comprise major programs under the super­
intendence of the three operational divisions of the department (Hydraulic-
Sanitary, Structural Engineering and Structural Mechanics, and Transpor­
tation), together with programs in certain areas of specialization which
are administered by the department such as Soil Mechanics and Photogram­
metry. Courses relating to the latter programs are listed under Civil Engi­
neering—General.

Hydraulic and Sanitary Engineering
and
Water Resources Engineering

203. Ground Water Hydrology. (3) I. Mr. Todd
(Formerly Hydraulic-Sanitary 203.)
Prerequisite: course 160.
Elements of ground-water occurrence, flow, quality, conservation, and basin
development. Water-well construction, development and hydraulics. Legal
considerations.
204. Surface Water Hydrology. (3) II.  Mr. Todd
(Formerly Hydraulic-Sanitary 204.)
Prerequisite: course 160.
Determination of design floods, hydrometeorological analysis, unitgraphs, channel and reservoir routing, flood control methods, river and flood forecasting, snowmelt runoff analysis, and artificial precipitation.

205. River-Harbor Hydraulics. (3) I.  Mr. Einstein, Mr. J. W. Johnson
(Formerly Hydraulic-Sanitary 205.)
Prerequisite: Engineering 103; course 166 desirable (may be taken concurrently).
Turbulence in open channel flow; nonsteady channel flow; tidal flow, surface wave systems; wave forces; design of hydraulic structures.

206. Sediment Transport. (3) II.  Mr. Einstein
(Formerly Hydraulic-Sanitary 206.)
Lectures and laboratory. Prerequisite: course 166.
Definition and description of sediment, its different types of motion. Mathematical relationships between sediment motion and flow. Design and management of rivers and reservoirs with respect to sediment load.

207. Advanced Hydraulic Design. (2) I.  Mr. Harder
(Formerly Hydraulic-Sanitary 221.)
Prerequisite: course 156 and either course 167 (formerly course 157) or course 168 (formerly course 158).
Design of diversion works, distribution systems, special hydraulic structures.

208. Advanced Hydraulic-Structures Laboratory. (2) II.  Mr. J. W. Johnson
(Formerly Hydraulic-Sanitary 220.)
Prerequisite: course 166 or 205.
Advanced problems, including experimental investigations of hydraulic model laws; experimental hydraulic structures, river and harbor models; studies of flood waves, oscillatory waves, beach erosion and protection, sediment transportation, energy dissipation.

211A–211B. Water and Sewage Treatment; Theory and Design. (3–3) Yr.  Mr. McGauhey
(Formerly Hydraulic-Sanitary 250A–250B.)
Prerequisite: course 140, 141, and 146, which may be taken concurrently.
Theory and design of elements of systems for water supply, water purification, sewage treatment and disposal.

213. Advanced Sanitary Chemistry. (2) I.  Mr. Thomas
(Formerly Hydraulic-Sanitary 260.)
Prerequisite: course 146.
Theory and application of advanced chemical instrumentation to the analysis of water and waste, domestic and industrial, including atmospheric pollutants. Particular consideration is given to the application of spectrophotometric, chromatographic, electrometric, and radiochemical equipment and techniques.

215. Advanced Sanitary Engineering Laboratory. (2) II.  Mr. Pearson
(Formerly Hydraulic-Sanitary 251.)
Lectures and laboratory. Prerequisite: course 145 or 211A.
Studies on the following unit processes of water and sewage treatment: rapid sand filtration, sedimentation, break-point chlorination, chemical treatment of industrial wastes, sludge digestion, sludge gas analysis, sludge conditioning and filtration, plant efficiency studies and special topics.
216. Industrial and Agricultural Waste Treatment. (2) II. Mr. Pearson
   (Formerly Hydraulic-Sanitary 261.)
   Prerequisite: course 211A or consent of the instructor.
   Studies of the wastes from industrial and agricultural processes that may
   be detrimental to watercourses, water supplies, sewerage systems, or the
   atmosphere; principles and methods of disposal and treatment of important
   wastes and municipal refuse.

218. Atmospheric Pollution. (3) I. Mr. Tebbens
   (Formerly Hydraulic-Sanitary 270.)
   Prerequisite: course 146.
   Study of air pollution by gases, fumes, vapors and dusts; nature of pol­
   luting materials, and relation of atmospheric conditions to their dispersal;
   methods of air analysis, standards of and control of pollution, and adminis­
   trative problems.

Structural Engineering and Structural Mechanics

220. Advanced Structural Analysis and Design. (3) I. Mr. Scordelis
   Lectures and computations in the analysis of statically indeterminate struc­
   tures by moment distribution, column analogy, and other methods; design
   of building frames for wind and earthquake loadings.

221. Experimental Structural and Stress Analysis. (3) I.
   (Formerly Structural Engineering 221.)
   Lectures and laboratory in the principal experimental methods used for
   structural and stress analysis, including similitude and loaded models, elastic
   line models, mechanical and electrical strain gauging, stress coat analysis,
   analogy methods, and photoelasticity.

230A–230B. Advanced Mechanics of Materials. (3–3) Yr. Mr. Popov
   (Formerly Structural Engineering 230A–230B.)
   Course 230A not prerequisite to 230B.
   Failure theories; inelastic bending; limit design; thick-walled cylinders;
   torsion of noncircular elements; design for fluctuating and sustained loads;
   application of theory of elasticity to some complex states of stress; curved
   bars; elastic stability; plates; beams on elastic foundations.

231. Dynamics of Structures. (3) II. Mr. Clough
   (Formerly Structural Engineering 231.)
   Prerequisite: course 137, and Engineering 102.
   Analysis of stresses and deflections in structures due to the application of
   dynamic loads. Approximate and "exact" methods for determining the re­
   sponse of buildings, bridges, frames to earthquake accelerations, wind gusts,
   moving loads, and bomb blasts.

234. Advanced Reinforced Concrete. (3) I. Mr. Lin, Mr. Bresler, Mr. Scordelis
   Study of shrinkage and plastic flow, elastic and ultimate design of beams,
   columns, footings, and slabs, unsymmetrical bending, eccentric loads, de­
   flections, torsion, prismatic and cylindrical shells, prestressed concrete simple
   and continuous beams, and circular tanks.

235. Analysis and Design of Masonry Dams. (3) II. Mr. Raphael
   (Formerly Structural Engineering 235.)
   Prerequisite: course 140.
   Lecture and design course. Selection of location and type; stability
   analysis, stress analysis of gravity, arch, multiple-arch, dome, and slab­
   buttress dams; problems imposed by construction conditions and use of
   mass concrete.
236. Advanced Bridge Design. (3) I. Mr. Lin, Mr. Scheffey
(Formerly Structural Engineering 236.)
Prerequisite: course 136.
Design and analysis of advanced bridge structures; bridge approaches; bridge substructures; bridge layouts; bridge economics; bridge specifications; special design problems.

Transportation Engineering

250. Analysis of Transportation Systems. (6) I.
The Staff (Mr. Kennedy in charge)
(Formerly Transportation Engineering 201 and 210.) Prerequisite: course 170, Engineering 120, Statistics 130E.
Analysis of the function, influence, characteristics, and operation of transportation facilities and systems; comprehensive advanced study of transportation problems influencing planning and design, as affected by public policy, finance, and organization and management.

251. Advanced Highway Design. (3) II. Mr. Moyer
(Formerly Transportation Engineering 202.)
An advanced study of the location and design of various types and classes of highways. Emphasis is placed on advanced theory and practice in the design of alignment; highway cross sections, intersections, interchanges, multilane expressways and arterial highways in urban areas.

255. Traffic Engineering: Operations. (3) II. Mr. Kennedy
(Formerly Transportation Engineering 211.)
Theory and practical application of street and highway traffic engineering restrictions and uniform traffic control devices. Parking control and public transit planning. Traffic engineering administration.

255L. Traffic Engineering Laboratory. (1) II. Mr. Kennedy
(Formerly Transportation Engineering 210L.) Prerequisite: course 250 (may be taken concurrently.)
Field and laboratory practice in making traffic engineering investigations and analysis of data. Vehicle performance.

260. Airport Engineering. (3) II. Mr. Horonjeff
(Formerly Transportation Engineering 270.) Prerequisite: graduate standing in engineering, except when special provision is made for students in certain programs of study.
Survey of the functions of government agencies in airport planning and the financing of public airports; evaluation of community airport requirements; factors covering the selection of airport sites; air traffic control and its effect on airport design; airport design requirements with respect to runways, taxiways, terminal area, drainage, and lighting.

265. Highway and Airport Pavements. (3) I. Mr. Horonjeff
(Formerly Transportation Engineering 220.)
An advanced study of the theories, principles, and practices in the design, construction, and maintenance of highway and airport pavements, including soil stabilization, design of rigid and flexible pavements, accelerated traffic and loading tests, and the design of asphaltic mixtures.

General Courses

270. Advanced Soil Mechanics. (2) II. Mr. Seed
(Formerly course 208.)
Prerequisite: course 121 and 122 or equivalent.
Advanced theories of soil mechanics including, among others, considera-
tions of pore-water pressures in earth masses, shear strength of cohesive soil, applicability of the various methods of slope stability analysis to practical problems, the analysis of pile foundations and the design of bulkheads.

271. Seepage and Earth Dams. (2) II. Mr. Seed
(Formerly course 209.)
The principles governing the flow of water through soils and their application in the design of earth dams.

298. Group Studies, Seminars, or Group Research. (1–5) I and II.
The Staff (Mr. Eberhart in charge)
Advanced study in various subjects related to civil engineering, through special seminars on topics to be selected each year, informal group studies of special problems, group participation in comprehensive design problems, or group research on complex problems for analysis and experimentation. The general areas in which studies may be undertaken include: engineering materials; structural mechanics and structural engineering; soil mechanics and foundation engineering; hydrology, fluid mechanics and hydraulic engineering; engineering biology and biochemistry and sanitary engineering; photogrammetric and geodetic engineering; engineering management and construction; transportation and traffic engineering. Examples of topics which have been studied in recent years include theory of thin shells; bending and buckling of thin plates; beams on elastic foundations; sanitary engineering project design; supplementary control surveys for photogrammetry; water resources, quality and pollution; air sanitation; urban transportation planning, highway finance, air transport policy and analysis.
The studies specifically undertaken in any particular session depend upon the availability of staff and the interests of qualified students. Announcements are made prior to each semester of topics concerning which seminars will be organized.

299. Individual Study or Research. (1–5) I and II.
The Staff (Mr. Eberhart in charge)
Investigation of selected advanced civil engineering subjects.

Graduate Seminars. (No credit) I and II.
The Staff
Meetings of the staff and graduate students for discussion of current developments and research in various fields of civil engineering and irrigation. Seminars scheduled in each of the following groups: hydraulics, irrigation, and sanitary engineering, and structures (including materials and soil mechanics).

ELECTRICAL ENGINEERING

Upper Division Courses

The basic prerequisite for all upper division courses is satisfaction of lower division requirements in an engineering program of study and completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

100A–100B. Electrical Circuits and Machinery. (4–4) Yr. Beginning each semester.
The Staff (Mr. Robertson in charge)
Prerequisite: Mathematics 14A or 4A–4B; Physics 4B. Not for students in electrical engineering.
Voltage generation; circuit constants; electrical instruments; single-phase and polyphase circuit analysis; single-phase transformers; electrical machinery (synchronous, induction, direct-current, and single-phase machines)
discussed primarily from the physics of performance; electronic tubes and
their associated circuits; practical engineering problems; associated labora-
tory experiments.

101. Electrical Engineering. (3) I and II. Mr. Sloan (in charge)
Prerequisite: Mathematics 4A, Physics 4B. Open to engineering students
not registered in agricultural, electrical, industrial, or mechanical engineer-
ning.

Electric power generation, transmission, distribution, and utilization.

102. Electrical Engineering Laboratory. (1) I and II.
One three-hour period per week to be arranged. Sections limited to fifteen
students. Prerequisite: course 101 (should be taken concurrently if possible).
Experiments designed to illustrate electrical theory and afford practice
in the operation of electrical equipment. Designed to accompany, and sup-
plement course 101.

103A-103B. Nuclear Accelerators. (2-2) Yr. Beginning each semester.
Mr. Woodyard
Prerequisite: course 100B or 106 or 109B or Physics 110B or 121 (may
be taken concurrently). Course 103A is normally prerequisite to 103B. Quali-
fied students may enroll in 103B without 103A with consent of instructor.
Theory, design, and applications of modern electronuclear machines such as
d-c accelerators, betatrons, r-f linear accelerators, cyclotrons, synchrotons,
and strong-focusing machines; recent developments; ion sources and vacuum
systems, lectures and demonstrations supplemented by visits to nearby nu-
clear laboratories.

106. Basic Electronics. (4) II. Mr. Woodyard
Prerequisite: course 100A or 101 or Physics 110A or 121. Not for students
majoring in electrical engineering.

Motion of charges in electromagnetic fields; electron energy levels in solids;
semiconductors; electron emission; vacuum tubes and transistors; equiva-
lent circuits; rectifiers and amplifiers; nonlinear circuits and distortion.

The Staff (Mr. Morton in charge)
Four lectures, one three-hour design problem session, and two three-hour
laboratory periods per week. Prerequisite: Mathematics 14B, Physics 4B.
Electric circuits and circuit analysis; analytical, graphical, and experi-
mental studies of circuits carrying direct, alternating, and transient cur-
rents. Magnetic circuits and materials, with applications to inductors and
transformers. Electronic and electromagnetic effects and devices.

111A-111B. Electrical Machinery. (3-3) Yr.
Mr. Bourne (in charge), Mr. Dalziel, Mr. Huelsman, Mr. Smith
111A: I and II.
111B: II.
Prerequisite: course 109B, Mechanical Engineering 100.
111A. The fundamental theory of the exploitation of nonlinear and linear
ferromagnetic materials to produce power modulation, amplification, and
energy conversion in static and rotating devices.
111B. The study of the dynamic and steady-state characteristics of ro-
tating electromechanical devices including the direct-current machine, the
induction machine, the synchronous machine, the Amplidyne, and other
specialized machines.
112A-112B. Energy Conversion in Electrical Systems. (5-4) Yr.  
Mr. Saunders  
Prerequisite: course 119 (may be taken concurrently) and Mechanical Engineering 100.  
Dynamic and steady-state specifications for electrical systems and the satisfaction thereof; analysis of nonlinear systems containing stationary power modulators and electromechanical energy converters.

114A-114B. Energy Transmission. (4-4) Yr.  
Mr. Dalziel, Mr. Bourne  
Prerequisite: course 109A-109B.  
A study of distributed-constant transmission lines with emphasis on energy transmission. A study of transient and steady-state behavior of energy transmission and generation systems, including steady-state and transient stability, system protection, and reactive power requirements.

Beginning each semester.  
Mr. Whinnery (in charge), Mr. Angelakos, Mr. Bridges, Mr. Scott, Mr. Silver, Mr. Thomasian  
Prerequisite: courses 106 or 109B.  
116A. Simple communication systems; frequency analysis of idealized channels; tuned and coupled circuits; r-f amplifiers; power amplifiers; feedback and oscillations; amplitude and angular modulation.  
116B. Microwave amplifiers; radiation and propagation; noise and generalized modulation systems; system calculations; introduction to information theory.

117A-117B. Electromagnetic Fields and Waves. (3-3) Yr.  
Mr. Angelakos, Mr. Rumsey, Mr. Scott, Mr. Susskind  
Prerequisite: courses 109B or 106.  
The mathematics of vector fields, static electric and magnetic fields. Maxwell’s equations. Applications to problems in wave propagation, skin effect, waveguides and cavity resonators, electromagnetic radiation, and ultra-high-frequency techniques.

119. Linear Systems Analysis. (3) I and II.  
Mr. Pederson (in charge), Mr. Desoer, Mr. Hopkin, Mr. Kuh, Mr. Robertson, Mr. O. J. M. Smith  
Prerequisite: course 109A-109B.  
Linear electrical, electromechanical and mechanical systems. System behavior from equilibrium equations, classical methods, and LaPlace transform techniques. Analysis of communication and control systems in time and frequency domains by the application of complex variable theory and pole-zero concepts. Signal flow analysis.

123. Communication Circuits. (3) I.  
Mr. Pederson, Mr. Kuh  
Prerequisite: course 119.  
The properties of lumped element communication circuits and their network functions; the development of synthesis methods and techniques for filters, filter amplifiers, equalizers, etc.; the analysis of communication transmission lines and the design of transmission line filters and matching networks.

125. Principles of Electronic Circuits. (3) I and II.  
Mr. Pederson  
Prerequisite: course 109B, not open to those taking course 116A.  
Transistor and vacuum-tube equivalent circuits, analysis and design of linear low-pass, band-pass and feedback amplifiers; power amplifiers; the
utilization of nonlinear operation for modulation, demodulation and harmonic and relaxation oscillators; discrete state circuit (e.g., multivibrator) operation and analysis.

126. Physical Electronics. (4) I. Mr. Woodyard
Three lectures and one three-hour laboratory period per week. Prerequisite: course 106 or 109B, or Physics 110B or 121.
Basic principles and theory underlying scientific and industrial applications of electronics. Wave properties of the electron, relativistic electron ballistics, kinetic theory of gases, conduction in vacuum and gases, electronic and nuclear magnetic resonance, X rays, electromagnetic heating, electron microscopes, vacuum systems.

127. Elemental Control. (1) I. Mr. Hopkin (in charge), Mr. O. J. M. Smith
One three-hour laboratory period per week. Prerequisite: course 119 (to be taken concurrently). Credit will not be given for both 127 and 112A.
Analysis, testing, construction and operation of open-loop control systems and system components. Control system dynamics, motor controllers, transducers, output members, relays, switching circuits and networks.

128. Feedback Control. (4) II. Mr. Hopkin, Mr. Smith
Three lectures and one three-hour laboratory period per week. Prerequisite: courses 111A (may be taken concurrently) or 100B; 119; Mechanical Engineering 100 or Engineering 102; course 127 or 112A recommended.
The principles of analysis, synthesis, construction, and operation of closed-loop control systems, including steady-state and transient theory, stability criteria, and performance design factors. Illustrations from various engineering fields, with emphasis on electromechanical systems.

130. Electrical Engineering Materials. (2) II. Mr. English
Prerequisite: Physics 121.
The properties of solid-state materials of particular importance in electrical engineering devices leading from an atomic and structural foundation to the parameters of interest in applications. Ferromagnetic materials, conducting materials (metals, semiconductors, insulators) and dielectric and ferroelectric materials.

132A-132B. Electrical Communications Laboratory. (2–2) I and II. Mr. Everhart, Mr. Angelakos
132A: I and II.
Prerequisite: 132A: course 116A (may be taken concurrently). 132B: courses 132A, 117A or 119; 116B and 117B or 123 to be taken concurrently.
Experiments illustrating the fundamental principles involved in the operation of communication circuits and electronic devices. Particular consideration is given to the special methods of measurement, and special techniques, which must be employed at high frequencies.

133A. Power Modulator Laboratory. (2) I and II. The Staff (Mr. Bourne in charge)
Prerequisite: course 111A (may be taken concurrently with 133A).
Selected experiments on magnetic amplifiers and rotating electric machinery, designed to illustrate the theory and recent developments in power modulators.

133B. Advanced Electrical Machinery Laboratory. (2) II. The Staff (Mr. Dalziel in charge)
Prerequisite: courses 133A, 111B (may be taken concurrently).
Advanced experiments on a-c and d-c machinery.
151A-151B. Switching and Computing Circuits. (3-3) Yr.

Mr. Singer, Mr. Morton

Two lectures and one three-hour laboratory period per week. Prerequisite: course 106 or 109B.

The functional and electrical design of switching circuits. Techniques and circuit components for digital information. Applications in high-speed digital computers and in industrial control.

152. Digital Computers. (3) II.

Prerequisite: course 151A.

Mr. Huskey

System design with emphasis on data processing systems. Logical properties of computer components. Logical design features of automatic calculators, digital differential analyzers, and large-scale digital systems.

198. Directed Group Studies for Advanced Undergraduates. (1-5) I and II.

The Staff (Mr. Whinnery in charge)

Prerequisite: course 109B; additional requirements may be specified by the instructor in each group.

Group study of selected topics in electrical engineering, usually related to new developments.

199. Individual Study and Research for Advanced Undergraduates. (1-5)

I and II. The Staff (Mr. Whinnery in charge)

Prerequisite: course 109B. Enrollment limited to senior students in engineering whose scholastic records show a scholarship average of B or higher or whose records indicate a capacity for independent study. Enrollment is subject to additional requirements imposed by the instructor concerned.

Individual study and/or research on a problem chosen by the student and carried out under guidance of an instructor.

Graduate Courses

As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division courses basic to the subject of the graduate course, irrespective of the department in which such basic work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.

205. Electron Optics and Beam Dynamics. (3) II.

Mr. Süsskind

Prerequisite: courses 116A, 117A or Physics 110A; Mathematics 122 recommended.

Principles of the motion of electrons and streams of electrons; their production and control; application to theory of vacuum tubes such as velocity-modulated and cross-field tubes, cathode-ray and storage tubes, electron microscopes, and other electron-beam devices.

206. Theory of High Frequency Tubes. (3) I.

Mr. Whinnery

Prerequisite: course 117A-117B or Physics 110A-110B.

A study of the interchange of energy between electromagnetic fields and various electron streams operating under transit-time conditions, with applications to the theory of space-charge-controlled tubes, velocity-modulation tubes, magnetrons, and traveling wave tubes.

210A-210B. Applied Electromagnetic Theory. (3-3) Yr.

Mr. Rumsey

Prerequisite: course 117A-117B or Physics 110A-110B.

211. Electrical Machinery. (3) I. Mr. Saunders
Generalized analysis of machines used for energy control and conversion. Application of the methods of analysis to systems containing electrical machinery.

212A-212B. Nonlinear Magnetic Circuits. (3-3) Yr. Mr. Bourne
Generalized approach to circuits containing magnetic cores with nonlinear, multivalued characteristics; methods for the dynamic representation of nonlinear system components; saturable reactor and magnetic amplifier theory; magnetic amplifier circuitry; practical applications of advanced magnetics in open-loop and feedback control systems. Offered in even-numbered years.

216. Microwave Antennas. (3) II. Mr. Angelakos
Prerequisite: course 117A-117B.
Application of Maxwell's equations to transmission, propagation, and reception of radio waves.

217. Microwave Networks. (3) II. Mr. Whinnery
Prerequisite: course 117A-117B or Physics 110A-110B.
Study of the application of network theory, including the general theorems, the methods of analysis, and the measurement techniques, to microwave guides, cavity resonators, coupling systems and networks of these components.

220. Electro-Acoustics. (3) II. Mr. Black
(Formerly numbered 220A-220B.)
Prerequisite: recommended, course 117A-117B or 123.
Analysis of vibrating systems; principles and apparatus involved in the production, propagation, measurement, and reception of sound.

222. Operational Analysis of Systems. (3) I and II. Mr. Desoer
Prerequisite: course 119 and Mathematics 185 (may be taken concurrently).
Application of operational methods of circuit analysis, including Laplace transform and its extension, the Z-transform, to systems having lumped and distributed parameters, and to sampled systems.

223A–223B. Network Theory. (3-3) Yr. Mr. Kuh
Prerequisite: course 123, and Mathematics 185, the latter may be taken concurrently.
223A. Network equations and energy relations; properties of driving point and transfer functions; relations between real and imaginary parts of network functions; canonical realization of LC, RC and RL networks.
223B. Synthesis of driving point and transfer functions; realization methods of Brune, Bode and Darlington; approximation in the frequency domain, the potential analog and generalized Fourier series methods; time domain synthesis.

227. Linear Feedback Control Systems. (3) I. Mr. Hopkin
Prerequisite: course 128, Mathematics 185, and course 222 (may be taken concurrently).
Design of linear feedback control systems, considering stability, power requirements and response speed. Relations between Laplace transform, time domain, frequency response and root loci methods. Optimization with restrictions, statistical analysis, synthesis, and system specifications. Realizability. Comparison or performance criteria.

228. Sampled-Data Control Systems. (3) II. Mr. Bergen
Prerequisite: course 222.
Analysis, synthesis, and critical study of sampled-data control systems.
General application of the Z-transform method to sampled-data problems. Study of digital computers in feedback control problems.

229. **Nonlinear Feedback Control Systems.** (3) II. Mr. Hopkin
Prerequisite: course 128.
Analysis and design of nonlinear feedback control systems: systems with unavoidable nonlinearities; systems with nonlinearities deliberately introduced to improve performance. Phase space and frequency response methods. Nonlinear transformations and decision functions. Carrier systems.

230A–230B. **Solid-State Electronics.** (3–3) Yr. Mr. English
Prerequisite: Physics 121.
Study of relations between the electrical, magnetic and radiation properties of solid-state electronic devices and the basic science of the solid state. Typical subjects include semiconductors (rectifiers, transistors, photodevices), ferrites, phosphors (electroluminescence), with emphasis on recent research.

240. **Nonlinear Active Circuits.** (3) I. Mr. Pederson
Prerequisite: course 119.
Thermionic and semiconductor electronics; active device electrical description and equivalent circuits; piecewise linear analysis techniques and determination of optimum or limiting performance, application to electron tube and transistor switching, sweep and relaxation circuits; nonlinear amplifier and oscillator analysis.

241. **Linear Active Circuits.** (3) II. Mr. Pederson
Prerequisite: course 123.
Application and extension of passive network theory to the analysis and synthesis of linear active circuits; potential instability; fundamental limitations and optimum performance of cascaded and feedback amplifiers; active circuit noise and minimal noise circuits; application to electron tube and transistor circuits.

251A–251B. **Digital Computer Systems.** (3–3) Yr. Mr. Singer
Prerequisite: course 151A–151B.
Design of digital systems, including over-all planning, combination of functional elements, design of electric circuitry, and planning of tests and check procedures. Analysis and synthesis of switching networks, using adaptations of symbolic logic. Design examples, tests, and demonstrations.

*252A–252B. **Applications and Programming of Digital Computers.** (2–2) Yr. Mr. Huskey
Prerequisite: course 152A–152B.
Study of types available, order codes, and checking procedures. Preparation and use of subroutine libraries. Logical design of computers.

260. **Stochastic Processes in Electrical Engineering.** (3) II. Mr. Thomasion
Prerequisite: course 116A; Statistics 134 or 202A.
Continuous random processes; spectral analysis; theory of optimum linear systems and nonlinear devices with random inputs; entropy, channel capacity, and coding in information theory; statistical detection of signals. Applications in noise and control theory. Special topics.

298. **Group Studies, Seminars, or Group Research.** (1–5) I and II.
The Staff (Mr. Whinnery in charge)
Prerequisite: specific preparation as determined by the instructor in each group.

* Not to be given, 1959–1960.
Advanced group study in electrical engineering; topics vary from year to year. May consist of organized lectures or seminar discussions, devoted chiefly to the research area in which the group is working. Sections planned for 1959–1960 are: Antennas and Radiation (I and II, Rumsey); Electron Optics (II, Süsskind); High-Frequency Tubes (I and II, Whinnery); Direct Synthesis of Control Systems (I and II, Bergen, Zadeh).

299. Individual Study or Research. (1–5) I and II.
   The Staff (Mr. Whinnery in charge)
   Investigation of advanced electrical engineering problems.

INDUSTRIAL ENGINEERING

UPPER DIVISION COURSES

The basic prerequisite for all upper division courses is satisfaction of lower division requirements in an engineering program of study and completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

141. Introduction to Industrial Engineering. (1) I.
   Mr. DeGarmo (in charge), Mr. L. E. Davis, Mr. Grassi
   Prerequisite: junior standing. Open only to those registered in industrial engineering.
   Introduction to the historical development of industrial engineering; literature in the field; relationship of the field to other phases of industry; important contributors to the field; current problems, professional organizations.

142. Methods and Standards. (4) II.
   Mr. L. E. Davis, Mr. Redman
   Three lectures and one three-hour laboratory period per week. Prerequisite: Engineering 101, course 141, Statistics 130E (may be taken concurrently). Not open to students who have completed course 143.
   Principles of process, methods and work flow analysis and design, job design, human engineering, equipment layout, work simplification, productivity improvement programs; principles of work measurement, performance standards, incentives and rewards, administration of methods and standards programs.

143. Motion and Time Study. (3) I.
   Mr. L. E. Davis, Mr. Redman
   Prerequisite: Engineering 100, or 101, or consent of the instructor; Business Administration 140 (may be taken concurrently); Statistics 130E recommended. Not open to students who have completed course 142.
   Principles of motion economy; study of hand motions and their simplification through the use of process charts, micromotion analysis, and workplace design; equipment layout; theory and practice of time study, rating of worker performance, and standard data theory.

146. Wage and Incentive Systems. (3) I and II.
   Mr. Keachie
   Prerequisite: course 142 or 143; Business Administration 140 (may be taken concurrently).
   Design and administration of wage and incentive systems for various industrial conditions; job evaluation and analysis; motivation and morale; incentives for indirect workers; effects of automation, governmental regulations, and guaranteed annual wages; labor union attitudes; relationship to various industrial engineering activities.
148. Planning and Layout of Manufacturing Facilities. (2) II.
Mr. Grassi (in charge), Mr. Lapsley, Mr. Keachie

One lecture and one three-hour laboratory period per week. Prerequisite: courses 151, 142, Business Administration 140, Engineering 120 (may be taken concurrently).

Principles involved in the design and operation of production facilities; product analysis, plant location, plant services, equipment selection, plant design, personnel factors.

149. Industrial Engineering Project. (1) II.
Mr. Grassi, Mr. L. E. Davis, Mr. Keachie, Mr. Redman

Prerequisite: courses 142, 151, 148 (may be taken concurrently).

In-plant projects dealing with various phases of industrial engineering; individual projects selected by the students; written and oral reports and discussions of the results.

151. Manufacturing, Planning, and Control. (5) I.
Mr. Lapsley (in charge), Mr. Grassi, Mr. Thomsen

Three lectures and six hours of laboratory per week. Prerequisite: course 142, Engineering 101, Mechanical Engineering 106A.

Consideration of the design and operation of manufacturing facilities; process selection; operation and capacity determination; production planning, scheduling, and control; design of manufacturing adjuncts of gages, jigs and fixtures, press dies, and tooling of production-type machines.

152. Principles of Metal Casting. (3) II.
Mr. Campbell

Two lectures and one three-hour laboratory period per week. Prerequisite: Engineering 45, 101, or the equivalent.

Casting of metals; methods of providing molds and patterns; gating; solidification; finishing and inspection of castings; source and elimination of defects; melting; design limitations.

161. Industrial Systems Analysis and Operations Research. (3) I and II.
Mr. Shephard, Mr. Cumming

Prerequisite: Statistics 130E, Mathematics 14A-14B or the consent of the instructor.

Introduction to the methods of analysis for the efficient allocation and control of resources in the design and operation of production systems—with illustrative examples of application of the methods.

198. Directed Group Studies for Undergraduates. (1-5) I and II.
The Staff (Mr. DeGarmo in charge)

Prerequisite: upper division standing in engineering.
Group studies of selected topics which vary from year to year.

199. Individual Study and Research for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. DeGarmo in charge)

Enrollment limited to senior students in engineering whose scholastic records show a scholarship average of grade B or higher or whose records indicate a capacity for independent study. Enrollment is subject to approval of the instructor concerned.

Individual study and/or research in a problem chosen by the student and carried out under guidance of an instructor.

**Graduate Courses**

As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the
Industrial Engineering; Mechanical Engineering

completion of at least 12 units of upper division courses basic to the subject of the graduate course, irrespective of the department in which such basic work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.

243. Advanced Motion and Time Study. (3) I. Mr. L. E. Davis, Mr. Redman

Prerequisite: courses 142 or 143, 146, Statistics 130E.
A continuation on an advanced level of the subject matter presented in courses 142 and 143; presentation of complex problems of production measurements and methods development; introduction to research techniques in development of fundamental data.

245. Advanced Metal Cutting. (3) II. Mr. Thomsen

Prerequisite: course 151 or the equivalent.
Theoretical aspects of metal cutting. Chip formation; selection and use of cutting tools; machinability and tool life; heat transfer problems and selection of cutting fluids. Tooling of screw machines. Relation of dimensional control to interchangeable manufacturing.

261. Advanced Topics in Industrial Systems Analysis and Operations Research. (3) I. Mr. Shephard

Prerequisite: course 161, Statistics 130E.
Advanced study of problems relating to decision processes; nonlinear and dynamic programming, replacement theory, organization theory and group dynamics, cost and production functions and digital computer simulation, analysis of complex industrial systems.

290. Industrial Engineering Seminar. (3) II. Mr. DeGarmo

Prerequisite: graduate standing in industrial engineering.
A study of past and current factors which contribute to policy-level problems and decisions in industrial engineering practice; case studies of problems arising from industrial engineering practice; current issues.

298. Group Studies, Seminars, or Group Research. (1-5) I and II.
The Staff (Mr. DeGarmo in charge)
Advanced group studies in various fields of industrial engineering on topics which vary from year to year.

299. Individual Study or Research. (1-5) I and II.
The Staff (Mr. DeGarmo in charge)
Individual investigation of advanced industrial engineering problems.

MECHANICAL ENGINEERING

UPPER DIVISION COURSES

The basic prerequisite for all upper division courses is satisfaction of lower division requirements in an engineering program of study and completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

100. Introduction to Dynamics. (2) I and II. Mr. Cunningham

Prerequisite: Mathematics 14A-14B (or Mathematics 4A-4B with Mathematics 110A concurrently), Physics 4A, Engineering 35; open only to students in electrical engineering.
Introductory treatment of kinematics and kinetics of a particle and of rigid bodies as applied to engineering problems. Force, energy, and momentum methods of solution.
105A. Thermodynamics. (3) I and II.

The Staff (Mr. H. A. Johnson in charge)

Prerequisite: course 100 or Engineering 102, which may be taken concurrently; Chemistry 1B or 8; Physics 4C; Mathematics 4B.

Energy transformations, reversibility, availability; thermal properties of gases and vapors. Theoretical cycles and practical engine forms, mechanisms and performance.

105B. Thermodynamics. (3) I and II.

Mr. H. A. Johnson (in charge), Mr. Farbar, Mr. Laird

Prerequisite: course 105A.


106A. Machine Design. (3) I and II. The Staff (Mr. Rouverol in charge)

Two lectures and one 3-hour laboratory period per week. Prerequisite: Engineering 25 (or 22 and 23), 102, and Civil Engineering 130. Not open to mechanical engineering students.

Application of the principles of mechanics, kinematics, physical properties of materials, and manufacturing processes to the design of machine parts.

107. Mechanical Laboratory. (2) I and II.

The Staff (Mr. Cornet in charge)

Prerequisite: course 105A and either 105B and Engineering 103, or course 109. For chemical engineering students, Chemical Engineering 144 and 146A.

Measurement and appraisal of the performance of mechanical engineering systems.

108. Mechanical Engineering Laboratory. (1) II.

The Staff (Mr. Iversen in charge)

Prerequisite: course 105B and Engineering 103 (may be taken concurrently).

Investigations of instrumentation, properties of substances, fluid flow, thermodynamics, and heat transfer.

109. Introduction to Heat Transfer and Fluid Mechanics. (3) I and II.

Mr. Giedt (in charge), Mr. Corcos, Mr. Tichvinsky

Prerequisite: course 105A. No credit allowed if either Engineering 103 or course 105B is taken.

The principles of conduction, convection and radiation heat transfer and one dimensional flow of incompressible and compressible fluids.

110. Theory of Machines. (3) I and II. The Staff (Mr. Frisch in charge)

(Formerly numbered course 106B.)

Prerequisite: Engineering 102.

Three lectures per week. Kinematic and dynamic analysis of machinery.

111. Nomography. (3) I and II.

Mr. Levens

Prerequisite: Mathematics 14A–14B.

Theory and design of concurrency and alignment nomograms. Nomographic solutions to equations of three or more variables. Representation and analysis of experimental data using nomographic techniques.

112. Machine Design. (3) I and II. The Staff (Mr. Rouverol in charge)

Prerequisite: course 110 (formerly course 106B), Civil Engineering 130.

Two lectures and one three-hour laboratory per week. Application of the theory of machines to the design of a complete machine to meet prescribed functional requirements. Design of components for static and dynamic loads. Relation of design to materials and manufacturing processes.
115. Reversed Thermodynamic Cycles and Refrigeration. (3) I.
Mr. Hutchinson
Prerequisite: course 105B. Not open to students who have taken course
117, no longer offered.
Theory and practice of refrigeration, illustrated by study trips to actual
plants.

116. Industrial Air Conditioning Methods Economics. (3) II.
Mr. Hutchinson
Prerequisite: course 105B. Not open to students who have taken course
117, no longer offered.
Theory and practice of air conditioning, illustrated by study trips to
actual plants.

118. Industrial Power-Plant Design. (3) II. Mr. Hutchinson
Prerequisite: course 105B.
Theory and practice of industrial power-plant design economics. Illus­trated by study trips to actual plants.

123A–123B. Internal Combustion Engines. (3-3) Yr.
Mr. Vogt (in charge)
Prerequisite: course 105B, Engineering 103, 102. Recommended: Mathe­matics 110A–110B.
Application of the principles of engineering mechanics and thermodynamics
to internal combustion engines.

124A–124B. Mechanical Engineering. (3-3) Yr.
The Staff (Mr. Vogt in charge)
Prerequisite: course 105B; Engineering 103; Electrical Engineering 100B.
Course 106B (may be taken concurrently with course 124A).
Summary of fundamentals of mechanical engineering; analysis of typical
engineering problems.

131A–131B. Mechanical Engineering Laboratories. (4-3) Yr.
The Staff (Mr. Farbar in charge)
Prerequisite: courses 105B, 108, Engineering 103, Electrical Engineering
100B.
Engineering applications of the properties of substances, fluid mechanics,
heat transfer, and dynamics.

151. Heat Transfer. (3) I and II. Mr. H. A. Johnson
Prerequisite: course 105B and Engineering 103. Recommended: Mathe­matics 110A–110B.
The study of the basic principles of heat transfer and their application to
the design of industrial equipment. Steady-state and transient problems of
conduction by analytical and graphical methods. Free and forced convection.
Transfer of radiant energy.

152. Industrial Mass Transfer. (3) II. Mr. Stewart
Prerequisite: course 105B or 151, Engineering 103 or Chemical Engineer­ing 146A.
Mass transfer processes both with and without simultaneous heat transfer
applied to process equipment, involving evaporation, evaporative cooling, hu­midification, dehumidification, and gas absorption.

154. Thermodynamics. (3) I and II. Mr. Stewart
Prerequisite: course 105B or Chemical Engineering 143 and Engineering
103. Recommended: Mathematics 110A–110B.
Engineering applications of the first and second laws of thermodynamics.
Thermodynamics of the pure component and of mixtures and solutions in
flow systems, separation processes, combustion reactions, and phase equilibria.
161. Applied Fluid Mechanics. (3) I and II.  Mr. Laird, Mr. Iversen  
Prerequisite: Engineering 103.  
The theory of viscous and turbulent flow with related phenomena; hydraulic machinery (including pumps, fans, compressors, turbines, and hydraulic couplings), similarity criteria and model laws.

163. Flow Problems of the Process Industries. (3) II.  Mr. Farbar  
Prerequisite: course 105A and Engineering 103. For chemical engineering students, Chemical Engineering 146A-146B.  
Flow properties of mixtures and suspensions, plastic flow, multiphase flow, materials handling, mixing and pumping equipment.

164. Instrumentation and Automatic Control. (3) I and II.  Mr. Thal-Larsen, Mr. Takahashi  
Prerequisite: Engineering 103 or courses 109, 105B or Physics 112; Engineering 102 or Physics 105B. Recommended: Mathematics 110A-110B.  
Descriptive and analytical study of instruments and fundamental mechanical and process control systems.

170. Mechanical Vibrations. (3) I and II.  Mr. Garland  
Prerequisite: Engineering 102 and Mathematics 14A-14B or equivalent.  
Introduction to the theory of mechanical vibrations with application to vibration isolation, critical speeds, and machinery.

171. Design of Mechanical Equipment. (3) I.  Mr. Radcliffe  
Two lectures and one three-hour laboratory period per week. Prerequisite: course 110 and 112.  
Application of engineering principles to the design of complete machines. Analysis of curved beams, centrifugal stresses, thermal stresses, and other selected topics. Theoretical and empirical methods. Economic aspects in material selection and processing.

172. Fundamentals of Experimental Stress Analysis. (3) I and II.  The Staff (Mr. Cunningham in charge)  
Two lectures and one three-hour laboratory period per week. Prerequisite: Civil Engineering 130 and Engineering 102.  
Experimental methods for the determination of strains in structure and machine members. Laboratory experiments making use of various types of strain gauges, associated recording and indicating instruments, brittle lacquers, photoelasticity and model analysis. Discussion of deviations from elementary theory of strength of materials.

175. Advanced Mechanics. (3) II.  Mr. Meriam  
Prerequisite: Engineering 102, Mathematics 14A-14B. Recommended for students planning graduate study.  
Advanced methods applied to problems of force and motion. Fundamental laws and principles of mechanics. Vector algebra and calculus; energy methods in statics and dynamics; dynamics of mass systems; variable mass; Euler's equations; gyroscopic motion; selected topics.

180. Elements of Analog Computers. (3) I and II.  Mr. Atkinson  
Two lectures and one three-hour laboratory period per week. Prerequisite: Engineering 102 or the equivalent; Electrical Engineering 100A, or 101; students majoring in mathematics, physics or chemistry with equivalent background may be admitted at the discretion of the instructor.  
Introduction to analog computers, emphasizing basic elements used in their construction and operation. Representation of fundamental mathematical processes by mechanical, electro-mechanical, electrical, and electronic devices. Integrators, differentiators, multipliers, adders, etc. Use of analog laboratory equipment.
181. Selection of Process Equipment and Materials of Fabrication. (3) I.

Mr. Cornet
Prerequisite: Civil Engineering 130 (Formerly Civil Engineering 108A); Engineering 45, 103, and course 105A or Chemical Engineering 146A.
Principles of corrosion. The selection of equipment and its design specification. For chemical and petroleum process industry. Consideration of process operating requirements, such as pressure, temperature, corrosion.

198. Group Studies for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. Garland in charge)
Prerequisite: upper division standing in engineering, plus particular courses to be specified by the instructor for each group.
Group studies of selected topics which vary from year to year. The program for 1959–1960 may include: Acoustics, Mr. Soroka; Analog Computing Methods, Mr. Atkinson; Design of Mechanical Equipment, Mr. Rouverol; Dynamics, Mr. Goldsmith; Elasticity, Mr. Nelson; Applied Kinematics, Mr. Radcliffe; Engineering Graphics, Mr. Levens; Engineering Plastics, Mr. Frisch; Principles of Solar Energy, Mr. Howe; Automatic Control Laboratory, Mr. Thal-Larsen.

199. Individual Study and Research for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. Soroka for Mechanics and Design; Mr. Vogt for Heat-Power Systems)
Enrollment limited to senior students in engineering whose scholastic records show a scholarship average of B or higher or whose records indicate a capacity for independent study. Enrollment is subject to additional requirements imposed by the instructor concerned.
Individual study and/or research on a problem chosen by the student and carried out under guidance of an instructor.

Graduate Courses
As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division courses basic to the subject of the graduate course, irrespective of the department in which such basic work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.
Graduate standing is required for admission to these courses. In addition, graduate students must have completed at least Mathematics 14A–14B before undertaking any of the following courses, except as noted.

265. Heat Conduction. (2) I.
Mr. Seban
Prerequisite: course 151 and Engineering 230 (may be taken concurrently).
Study of steady-state, transient, and periodic problems of heat conduction, using both mathematical and numerical methods of solutions. Introduction to problems of thermal stress.

266. Heat Convection. (3) II.
Mr. Seban
Prerequisite: course 151, Aeronautical Sciences 162, and Engineering 230.
Mathematical analysis of convection problems, including boundary layer theory and heat transfer during laminar and turbulent flow. Discussion of allied topics such as boiling, condensation, and mass transfer.
267. Thermal Radiation. (2) I.
Prerequisite: course 151 (may be taken concurrently).
The transfer of radiant energy, gaseous radiation, geometrical and spectral characteristics of systems involving thermal radiation.

268. Advanced Problems in Thermodynamics. (3) II. Mr. Oppenheim
Prerequisite: course 154.
An introduction to the statistical thermodynamics of the pure component and of mixtures. The thermodynamics of irreversible phenomena.

271. Theory of Pumping Machinery. (3) II. Mr. Iversen
Recommended: course 161 or Aeronautical Sciences 162.
The design and performance of all types of pumping machinery.

272. Flow in Porous Media. (3) II. Mr. Putnam
Recommended: Aeronautical Sciences 162 or Mathematics 270.
Applications of fluid mechanics and thermodynamics to flow of single-phase and multiphase fluids in porous media, with application to reservoir problems.

280. Application of Analogs to Engineering Problems. (3) II. Mr. Atkinson
Two lectures and one three-hour laboratory period per week. Prerequisite: graduate standing in engineering, physics, or mathematics.

283A–283B. Oscillations in Nonlinear Systems. (3–3) Yr. Mr. Rosenberg
Prerequisite: course 170 or Electrical Engineering 109B.

284A–284B. Mechanical Vibrations. (3–3) Yr. Mr. Soroka
Prerequisite: course 170 recommended.

285A. Basic Theory of Elasticity. (3) I. Mr. Naghdi
Prerequisite: differential equations, and strength of materials.
Fundamental concepts and methods of the mathematical theory of elasticity, with application to engineering problems.

285B. Advanced Theory of Elasticity. (3) II. Mr. Naghdi
Prerequisite: course 285A.
A continuation of course 285A, including the study of torsion, curvilinear coordinates, three-dimensional problems, flat plates, and other selected topics.

287A. Advanced Engineering Dynamics. (3) I. Mr. Goldsmith
Prerequisite: Engineering 102 or Physics 105B; Mathematics 110A–110B or the equivalent; graduate standing in engineering, mathematics, or physics. Course 284A–284B recommended.

287B. Impact. (3) II. Mr. Goldsmith
Prerequisite: course 287A. Course 284A–284B recommended.

298. Group Studies, Seminars, or Group Research. (1–5) I and II.
The Staff (Mr. Garland in charge)
Advanced study in various fields of mechanical engineering on topics which may vary from year to year.
The program for 1959–1960 may include: Acoustics, Mr. Soroka; Applications of Variational Principles to Engineering Problems, Mr. Rosenberg; Automatic Controls, Mr. Takahashi; Exterior Ballistics of Rockets, Mr. Leitmann; Mechanical Invention, Mr. Rouverol; Wave Propagation in Solids, Mr. Goldsmith; Plasticity, Mr. Naghdi; Analytical Dynamics and Relativity, Mr. Lieber; Hydrodynamic Stability, Mr. Lieber; Sea Water Conversion, Mr. Howe.

299. Individual Study or Research. (1–5) I and II.
The Staff (Mr. Soroka, in charge Mechanics and Design; Mr. Vogt, in charge Heat-Power Systems)
Investigation of advanced mechanical engineering problems.

Aeronautical Sciences

UPPER DIVISION COURSES

The basic prerequisite for all upper division courses is satisfaction of lower requirements in an engineering program of study and completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

121. Engineering Aerodynamics. (3) II. Mr. Laitone
Prerequisite: Engineering 103.
Wing characteristics, performance determination, loading conditions, static and dynamic stability and control of airplanes.

122. Propulsion. (3) I and II. Mr. Oppenheim, Mr. Starkman
Prerequisite: Mechanical Engineering 105A–105B, Engineering 103, and senior standing.
Analysis of propulsion systems and machinery with emphasis on the aerodynamics, thermodynamics and mechanics of systems applicable to jet propulsion of air craft and missiles.

162. Elementary Hydrodynamics. (3) I and II. Mr. Laitone, Mr. Talbot
Prerequisite: Engineering 103, Mathematics 14B.
Stream function, potential function, and conformal transformation with applications to engineering problems.

GRADUATE COURSES

As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of prepara-
tion for the work proposed; adequate preparation will consist normally of
the completion of at least 12 units of upper division courses basic to the
subject of the graduate course, irrespective of the department in which such
basic work may have been completed. The admission of undergraduates to
graduate courses is limited to seniors who have an average scholarship of
not lower than B in the basic courses.

223. Dynamics of Reactive Fluids. (3) II. Mr. Oppenheim
Studies of processes involving mutual interaction between fluid dynamic,
chemicokinetic, heat- and mass-transfer phenomena.

270. Wing Theory. (3) II. Mr. Laitone
Prerequisite: course 162, Engineering 230.
Airfoil and deeply submerged hydrofoil theory. The lift, drag and mo-
ment of wings and hydrodynamic control surfaces.

276. Mechanics of Real Fluids. (3) II. Mr. Schaaf, Mr. Corcos
Prerequisite: Engineering 230. Recommended: Mechanical Engineering
161 and course 162.
Theory of viscous and turbulent flow with applications to fundamental
flow problems.

277. Compressible Fluids. (3) I. Mr. Sherman
Prerequisite: Engineering 230. Recommended: Mechanical Engineering
162 or Mathematics 270.
Fundamentals of subsonic and supersonic flow, shock waves, different
theoretical methods, laboratory equipment, and procedures for supersonic in-
vestigations.

298. Group Studies, Seminars, or Group Research. (1-5) I and II.
The Staff (Mr. Schaaf in charge)
Advanced study in various fields of aeronautical sciences on topics which
may vary from year to year.
The program for 1959-1960 will include: High Flux Heat Transfer, Mr.
Giedt; Astronautics, Mr. Laitone; Experimental Method and Advanced De-
sign, Mr. Maslach; Introduction to Aerothermochemistry, Mr. Oppenheim;
Rarefied Gas Dynamics, Mr. Talbot, Mr. Schaaf; Dynamics of Very Hot
Gases, Mr. Talbot; Advanced Propulsion Systems, Mr. Starkman; Magneto-
hydrodynamics, Mr. Sherman.

299. Individual Study or Research. (1-5) I and II.
The Staff (Mr. Laitone in charge)
Investigation of advanced problems in aeronautical sciences.

MINERAL TECHNOLOGY
Ceramic Engineering

UPPER DIVISION COURSES*
The basic prerequisite for all upper division courses is satisfaction of lower
division requirements in an engineering program of study and completion of
the Engineering Examination, Upper Division. Additional prerequisites are
indicated.

101. Phase Changes. (3) II. Mr. Searcy
Two lectures and one laboratory period per week. Prerequisite: Chemistry
110A.
Phase rule and concepts of phase diagrams. Phase transformation under
equilibrium and nonequilibrium conditions. Application of phase diagrams to
ceramic and metallurgical problems.

* For other course in this field, see Engineering 160, page 141.
102. Physical Ceramics. (2) I. Mr. Pask
Prerequisite: course 101 or consent of the instructor.
Introduction to ceramic engineering, with emphasis on chemical and physical properties of inorganic nonmetallic materials. The effect of chemical compositions and physical processing on properties. Emphasis on glasses and refractories.

102L. Physical Ceramics Laboratory. (1) I. Mr. Pask, Mr. Fulrath
Prerequisite: open only to students who have had or are enrolled in course 102.
The laboratory part of course 102.

103. Chemical Ceramics. (3) I. Mr. Searcy
Two lectures and one laboratory period per week. Prerequisite: course 101 or consent of the instructor.
Fundamentals of inorganic and physical chemistry applied to materials of ceramic interest: colloids, clays, glasses, oxides, and high melting materials.

105. Principles of Ceramic Engineering. (4) II. Mr. Pask
Three lectures and one three-hour laboratory period per week. Prerequisite: course 102.
Unit operation of ceramic engineering processes: nature and processing of ceramic materials, rheological properties of colloidal systems, slurries and plastic masses, formulation of compositions with specific textures, forming principles, drying and firing problems. Process analyses. Special problem included in laboratory work.

190. Industrial Ceramics and Metallurgy. (1) I. Mr. Fulrath, Mr. McGarry, Mr. Himmel
Prerequisite: junior standing in engineering, chemistry, physics, or geology. Course may be repeated once for credit.
Lectures, field trips, and reports on topics related to the ceramic and metallurgical industries.

198. Directed Group Studies for Advanced Undergraduates. (1-5) I and II. Mr. Pask (in charge)
Prerequisite: senior standing or consent of the instructor.
Seminar discussions of recent articles in the scientific and technical literature pertaining to ceramics. Last quarter of semester devoted to individual problems involving engineering design and analysis.

199. Individual Studies or Research for Advanced Undergraduates. (1-5) I and II. The Staff (Mr. Pask in charge)
Enrollment limited to senior students in engineering, chemistry, geology, or physics whose scholastic records show a scholarship average of grade B or higher or whose records indicate a capacity for independent study.
Individual research studies pertaining to properties and utilization of nonmetallic minerals and to the problems of the different divisions of the ceramic industry. Preparation of new high melting compounds, high temperature phase diagram studies.

GRADUATE COURSES
As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division courses basic to the subject of the graduate course, irrespective of the department in which such basic
work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.

271. High Temperature Materials. (3) I. Mr. Searcy
Prerequisite: course 102.
Relationships between structures, compositions and physical and chemical properties in high temperature materials. Kinetics of high temperature reactions.

298. Group Studies, Seminars, or Group Research. (1-5) I and II.
Prerequisite: consent of the instructor. The Staff (Mr. Pask in charge)
Principles of crystal chemistry and their application to ceramics. Advanced studies of solid state reactions. Applications of chemical thermodynamics to predicting stabilities of nonmetallic-metal and nonmetallic-gas systems. Other seminar courses given each year; subject matter will vary.

299. Individual Study or Research. (1-5) I and II.
The Staff (Mr. Searcy in charge)
Advanced problems in clay technology, physical ceramics, solid-state reactions, phase diagrams, glass-to-metal bonding. Dissociation pressures of high melting compounds. Molecular weights and stabilities of high temperature vapors. Crystal structures, bond strengths, and bond theory for solids.

Geological Engineering

UPPER DIVISION COURSES*

The basic prerequisite for all upper division courses is satisfaction of lower division requirements in an engineering program of study and the completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

100. Fundamentals of Geologic Engineering. (2) I. Mr. Trask
Prerequisite: Geology 150 or the equivalent.
Application of geology to engineering, the influence of mineral composition, fabric, texture, stratification, weathering, porosity, permeability, water content, fracturing, strength, and other factors upon the design and construction of engineering structures.

101. Geological Evaluation of Construction and Foundation Problems in Civil, Mining, and Petroleum Engineering. (3) II. Mr. Trask
Prerequisite: Geology 150 or the equivalent.
Geologic problems of concern to the civil engineer in designing and constructing dams, tunnels, bridges, highways, airfields; to the mining engineer in locating shafts, tunnels and adits, mine development procedure, subsidence, water problems; to the petroleum engineer in drilling, procuring, drilling muds, landslides; frozen ground.

102. North American Mining Districts. (3) I. Mr. Wisser
Prerequisite: Geology 150 or the equivalent.
Ore deposit distribution in western North America; relation to intrusives, structural features, geologic history of their surroundings. Analyzes districts to determine reasons for formation; emphasis on areas subject to intensive exploration by modern geological, geophysical, and engineering methods.

103. Exploration for Metalliferous Deposits. (3) II. Mr. Wisser
Prerequisite: Geology 150 or the equivalent.
Exploration methods for mineral deposits, including placers. Application

* See also Engineering 161, page 141, and courses in Geology, page 211.

198. Directed Group Studies for Advanced Undergraduates. (1–5) I and II. The Staff (Mr. Trask in charge)
   Prerequisite: upper division standing in engineering or consent of the instructor.
   Group study of selected topics.

199. Individual Study for Advanced Undergraduates. (1–5) I and II.
   The Staff (Mr. Trask in charge)
   Prerequisite: enrollment limited to senior students in engineering whose scholastic records show a scholarship average of grade B or higher or whose records indicate a capacity for independent study.

GRADUATE COURSES

As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division courses basic to the subject of the graduate course, irrespective of the department in which such basic work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.

202. Geological Engineering Case Histories. (2) I. Mr. Trask
   Prerequisite: Geology 5 and 150 or equivalent.
   An analysis of geological aspects of engineering construction problems by means of studies of case histories and review of current literature.

203. Advanced Mineral Exploration. (2) I. Mr. Hawkes, Mr. Wisser
   Prerequisite: course 103, Mining 105, 106, Geology 106B, or their equivalent.
   A study of mineral exploration case histories stressing the integrated use of geological, geophysical, and geochemical ore guides in the search for mineral deposits.

298. Group Studies, Seminars, or Group Research. (1–5) I and II.
   The Staff (Mr. Trask in charge)
   Group studies may be arranged in different fields of geological engineering such as foundation problems, mineral exploration, geochemistry, and geophysics.

299. Individual Study or Research. (1–5) I and II.
   The Staff (Mr. Trask in charge)

Metallurgy

UPPER DIVISION COURSES*

The basic prerequisite for all upper division courses is satisfaction of lower division requirements in an engineering program of study and the completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

* For other courses in this field, see Engineering 163, 163L, 164, 165 and 166, pages 141 and 142.
100. Material and Energy Balances. (3) II. Mr. Ravitz
Prerequisite: Chemistry 110A.
Material and energy balances of metallurgical and ceramic processes; fuels; combustion and heat utilization; introduction to unit processes.

101. Metallurgical Thermodynamics. (3) I. Mr. Hultgren
Prerequisite: Chemistry 110B and senior standing.
The principles of thermodynamics with emphasis on their application to metallurgical and ceramic problems.

102. Unit Processes for Mineral Industries. (3) I. Mr. Ravitz, Mr. Fuerstenau
Two lectures and one laboratory period per week. Prerequisite: course 100.
Principles of the unit processes involved in the extraction of metals from their ores; calcining, roasting, smelting, refining, leaching, electrolysis, and related processes; metallurgical calculations.

103. Advanced Physical Metallurgy. (3) II. Mr. Hultgren
Two lectures and one laboratory period per week. Prerequisite: Ceramic Engineering 101 or consent of the instructor.
Application of principles of physics and chemistry to study of metals; elastic and plastic theory; theories of alloying; microstructure as affected by alloying and heat treatment; correlation between microstructure and mechanical and chemical behavior; kinetics of metallurgical reactions.

104. Mineral Dressing. (3) I. Mr. Fuerstenau
Two lectures and one laboratory period per week. Prerequisite: junior standing in engineering, chemistry, or geology.
Systematic study of unit operations of mineral dressing, including crushing and grinding, sizing, gravity concentration, flotation, magnetic and electrostatic separation, thickening and filtration; economics of mineral dressing.

198. Directed Group Studies for Advanced Undergraduates. (1-5) I and II. The Staff (Mr. Hultgren in charge)
Prerequisite: senior standing in engineering.
Group study of selected topics.

199. Individual Study or Research for Advanced Undergraduates. (1-5) I and II. The Staff (Mr. Hultgren in charge)
Enrollment limited to senior students in engineering whose scholastic records show a scholarship average of grade B or higher or whose records indicate a capacity for independent study.

**Graduate Courses**

As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division courses basic to the subject of the graduate course, irrespective of the department in which such basic work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.

†202. Metallurgy of the Less-Common Metals. (2) II. Mr. Ravitz
† To be given if a sufficient number of students enroll.
206A–206B. Materials for Nuclear Engineering. (2–2) I and II.  Mr. Fulrath
Prerequisite: Engineering 45 and Chemistry 110A–110B or the equivalent.
Basic considerations of engineering materials used primarily in nuclear reactor technology. The fundamentals of production, fabrication, irradiation damage of special materials and the specific problems related to the use of common engineering materials in reactor design.

240. Metallurgical Thermodynamics. (3) II.  Mr. Kelley
Prerequisite: course 101 or Chemistry 114H.
Thermodynamic properties of metallurgical substances and their application to heat balances and reaction equilibria in extractive metallurgical processes.

250. Physics of Metals. (3) I.  Mr. Parker
A theoretical study of the metallic state, emphasizing those properties of technologic importance; chemical bonding forces, crystal structures of metals and alloys, compressibility, specific heat, magnetism, electrical and thermal conductivity, thermodynamics.

256. Reaction Kinetics in Metals. (3) II.  Mr. Dorn
Prerequisite: Engineering 163, 163L, Chemistry 110A–110B.
Introduction to the application of statistical mechanics to reaction kinetics in metallic systems. Special emphasis will be given to analytical treatment of recrystallization, phase transformations including decomposition of austenite and precipitation hardening, diffusion in metals, and the hardenability of steels.

260. Dislocation Theory. (3) II.  Mr. Parker
Prerequisite: Engineering 160 or equivalent.
Application of the theory of dislocations to an understanding of properties. Current experimental and theoretical state of knowledge concerning crystal growth, yielding, strain hardening, solution hardening, recovery, recrystallization, creep, and fracture.

298. Group Studies, Seminars, or Group Research. (1–5) I and II.
The Staff (Mr. Parker in charge)

299. Individual Study or Research. (1–5) I and II.
The Staff (Mr. Ravitz in charge)

Research Conference in Metallurgy and Ceramics. (No credit) I and II.
The instructing staff and graduate students meet once a week to discuss research and advanced subjects.

Mineral Engineering

100. Petrophysics. (3) I.  Mr. Witherspoon
Prerequisite: Physics 4C and Mathematics 4B; Chemistry 110A and Geology 5 (both may be taken concurrently).
Engineering study of rocks from the standpoint of their mineral content, texture, fluid distribution, conductivity, and elastic behavior.

101. Economics of the Mineral Industry. (3) I.  Mr. Shaffer
Prerequisite: senior standing in one of the mineral technology fields.

† To be given if a sufficient number of students enroll.
102. Mineral Engineering Applications of Fluid Mechanics. (3) I.
   Mr. Putnam
   Prerequisite: Engineering 103, Petroleum Engineering 110, or Mechanical
   Engineering 105A or equivalent.
   Extension of elementary fluid mechanics, thermodynamics and dynamics to
   flow problems encountered in transmission and pumping of fluids.

102L. Mineral Engineering Applications to Fluid Mechanics. (1) II.
   Prerequisite: course 102.
   Mr. Putnam
   Laboratory exercises in the application of fluid mechanics and thermo-
   dynamics to mineral engineering systems.

**Mineral Technology**

UPPER DIVISION COURSES‡

The basic prerequisite for all upper division courses is satisfaction of lower
division requirements in an engineering program of study and completion of
the Upper Division Engineering Examination. Additional prerequisites are
indicated.

100. Introduction to Mining. (3) II.
   Mr. Hawkes
   Prerequisite: Geology 150 (may be taken concurrently).
   The discovery, production, processing, and marketing of mineral raw
   materials other than petroleum.

103. Geological Factors in the Valuation and Operation of Mines. (3) II.
   Mr. Wisser
   Prerequisite: courses 100 and 101.
   Geological aspects of mine valuation. Size and metal content of ore de-
   posits, based on geological reasoning, sampling, estimation of tonnage and
   average grade. Mining operations affected by geological factors; location of
   shafts, adits, mine levels. Selection of stoping methods.

104. Mine Economic Analysis and Reports. (3) II.
   Mr. Shaffer
   Two lectures and one laboratory period per week. Prerequisite: courses
   100 and 101. Course 103 and Geological Engineering 103 may be taken con-
   currently.
   Principles of engineering economic analysis applied to exploration, de-
   velopment, operation, and valuation of mineral deposits. Each analysis will be
   presented by the student as a formal report.

105. Geochemical Prospecting. (3) I.
   Mr. Hawkes
   Prerequisite: Chemistry 5, Geology 150 or the equivalent.
   Introduction to the principles and practice of geochemical methods of
   prospecting for deposits of metallic and industrial minerals.

106. Geophysical Prospecting. (3) II.
   Mr. Ward
   Prerequisite: Geology 150 or the equivalent, Physics 4B.
   Introduction to the applications of geophysics to exploration for deposits of
   metallic and industrial minerals and to problems in civil engineering.

198. Directed Group Studies for Advanced Undergraduates. (1-5) I and II.
   The Staff (Mr. Shaffer in charge)
   Prerequisite: upper division standing in engineering or consent of the
   instructor.
   Group study of selected topics which vary from year to year.

‡ See also courses in Geology.
Mineral Technology

199. Individual Study for Advanced Undergraduates. (1-5) I and II.
   The Staff (Mr. Shaffer in charge)

   Enrollment limited to senior students in engineering whose scholastic records show a scholarship average of grade B or higher or whose records indicate a capacity for independent study.

Graduate Courses

As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division courses basic to the subject of the graduate course, irrespective of the department in which such basic work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.

201A–201B. Investigations in Mining Practice. (2–3; 2–3) Yr.
   The Staff (Mr. Shaffer in charge)

   Program of work and credit to be arranged. Open to advanced students in geology and physics, as well as mining.
   Instruction on the analysis, design, and development of mining systems. Applications of methods of modern physics and electronics to mining and mineral exploration.

202. Advanced Mineral Economic Analysis. (2) I. Mr. Shaffer

   Economic analysis of mineral properties based on actual case histories.

203A–203B. Tectonic Analysis of Ore Districts. (2–2) Yr. Mr. Wisser

   Prerequisite: consent of the instructor.
   Principles of deformation in the earth's crust; classification of ore districts according to type of deformation with which they are associated. Interrelation of mechanics of deformation with those of ore deposition. Application to search for new mining districts.

298. Group Studies, Seminars, or Group Research. (1–5) I and II.
   The Staff (Mr. Shaffer in charge)

299. Individual Study or Research. (1–5) I and II.
   The Staff (Mr. Shaffer in charge)

Petroleum Engineering

Upper Division Courses*

The basic prerequisite for all upper division courses is satisfaction of lower division requirements in an engineering program of study and completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

110. Thermal and Volumetric Behavior of Petroleum Reservoir Systems.
   (3) II. Mr. Putnam

   Prerequisite: Chemistry 110A, Physics 4C, Mathematics 4B.
   Principles of thermodynamics, heat transfer, combustion and volumetric behavior with applications to petroleum reservoir systems.

   * For other course in this field, see Engineering 169, page 142.
110L. Petroleum Engineering Fundamentals Laboratory. (1) II. 
Mr. Witherspoon
Prerequisite: Mineral Engineering 100, Geology 5, and course 110 (may be taken concurrently).
Laboratory exercises on the measurement of properties of petroleum reservoir rocks and fluids.

111. Petroleum Engineering—Development. (3) I. 
Mr. Somerton
Prerequisite: Civil Engineering 111 and 130; Mineral Engineering 100; Mineral Engineering 102 and Geology 111A, both of which may be taken concurrently; or consent of instructor.
Analysis of principles and methods of oil field development including drilling mechanics, zonal evaluation, well completion and completion evaluation.

111L. Petroleum Engineering—Development Laboratory. (2) I.
Mr. Somerton
Prerequisite: course 111, which should be taken concurrently.
Laboratory experiments in petroleum engineering development including drilling mechanics, zonal evaluation and well completion evaluation.

112. Petroleum Reservoir Mechanics. (3) II. 
Mr. Fatt
Prerequisite: course 110, Chemistry 110A, Engineering 103, Mineral Engineering 100, Mathematics 14A-14B; or consent of instructor.
Principles of fluid mechanics applied to single phase and multiphase flow of fluid in porous rock.

112L. Petroleum Reservoir Mechanics Laboratory. (2) II.
Mr. Fatt
Prerequisite: course 112 (may be taken concurrently).
Laboratory exercises in the application of fluid mechanics to single and multiphase fluid flow through porous media.

198. Directed Group Studies for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. Somerton in charge)
Prerequisite: upper division standing in engineering or consent of the instructor.
Group studies of selected topics which vary from year to year.

199. Individual Study or Research for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. Fatt in charge)
Enrollment limited to senior students in engineering whose scholastic records show a scholarship average of grade B or higher or whose records indicate a capacity for independent study.

GRADUATE COURSES

As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division courses basic to the subject of the graduate course, irrespective of the department in which such basic work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.

205. Kinetic Theory of Fluids and Surfaces. (2) I. 
Mr. Fatt
Prerequisite: course 110, or Mechanical Engineering 105A, or Chemistry 110A-110B.
Study of gases and liquids of interest to mineral engineers from the standpoint of kinetic theory. Chemistry and physics of mineral surfaces and the interaction of these surfaces with fluids.

208. Advanced Reservoir Engineering. (3) II. Mr. Fatt
Prerequisite: course 112 (formerly course 102), or Mechanical Engineering 105A and Engineering 103.
Study of the detailed behavior of petroleum reservoirs using as a basis the thermodynamics and phase behavior of the fluids and the mechanics of multiphase flow through porous media.

213. Valuation of Oil- and Gas-Producing Properties. (2) II. Mr. Witherspoon
Prerequisite: graduate standing or consent of the instructor.
A study of the physical and economic factors underlying the appraisal of oil-producing properties. Estimation and evaluation of oil and gas reserves.

298. Group Studies, Seminars, or Group Research. (1-5) I and II.
The Staff (Mr. Fatt in charge)
Advanced study in various fields of petroleum engineering on topics which may vary from year to year depending upon student interest. Topics suggested for 1959–1960 are: Advanced Fundamentals: Well Logging (Fatt, Somerton); Hydrocarbon Phase Behavior (Fatt); Immiscible and Miscible Fluid Displacement (Fatt); Thermal Recovery Processes (Fatt); Surface and Colloidal Chemistry Petroleum Reservoirs (Witherspoon, Fatt); Physics of Reservoir Rocks (Somerton, Fatt); Rheology of Petroleum and Drilling Fluids (Witherspoon); Multiphase Fluid Flow (Fatt). Advanced Design and Professional Analysis: Natural Gas Technology (Witherspoon); Secondary Oil Recovery (Witherspoon); Drilling Mechanics (Somerton); Applications of Rheology (Fatt); Well Production Mechanics (Somerton); Use of Analog and Digital Computers (Somerton).

299. Individual Study or Research. (1-5) I and II.
The Staff (Mr. Putnam in charge)

Process Engineering
UPPER DIVISION COURSES

The basic prerequisite for all upper division courses is satisfaction of lower division requirements in an engineering program of study and completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

100. Project Engineering of Process Plants. (3) II. Mr. McGarry
Prerequisite: Electrical Engineering 101 (or equivalent), Engineering 103 and Mechanical Engineering 151, or Chemical Engineering 146A.
Details of design and erection of process plants are covered, including plant location, flow diagrams, plot plans, scheduling, engineering design, procurement, contracts, vessels, heat exchangers, piping design, instrumentation, auxiliary equipment, structures, safety, and construction.

NAVAL ARCHITECTURE
UPPER DIVISION COURSES

The basic prerequisite for all upper division courses is satisfaction of lower division requirements in an engineering program of study and completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.
151. Statics of Naval Architecture. (3) I.  
(Formerly Mechanical Engineering 129A.)  
Mr. Paulling  
Prerequisite: Engineering 103, Civil Engineering 130, Engineering 102.  
Fundamentals of the geometry of the ship’s form, including its presentation in the lines drawings; buoyancy and stability in both intact and damaged conditions; subdivision, freeboard, measurement rules and requirements; grounding and launching; strength and stiffness, including both general concepts of loading systems and determination of scantlings.

152. Dynamics of Naval Architecture. (3) I.  
(Formerly Mechanical Engineering 129B.)  
Mr. Paulling  
Prerequisite: course 151 and Engineering 103.  

153. Marine Engineering. (3) II.  
(Formerly Mechanical Engineering 128.)  
Mr. Tichvinsky  
Prerequisite: Mechanical Engineering 105B, Engineering 102. Recommended: course 151.  
The power requirements and the selection of power plants for various types of vessels and the necessary auxiliaries for steam and motor ships will be considered.

154. Applied Naval Architecture. (3) II.  
(Formerly Mechanical Engineering 126.)  
Mr. Paulling  
Prerequisite: courses 151, 152.  
A laboratory and drawing room course involving the preparation of a preliminary ship design, starting with a prescribed set of owner’s requirements or military requirements. The work will include determination of optimum dimensions and coefficients of form; preparation of lines; estimated power requirements and dimensional propeller design; investigation of stability and floatability under damaged conditions; basic structural design, including development of midship section; basic arrangement studies and decisions.

198. Directed Group Studies for Advanced Undergraduates. (1-5) I and II.  
The Staff (Mr. Schade in charge)  
Prerequisite: requirements will be specified by the instructor.  
Group studies of selected topics which vary from year to year.

199. Individual Study and Research for Advanced Undergraduates. (1-5)  
I and II.  
The Staff (Mr. Schade in charge)  
Prerequisites: enrollment limited to students in engineering whose scholastic records show a scholarship average of grade B or higher or whose records indicate a capacity for independent study. Enrollment is subject to additional requirements imposed by the instructor concerned.  
Individual study and/or research on a problem chosen by the student and carried out under guidance of an instructor.

GRADUATE COURSES

As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division courses basic to the sub-
ject of the graduate course, irrespective of the department in which such basic work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.

240A–240B. Theory of Ship Structures. (3-3) Yr. Mr. Schade
(Formerly Mechanical Engineering 240A–240B.)
Prerequisite: course 151.
Design and performance of ship structures using rational methods. Predictions of force and moment systems applied to the structure; distributions of stresses, strains and displacements; and interpretation of large-scale experiments and performance data.

241A–241B. Hydrodynamics of Ships. (3-3) Yr. Mr. Wehausen
Prerequisite: Mechanical Engineering 162, Mathematics 14A–14B, and course 151, 152, or permission of instructor.

298. Group Studies, Seminars, or Group Research. (1-5) I and II.
The Staff (Mr. Schade in charge)
Advanced study in various fields of naval architecture on topics which may vary from year to year.

299. Individual Study or Research. (1-5) I and II.
The Staff Mr. Schade in charge
Investigation of selected advanced naval architecture subjects.

RELATED COURSES IN OTHER DEPARTMENTS
Mathematics 270. Technical Hydrodynamics. (3) I. Mr. Wehausen

NUCLEAR ENGINEERING
UPPER DIVISION COURSES

The basic prerequisite for all upper division courses is satisfaction of the lower division requirements in an engineering program of study and completion of the Upper Division Engineering Examination. Additional prerequisites are indicated.

165. Introduction to Nuclear Reactor Theory. (3) I and II.
Mr. Schrock, Mr. Grossman
Condensed course for non-nuclear engineering majors in engineering or science. Applied nuclear physics; diffusion and slowing down of neutrons; critical mass calculations for bare, reflected, homogeneous or heterogeneous reactors; kinetics and control; shielding; instrumentation and radiological measurements, thermal characteristics; reactor systems and safety.

166. Introduction to Nuclear Engineering Laboratory. (1) I and II.
Mr. Schrock, Mr. Grossman
Prerequisite: course 165 (may be taken concurrently).
Experimental work in nuclear measurements and nuclear reactor performance; Geiger-Muller, Beta-proportional, scintillation counters; half lives; absorption and shielding; reactor operating and monitoring; calibration of foils; control rod calibration; effect of absorbers on reactivity; buckling and power calibration; etc.
GRADUATE COURSES

As a condition for enrollment in a graduate course the student must submit to the instructor in charge of the course satisfactory evidence of preparation for the work proposed; adequate preparation will consist normally of the completion of at least 12 units of upper division courses basic to the subject of the graduate course, irrespective of the department in which such basic work may have been completed. The admission of undergraduates to graduate courses is limited to seniors who have an average scholarship of not lower than B in the basic courses.

250A-250B. Nuclear Reactor Theory. (3-2) Yr. Mr. Grossman
Prerequisite: Engineering 230 (may be taken concurrently); Physics 124 or chemistry 123.
A study of the theory of nuclear reactors involving the principles of nuclear reactions in a sub-critical and critical assembly.

251A-251B. Nuclear Engineering Laboratory. (1-1) Yr. Mr. Schrock
Prerequisite: course 250A-250B (may be taken concurrently) and/or consent of instructor.
Studies center around experiments with a nuclear reactor and several sub-critical assemblies. Theoretical concepts will be investigated and certain constants appearing in reactor theory will be determined and examined.

252. Nuclear Reactor Systems Design. (2) II. Mr. Schrock, Mr. Grossman
Prerequisite: course 250B, 260, and Metallurgy 206B, to be taken concurrently.
Original designs of a nuclear reactor and its system involving electric power or heat production will be developed. Analytical studies of neutronics, heat exchange, stress analysis, hazards, systems design, etc., will be made.

260. Nuclear Reactor Systems. (3) II. Mr. Grossman, Mr. Schrock
Prerequisite: course 250A, Engineering 230, Mechanical Engineering 151.
A study of the technology of nuclear reactors and systems. The disciplines of reactor physics and the engineering sciences of thermodynamics, heat transfer, fluid dynamics, and thermal stress analysis applied to nuclear reactors.

270. Neutron Transport Theory. (3) I and II. Mr. Stuart, Mr. Grossman
Prerequisite: courses 250A-250B, Engineering 230.
Theory of the statistical distribution in space, angle, and energy of neutrons in migration through bulk media. Discussion of physical assumptions and mathematical techniques for solving the integral equations for neutron distribution in problems relevant to reactor theory.

298. Group Studies, Seminars, or Group Research. (1-5) I and II.
The Staff (Mr. Grossman in charge)
Advanced study in fields of nuclear engineering on topics which may vary from year to year. The program for 1959-1960 may include: Nuclear Reactor Systems; Radiation Shielding; Fast Reactors; Thermonuclear Fusion; Advanced Power and Propulsion Cycles.

299. Individual Study or Research. (1-5) I and II.
The Staff (Mr. Grossman in charge)
Investigation of advanced nuclear engineering problems.
ENGLISH

(Department Office, 2125 Dwinelle Hall)

Myron F. Brightfield, Ph.D., Professor of English.
Bertrand H. Bronson, Ph.D., Professor of English.
James R. Caldwell, Ph.D., Professor of English.
James M. Cline, Ph.D., Professor of English.
Bertrand Evans, Ph.D., Professor of English.
James D. Hart, Ph.D., Professor of English.
Arthur E. Hutson, Ph.D., Professor of English.
Charles W. Jones, Ph.D., Litt.D., Professor of English.
James J. Lynch, Ph.D., Professor of English.
Gordon McKenzie, Ph.D., Professor of English.
Josephine Miles, Ph.D., Professor of English.
Mark Schorer, Ph.D., Professor of English.
Henry N. Smith, Ph.D., Professor of English (Chairman of the Department).
George R. Stewart, Ph.D., Professor of English.
Arthur G. Brodeur, Ph.D., Professor of English and Germanic Philology, Emeritus.
Willard E. Farnham, Ph.D., Professor of English, Emeritus.
Walter M. Hart, Ph.D., LL.D., Professor of English, Emeritus.
Benjamin H. Lehman, Ph.D., Professor of English, Emeritus.
Travis M. Bogard, Ph.D., Associate Professor of English.
Howard E. Hugo, Ph.D., Associate Professor of English.
John E. Jordan, Ph.D., Associate Professor of English.
Charles Muscatine, Ph.D., Associate Professor of English.
Thomas F. Parkinson, Ph.D., Associate Professor of English.
John H. Raleigh, Ph.D., Associate Professor of English (Vice-Chairman of the Department).
David W. Reed, Ph.D., Associate Professor of English.
Wayne Shumaker, Ph.D., Associate Professor of English.
Ernest Tuveson, Ph.D., Associate Professor of English.
Ian P. Watt, M.A., Associate Professor of English.
Jonas A. Barish, Ph.D., Assistant Professor of English.
Robert L. McNulty, Ph.D., Assistant Professor of English.
John Paterson, Ph.D., Assistant Professor of English.
Constantinos A. Patrides, Ph.D., Assistant Professor of English.
Ralph W. Rader, Ph.D., Assistant Professor of English.
Alain Renoir, Ph.D., Assistant Professor of English.
Hugh M. Richmond, Ph.D., Assistant Professor of English.
Louis A. M. Simpson, Ph.D., Assistant Professor of English.
John L. Traugott, Ph.D., Assistant Professor of English.
Larzer Ziff, Ph.D., Assistant Professor of English.
Whitney F. Bolton, Ph.D., Instructor in English.
Frederick C. Crews, Ph.D., Instructor in English.
Barbara Garlitz, Ph.D., Acting Instructor in English.
Thomson W. Gunn, M.A., Acting Instructor in English.
Martin Halpern, Ph.D., Acting Instructor in English.
Brendan P. O Hehir, Ph.D., Acting Instructor in English.
Norman C. Rabkin, Ph.D., Instructor in English.
Sheldon Sacks, M.A., Acting Instructor in English.

§ In residence fall semester only, 1959–1960.
Students must have passed Subject A before taking any course in English.

*Letters and Science List.*—All undergraduate courses in this department are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

*Departmental Major Advisers:* Mr. Barish, Chairman; Mr. Crews, Mr. Jordan, Mr. McNulty, Mr. Paterson, Mr. Rader (II), Mr. Richmond, Mr. Watt (I).

*The Major Program.*

(A) *Preparation for the Major.*—First Year—Required: course 1A–1B (3–3), Composition and Study of Literature. Second Year—Required: course 46A–46B (3–3) and 3 additional units to be elected from courses 25 (3), 30 (3), 41 (3), 44A–44B (3–3), 49 (3).

(B) The Major.—Twenty-four units of upper division work with specific requirements as follows: Third Year—Required: the Junior Course, English 100 (3): Methods and Materials of Literary Criticism. Fourth Year—Required: the Senior Course, English 151 (3).

The total program (lower and upper division) must include at least: 3 units in Chaucer or the Age of Chaucer; 3 units in Shakespeare; 3 units in Milton or the Age of Milton; 3 units in American Literature selected from English 30, 35A–35B, 130A, 130B, 130C; 3 units in a period or type course.

The department will certify to the completion of a major program for graduation only on the basis of at least a C average in the upper division courses taken in the department. Students who do not maintain such an average will be required to withdraw from the major in English.

Attention is called to the requirements in foreign languages for higher degrees in English—a reading knowledge of French or German for the M.A.; of French, German, and Latin for the Ph.D. Undergraduates contemplating advanced study in English should prepare to satisfy these requirements as they proceed to the bachelor's degree.

*Teacher Training.*—Consult I. Mr. Evans; II. Mr. Lynch; see also the ANNOUNCEMENT OF THE SCHOOL OF EDUCATION.

*Higher degrees.*—Consult Mr. Farnham; see also the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION, and the Graduate Division Bulletin entitled ANNOUNCEMENT IN MODERN LANGUAGES AND LITERATURES.

**Lower Division Courses**

**FRESHMAN COURSE**

1A–1B. *First-Year Reading and Composition.* (3–3) Yr. Beginning each semester.

Mr. Barish, Mr. Bogard, Mr. Brightfield, Mr. Caldwell, Mr. Cline, Mr. Crews, Miss Garlitz, Mr. Gunn, Mr. Halpern, Mr. Hugo, Mr. Hutson, Mr. Jones, Mr. Jordan, Mr. Lynch, Mr. McKenzie, Mr. McNulty, Mr. Muscatine, Mr. O Hehir, Mr. Parkinson, Mr. Paterson, Mr. Patrides, Mr. Rabkin, Mr. Rader, Mr. Reed, Mr. Renoir, Mr. Richmond, Mr. Sacks, Mr. Shumaker, Mr. Simpson, Mr. Sledd, Mr. Stewart, Mr. Traugott, Mr. Watt

Prerequisite for the English major. Course 1A is prerequisite to 1B.

Prerequisite: a passing grade in Subject A (examination or course). Credit for English 1A or 1B will not be given to any student who has not passed the Subject A examination or course.

1A. Training in writing and reading.

1B. An introduction to the study of literature, with further training in writing.
SOPHOMORE COURSES

25. Language. (3) II. Miss Miles
   Designed for sophomores, but open to students in the upper division.
   The origins and symbols of human speech; patterns, change, and growth
   in language; the interrelations of language, thought, and civilization. Em­
   phasis on English, as written and spoken in England and in America.

30. Introduction to American Literature. (3) II. Mr. Stewart

33A-33B. American Studies. (3-3) Yr.
   Open to sophomores with the consent of the instructor. Limited to 15 stu­
   dents. Not open to students taking History 33A-33B or Political Science
   33A-33B.
   An honors course in the study of American culture. The class will study
   significant ideas and issues, drawing on material from history, literature,
   political science, philosophy, and other fields. The course will emphasize dis­
   cussion and the writing of essays and will include occasional joint meetings
   with the staff and students of the two equivalent courses (History 33A-33B
   and Political Science 33A-33B).

40. Intermediate Exposition. (3) II. Mr. Tuveson
   Prerequisite: course 1A-1B or Speech 1A-1B or the equivalent.
   Writing in various expository forms.

41. Writing in Connection with the Reading of Important Books of the
   Nineteenth and Twentieth Centuries. (3) I. Mr. Simpson
   Prerequisite: course 1A-1B or Speech 1A-1B, or consent of the instructor.

44A-44B. Masterpieces of Literature. (3-3) Yr. Mr. Stewart, Mr. Watt
   44A. I: Mr. Stewart; 44B. II: Mr. Watt.
   44A is not prerequisite to 44B.
   Lectures on great works of the world’s literature.

46A-46B. Survey of English Literature. (3-3) Yr.
   Mr. Crews, Miss Garlitz, Mr. Gunn, Mr. Hugo, Mr. Jordan, Mr.
   McNulty, Mr. Muscatine, Mr. Parkinson, Mr. Paterson, Mr.
   Patrides, Mr. Rabkin, Mr. Richmond, Mr. Shumaker, Mr. Simp­
   son, Mr. Tuveson, Mr. Watt
   Prerequisite: course 1A-1B.
   Close study of typical works of major authors from Chaucer to T. S. Eliot,
   with consideration of the more important aspects of English literary history.

*49. Ten Great Books in the British Tradition. (3) II. Mr. Cline

UPPER DIVISION COURSES

Group I—Unrestricted Courses
   (Open to all students in the upper division; enrollment
   not limited, except as noted)

A. COURSES IN COMPOSITION AND LANGUAGE

110. The English Language. (3) I and II. Mr. Hutson, Mr. Sledd

131. American English. (3) II. Mr. Reed
   General description of the English language in America. Comparisons with
   British English. American regional dialects.

* Not to be given, 1959–1960.
141. Modes of Writing (Exposition, Fiction, Verse, etc.). (3) II.
Mr. Parkinson

Prerequisite: course 1A–1B or Speech 1A–1B, or consent of the instructor.
Open to qualified sophomores with consent of the instructor.
Writing in connection with readings in recent English literature and its continental backgrounds.

B. COURSES IN LITERATURE

114A. The English Drama to 1642. (3) I.
Mr. Barish
The history of English drama from the miracle plays to the closing of the theaters in 1642; special critical attention to Marlowe, Chapman, Jonson, and Webster; Shakespeare's practice as a playwright in relation to the work of his contemporaries.

114B. The English Drama from 1660 to 1850. (3) II.
Mr. Lynch
The drama of the Restoration period; various lines of development in the drama from the Restoration to about 1850, such as sentimental comedy, domestic tragedy, melodrama, and operatic farce; the impact of developments in the theater on the drama.

*114C. British and American Drama from 1850 to the Present. (3) I.
Mr. Bogard
The history of dramatic literature in England, America, and Ireland, with emphasis on Shaw and O'Neill; continental influences and developments in the theater that have influenced the drama.

116. The English Bible as Literature. (3) I.
Mr. Jordan

117A–117B. Shakespeare. (3–3) Yr.
Mr. Evans, Mr. Barish
Open both to students whose major is English and to others. 117A is not prerequisite to 117B. Lectures on the entire works of Shakespeare, including nondramatic poems.

*117E. Shakespeare. (3) I.
May not be taken by students whose major is English.
Lectures on selected plays of Shakespeare.

*117J. Shakespeare. (3) II.
Mr. Barish
Limited to twenty-five students. Studies of selected plays, with practice in various critical approaches; e.g., establishing text, relation to source, changing concepts of comedy and tragedy, influence of physical conditions on technique.

119. The Age of Johnson. (3) II.
Mr. Rader

120A–120B. Medieval Literature. (3–3) Yr.
Mr. Jones
120A is prerequisite to 120B but students may receive credit for 120A without taking 120B.

121. The Romantic Period. (3) II.
Mr. Simpson

122. The Victorian Period. (3) I.
Mr. McKenzie

123. Nineteenth-Century British Prose. (3) I.
Mr. Jordan

* Not to be given, 1959–1960.
§124. The Popular Ballad. (3) I. Mr. Bronson

125B. The Novel in Western Civilization. (3) II. Mr. Hugo

125C–125D. The English Novel. (3–3) Yr. Mr. Brightfield
125C is not prerequisite to 125D.

*125E. The American Novel. (3) I. Mr. Ziff

*128. Regional Literature: California and the West. (3) II. —

*130A. American Literature before 1840. (3) II. —

130B. American Literature: 1840–1885. (3) I. Mr. Smith
130C. American Literature: 1885 to the Present. (3) II. Mr. Hart

*132. The Transcendental Movement in American Literature. (3) II. Mr. Smith

*149. The English Lyric. (3) II. Miss Miles
The development of the English traditions of structure and style in lyric poetry.

*152. Chaucer. (3) II. Mr. Renoir

*153. Introduction to the Study of Poetry. (3) II. —

155. The Age of Chaucer. (3) I. Mr. Muscatine

158A–158B. The English Renaissance. (3–3) Yr. Mr. Cline, Mr. Patrides
158A. Beginnings of the English Renaissance, and literature of the sixteenth century.
158B. Literature of the seventeenth century.
158B satisfies the Plan I English major requirement of a course on Milton or the Age of Milton.

160. British Literature from 1900 to the Present. (3) II. Mr. Schorer

161. Recent British and American Poetry. (3) II. Mr. Parkinson

166. The Age of Swift and Pope. (3) I. Mr. Traugott

Group II—Restricted Courses
A. THE JUNIOR COURSE
(Sections limited to twenty students each)

Designed primarily for juniors whose major subject is English.

100. Methods and Materials of Literary Criticism. (3) I and II.
Mr. Bogard, Mr. Caldwell, Miss Garlitz, Mr. Halpern, Mr. Hugo, Mr. McKenzie, Miss Miles, Mr. O Hehir, Mr. Paterson, Mr. Sacks, Mr. Simpson, Mr. Watt
Explication and evaluation of literary texts and study of the various principles of literary judgment.

* Not to be given, 1959–1960.
§ To be given one semester only.
B. THE SENIOR COURSE

(Sections limited to twenty students each)

Prerequisite: course 100. Designed primarily for seniors whose major subject is English.

*151A. Arnold. (3) I. Mr. Caldwell
*151B. Byron. (3) I. Mr. Watt
151C. Conrad. (3) I.
*151D. Dryden. (3) II.
*151E. Henry James. (3) I.
151F. Fielding. (3) II. Mr. Sacks
*151H. Hawthorne. (3) I. Mr. Ziff
151J. Milton. (3) I and II. Mr. Barish, Mr. McNulty, Mr. Patrides, Mr. Richmond
   Mr. Barish, Mr. Patrides; II: Mr. McNulty, Mr. Richmond.
*151K. Contemporary Authors. (3) I and II. Mr. Bogard, Mr. Schorer
   I: (O'Neill), Mr. Bogard; II: (Lawrence), Mr. Schorer.
151L. Chaucer. (3) I and II. Mr. Bronson, Mr. Cline, Mr. Caldwell
   I: Mr. Bronson; II: Mr. Cline, Mr. Caldwell.
*151M. Melville. (3) II.
151P. Pope. (3) I. Mr. O'Hehir
151S. Shakespeare. (3) I and II.
*151Sp. Spenser. (3) I.
*151Sw. Swift. (3) II.
*151T. Thomas Hardy. (3) II.
151W. Whitman. (3) I. Mr. Parkinson
151Wd. Wordsworth. (3) II. Mr. Jordan

C. HONORS COURSE

199. Special Study for Advanced Undergraduates. (1–3) I and II.
Reading and conference for individual honor students.
Any student who completes 9 or more units of upper division English in the junior year with an average grade of not less than B may apply for admission to course 199. Such honor students undertake, in a chosen field, a program of reading and of conferences with the instructor. The subject matter should not coincide with that of any regular course and should be specific enough to permit the student to write a significant essay based upon his study. The number of units of credit is determined by the instructor.

* Not to be given, 1959–1960.
D. ADVANCED COMPOSITION

(Open only to upper division students who have the consent of the instructor. With the consent of the instructor, courses numbered 106 may be repeated without duplication of credit.)

106A. Short Fiction. (3) I. Mr. Burgess

106B. Verse. (3) II. Mr. Gunn

*106D. Literary Criticism. (3) I. Mr. Watt

106E. Long Narrative. (3) II. Mr. Stewart

The student will work throughout the semester on a single project, either fiction (novel) or nonfiction (biography, history).

106H. Expository and Critical Writing. (3) I. Mr. Shumaker

106L. Advanced Composition. (3) I and II. Mr. Lynch, Mr. Evans

Primarily for candidates for the Certificate of Completion of the teacher-training curriculum whose teaching major is English.

106M. Advanced Composition. (3) I and II. Specifically for candidates for the Certificate of Completion of the teacher-training curriculum whose teaching major is not English.

106P. Advanced Prose. (3) I and II. Miss Miles

Prerequisite: consent of instructor.

Special section in advanced prose for teaching assistants, readers, and honor students in departments other than English.

TEACHERS' COURSE

300. Problems in Teaching English Literature and Composition in Secondary Schools. (2) I and II. Mr. Evans, Mr. Lynch

This course, designed for seniors and graduate students undertaking an English teaching major or minor, should be completed before practice teaching. The course is accepted in partial satisfaction of the 22-unit requirement in education for the general secondary credential.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

Students who have not passed the department's examination in French or in German will be admitted to a seminar only with consent of the instructor.

French 206A-206B and German 265 are especially recommended to candidates for higher degrees. Attention is directed to German 204.

The following courses are recommended for first-year graduate students: 200, 202, 208, 211A-211B, 213.


Since the courses listed as seminars are concerned with specific problems in the designated fields, the attention of graduate students desiring general surveys is directed to the following upper division courses: 119, 120, 121, 122, 123, 128, 130A, 130B, 130C, 155, 158A-158B, 160, and 166.

* Not to be given, 1959-1960.
200. Techniques of Literary Scholarship. (3) I and II.
   Mr. Brightfield, Mr. Lynch, Mr. Tuveson
   I: Mr. Lynch, Mr. Tuveson; II: Mr. Brightfield.

202. The History of English Criticism. (3) I.
   Mr. Brightfield

203M. Readings in Renaissance Literature. (3) II.
   Miss Miles
   Prerequisite: open to graduate students and (with consent of instructor) to advanced undergraduates.
   Readings in the general area of English 158A. A student may not take both 158A and 203M for credit.

203N. Readings in English Literature, 1660-1744. (3) I.
   Mr. Tuveson
   Prerequisite: open to graduate students and (with consent of instructor) to advanced undergraduates.
   Readings in the general area of English 166. A student may not take both 166 and 203M for credit.

203P. Readings in American Literature of the Nineteenth and Twentieth Centuries. (3) II.
   Mr. Tuveson
   Prerequisite: open to graduate students and (with consent of instructor) to advanced undergraduates.
   Readings in American literature of the nineteenth and twentieth centuries. A student may not take this course for credit if he has received credit for either 130B or 130C.

*204. Celtic Studies. (3) I and II.
   This course may be repeated for credit.

205A-205B. The Structure and History of the English Language.
   (3-3) Yr.
   Mr. Hutson, Mr. Reed
   205B. I: Mr. Hutson; 205A. II: Mr. Reed.
   Course 205A is prerequisite to course 205B.
   205A. The structure of present-day English—pronunciation, grammar, vocabulary, dialects.
   205B. The history of English structure from Old English to the present; sources of vocabulary, development of dialects, rise of standard English.

207. Linguistics and Literary Analysis. (3) II.
   Mr. Sledd
   Prerequisite: course 205A–205B. Students whose interest is contemporary literature may take 207 concurrently with 205B.
   A seminar to explore the application of linguistic knowledge and methods of analysis to literary works.

208. Problems in the Study of Literature. (3) I and II.
   Mr. McNulty, Mr. Renoir, Mr. Stewart
   Textual analysis, discussion of scholarly approaches, based on secondary reading; problems in the presentation of materials.
   I: Renaissance Studies (Spenser), Mr. McNulty; Comedy, Mr. Traugott; II: American Literature, Mr. Stewart; Pre-Elizabethan, Mr. Renoir.

210. Chaucer. (3) II.
   Mr. Muscatine
   Some knowledge of Chaucer and his language is presupposed.

211A. Introduction to Old English. (3) I and II.
   Mr. Hutson, Mr. Renoir
   I: Mr. Renoir, Mr. Hutson; II: Mr. Hutson.
   Rapid reading of Old English texts.
   Open to seniors with consent of the instructor.

* Not to be given, 1959-1960.
211B. The Beowulf. (3) II. Mr. Hutson

211G*–211H. Old and Middle English. (3–3) Yr. Mr. Hutson, Mr. Reed
Especially designed for candidates for the Ph.D. degree.
Development of the English language from its beginnings as illustrated in representative texts. Prerequisite for 211G: a reading knowledge of German.

*211J. Modern English. (3) II. Mr. Sledd
Especially designed for candidates for the Ph.D. degree.
Continuation of 211G–211H. Development of standard English to the present; the structure of present-day English.

212. Old English Poetic Forms and Techniques. (3) I. Mr. Renoir
Prerequisite: two semesters of Old English.

213. Readings in Middle English. (3) I and II.
Mr. Cline, Mr. Muscatine, Mr. Renoir, Mr. Sledd, Mr. Stewart
I: Mr. Cline, Mr. Renoir, Mr. Stewart; II: Mr. Muscatine, Mr. Sledd.
Rapid reading of selections in Middle English, and perhaps some entire poems, from the twelfth century to the fifteenth.

214. American Drama. (3) II. Mr. Bogard
Prerequisite: consent of instructor.
Studies in American drama from the colonial period to the present.

217. Studies in Shakespeare. (3) II. Mr. Evans

218. Milton and His Contemporaries. (3) I. Mr. Shumaker

220A–220B. The Medieval Mind. (3–3) Yr. Mr. Jones, Mr. Caldwell
220A. I: Mr. Jones; II: Mr. Caldwell.
220B. II: Mr. Jones.
220A. Readings in Medieval Latin. I and II.
Prerequisite: two years of high school Latin or the equivalent.
An introduction to the central language and literature of the Middle Ages.
220B. Dominant Themes in Medieval Literature. II.
Prerequisite: course 120 or 220A or the equivalent.
Bibliography and special problems. Accent upon medieval European literature without geographical or linguistic distinctions.

*225A–225B. The Popular Ballad. (3–3) Yr. Mr. Bronson

*228. Regional Literature: California and the West. (3) II. Mr. Hart

230A–230B. American Literature. (3–3) Yr. Mr. Hart, Mr. Smith
230A is not prerequisite to 230B.

*232. Anglo-American Literary Relations. (3) I. Mr. Tuveson
Literary culture of the American colonies and of the United States (to 1840) considered as an integral part of the British tradition.

*235. Mark Twain. (3) II. Mr. Smith

*245. Spenser. (3) II.

247. Theory of Poetry. (3) I. Miss Miles

251A–*251B. Romantic Poets. (3–3) Yr. Mr. Caldwell
251A is not prerequisite to 251B.

* Not to be given, 1959–1960.
254A-254B. Elizabethan Drama. (3-3) Yr.  
254A is not prerequisite to 254B.

257A. Literary Criticism, 1750-1850. (3) II.  
Mr. McKenzie

*257B. Methods and Assumptions of Recent Literary Critics. (3) II.  
Mr. Shumaker

258. Johnson and His Contemporaries. (3) I.  
Mr. Bronson

260. Modern British Literature. (3) II.  
British literature from 1900 to the present.  
Mr. Watt

*262. Nineteenth-Century Literature. (3) II.  
Mr. Brightfield

*264. John Donne and His Followers. (3) I.  
Mr. Tuveson

*266. Period from 1660 to 1744. (3) II.  
Mr. Schorer

269. Theory of Fiction. (3) II.  
Mr. Schorer

298. Special Study. (3-6) I and II.  
The Staff (Mr. Schorer in charge)  
This course is normally reserved for students directly engaged upon the doctoral dissertation.

The members of the department are variously engaged in particular research and stand ready to advise and direct properly qualified graduate students in their several fields. Some indication of fields of interest is herewith suggested:

1. Critical Theory (Brightfield, Caldwell, McKenzie, Miles, Schorer, Shumaker).
2. Prose Fiction (Brightfield, Paterson, Raleigh, Schorer).
3. Drama (Barish, Bogard, Evans).
4. Poetry (Caldwell, Miles, Parkinson, Simpson).
5. Linguistics (Hutson, Reed, Sledd).
6. Early Germanic Literature (Renoir).
7. Celtic (Hutson).
8. The Ballad (Bronson).
9. Chaucer and the Middle Ages (Caldwell, Cline, Jones, Muscatine, Renoir, Shumaker, Sledd).
10. Shakespeare, Spenser, Milton, Donne, Sixteenth and Seventeenth Centuries (Barish, Bogard, Cline, Evans, McNulty, Miles, Shumaker).
13. Twentieth Century (Hart, Parkinson, Schorer, Stewart).

299. Special Study. (1-3) I and II.  
The Staff (Mr. Schorer in charge)  
This course is primarily for students engaged in preliminary exploration of a restricted field, involving research and the writing of a report. It may not be substituted for available seminars.

RELATED COURSES

Romanticism in Western Europe (Comparative Literature *121).
The Literature of the Renaissance in Western Europe (Comparative Literature 151A-151B).
The Symbolist Movement in European Literature (Comparative Literature 201A-*201B).
Seminar in Sociology of Literature (Sociology and Social Institutions 251).

* Not to be given, 1959-1960.
Entomology and Parasitology

Entomology and Parasitology

(Department Office, 112 Agriculture Hall)

Roderick Craig, Ph.D., Professor of Entomology.
Julius H. Freitag, Ph.D., Professor of Entomology.
Deane P. Furman, Ph.D., Professor of Parasitology.
William M. Hoskins, Ph.D., Professor of Entomology.
*Dilworth D. Jensen, Ph.D., Professor of Entomology.
E. Gorton Linsley, Ph.D., Professor of Entomology (Chairman of the Department).
Abraham E. Michelbacher, Ph.D., Professor of Entomology.
Morris A. Stewart, Ph.D., Professor of Parasitology.
Robert L. Usinger, Ph.D., Professor of Entomology.
Edward O. Essig, M.S., Professor of Entomology, Emeritus.
Philip F. Bonhag, Ph.D., Associate Professor of Entomology.
John W. MacSwain, Ph.D., Associate Professor of Entomology.
Woodrow W. Middlekauff, Ph.D., Associate Professor of Entomology.
A. Earl Pritchard, Ph.D., Associate Professor of Entomology.
Ray F. Smith, Ph.D., Associate Professor of Entomology.
Ronald W. Stark, Ph.D., Assistant Professor of Entomology.

Merlin W. Allen, Ph.D., Professor of Plant Nematology, Davis.
William W. Allen, Ph.D., Lecturer in Entomology.
Richard M. Bohart, Ph.D., Professor of Entomology, Davis.
Curtis P. Clausen, M.S., Professor of Biological Control, Riverside.
Richard L. Doutt, Ph.D., Associate Professor of Biological Control.
Norman W. Frazier, Ph.D., Lecturer in Entomology.
Harold T. Gordon, Ph.D., Lecturer in Entomology and Physiology.
*Paul D. Hurd, Jr., Ph.D., Lecturer in Entomology.
Harold F. Madsen, Ph.D., Lecturer in Entomology.
Mauro E. Martignoni, Ph.D., Lecturer in Insect Pathology.
Robert L. Metcalf, Ph.D., Professor of Entomology, Riverside.
Edward A. Steinhaus, Ph.D., Professor of Insect Pathology.
Edward S. Sylvester, Ph.D., Lecturer in Entomology.
Jean P. Vité, Ph.D., Lecturer in Entomology.

Letters and Science List.—Courses 100, 106, 110, 112, 117, 119, 126, 127, 129, 131, 133 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. MacSwain.
Preparation for the Major.—See page 79 of the Circular of Information.

Lower Division Course

49. Summer Field Course. (No credit)

Mr. MacSwain, Mr. Bohart, Mr. Hurd

Six weeks, daily, except Sunday. Prerequisite: one course in entomology or approval of the instructor.
The study and collection of insects in their natural habitats, with special emphasis on ecology, life histories, and field recognition.

Upper Division Courses

100. General Entomology. (4) II.

Lectures and laboratory.
An introduction to the classification, life histories, morphology, physiology, and ecology of insects.

106. Introduction to Structure and Function in Insects. (4) I. Mr. Bonhag
Lectures and laboratory. Prerequisite: course 100 or the equivalent.
General principles of insect morphology with emphasis on the functional
approach. Comparative anatomy of selected insect types.

110. Insect Physiology. (3) II. Mr. Craig
Lectures and laboratory. Prerequisite: course 106; Chemistry 8 or the
equivalent.
Detailed consideration of nutrition, digestion, excretion, circulation, respiration,
and the nervous and hormonal systems of insects.

112. Systematic Entomology. (4) II. Mr. Linsley, Mr. Usinger
Lectures and laboratory. Prerequisite: course 100 or consent of the instructor.
The classification of insects, taxonomic categories and procedure; bibliographic
methods; nomenclature; museum practices.

114. Forest Entomology. (3) I. Mr. Stark
Lectures and laboratory. Prerequisite: not open to entomology majors
without special consent of the instructor.
The identification, life histories, ecology, and control of insects affecting
western forests and forest products.

117. Helminthology. (4) I. Mr. Stewart, Mr. Furman
Lectures and laboratory.
Helminthic infections of man and domestic animals. Biology, host-parasite
interrelationships, identification, prophylaxis, and therapeusis.

118. Plant Nematology. (4) II Mr. M. W. Allen
Lectures and laboratory.
Identification, morphology, biology, and distribution of plant parasitic
and associated nematodes. Symptomatology, pathalogy, and control of nemic
infections in cultivated crops. Techniques employed in the manipulation and
examination of soil and infected plants.

119. Acarology. (3) I. Mr. Pritchard
Lectures and laboratory. Prerequisite: course 112 or consent of the instructor.
The taxonomy, biology, and ecology of mites and ticks. Laboratory rearing
techniques and slide preparation methods.

124. Economic Entomology. (4) I. Mr. Michelbacher, Mr. Middlekauff
Lectures and laboratory.
Life histories, habits, distribution, economics, and control of insects attacking
agricultural crops and stored products.

125. Insect Vectors of Plant Diseases. (4) I. Mr. Freitag, Mr. Sylvester, Mr. Jensen, Mr. Frazier
Lectures and laboratory. Prerequisite: Plant Pathology 120 or consent of
the instructor.
The role of insects in the transmission and causation of plant diseases.
Laboratory studies of disease symptoms, host ranges, methods of transmission,
and properties of plant viruses.

126. Medical Entomology. (4) II. Mr. Stewart, Mr. Furman
Lectures and laboratory.
The role of insects and other arthropods in transmission and causation of
diseases of humans and domestic animals.
127. Insect Ecology. (3) II.
Prerequisite: upper division standing in one of the biological sciences.
Principles of ecology, with examples from the insects; insect behavior; analysis of the insect environment; population dynamics.

128. Chemistry of Insecticides and Fungicides. (4) I.
Lectures and laboratory. Prerequisite: Chemistry 8 or consent of the instructor.
Chemical composition and reactions of insecticides and fungicides, and their physiological effects on plant and animal tissues.

129. Biological Control of Insect and Weed Pests. (3) I.
Lectures and laboratory. Prerequisite: course 100 or consent of the instructor.
Principles and methods of biological control; biology of entomophagous insects; critical discussion of important world projects.

130. Insects in Relation to Deciduous Fruit and Nut Crops. (3) II.
Lectures and laboratory (field trip). Prerequisite: course 124.
An advanced course on the biology, ecology, recognition and control of insects and related pests of major deciduous fruits and nuts in California. Emphasis on application methods and the principles of experimental field entomology.

131. Insect Pathology. (4) II.
Lectures and laboratory. Prerequisite: course 100, and at least one course in mycology or bacteriology, or protozoology.
General insect pathology and microbiology, including biological relationships between microorganisms and insects. Detailed study of bacterial, fungus, virus, and protozoan diseases of insects; noninfectious diseases; histopathology. Microbial agents and biological control.

133. Biology of Aquatic Insects. (4) II.
Lectures and laboratory. Field trips for the study of stream and lake survey methods.
General and applied limnology, with special reference to insects. Laboratory exercises on the life histories and identification of aquatic insects.

135. Insects in Relation to Flowering and Other Ornamental Plants. (2) I.
Lecture and laboratory. Prerequisite: course 124.
The study of the importance, recognition, taxonomy, biology, ecology, and control of insects and related pests of flowering and other ornamental plants.

136. Insects in Relation to Vegetable and Field Crops. (3) II.
Lectures and one or more field trips. Prerequisite: course 124.
The major insects and related organisms attacking commercial vegetable and field crops in California; their biology, ecology, distribution, diagnosis, cultural, and chemical control.

198. Directed Group Studies for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. Linsley in charge)

199. Special Study for Advanced Undergraduates (1-5) I and II.
The Staff (Mr. Linsley in charge)
Entomology and Parasitology

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 18)

200A-200B. Research in Entomology and Parasitology. (1-6; 1-6) Yr.
The Staff (Mr. Linsley in charge)

201A-201B. Seminar in Economic Entomology. (1-1) Yr.
Mr. Jensen, Mr. Madsen, Mr. Smith, Mr. W. W. Allen, Mr. Frazier, Mr. Middlekauff

202A-202B. Seminar in Parasitology. (1-1) Yr. Mr. Stewart, Mr. Furman

203A-203B. Seminar in Insect Toxicology and Insect Physiology. (1-1) Yr.
Mr. Craig, Mr. Hoskins, Mr. Gordon

204A-204B. Seminar in Insect Pathology. (1-1) Yr. Mr. Steinhaus

205A-205B. Seminar in Systematic Entomology. (1-1) Yr.
Mr. Linsley, Mr. MacSwain, Mr. Usinger, Mr. Hurd

210. Insect Biochemistry. (3) I. Mr. Craig, Mr. Gordon, Mr. Hoskins
Lectures and laboratory. Prerequisite: courses 110, 128. Recommended: courses 106, 112, 127; Biochemistry 102.
Interpretation of ecological specializations, including parasitism and host specificity, on the basis of nutrition and enzyme mechanisms. In alternate years, emphasis is placed on the action of toxic chemicals, resistance to insecticides, bioassay methods, and interpretation of experimental results. May be taken twice for credit.

212. Principles of Systematic Entomology. (3) II.
Mr. Linsley, Mr. Usinger
Prerequisite: course 112 or consent of the instructor.
The theory and philosophy of systematic entomology with emphasis on phylogeny, zoogeography, and nomenclature.

226. Advanced Medical Entomology. (2) I. Mr. Stewart, Mr. Furman
Prerequisite: courses 117, 126; Bacteriology 101. Recommended: courses 106, 112, 127.
The genesis of arthropod-borne diseases.

232. History of Entomology. (3) II.
Mr. Jensen
Prerequisite: course 100 or consent of the instructor.
The historical development of influential ideas and principles in biology with special reference to entomology. Consideration is given to the effects of philosophy, religion, political and economic factors on the evolution of the scientific method.

250. Principles and Methods of Entomological Research. (3) I.
Mr. Sylvester
A presentation of the techniques and purposes of the scientific method and experimentation in the field of entomology, with emphasis on problem selection and the accompanying collection, evaluation, and presentation of data.

Staff Seminar in Entomology. (No credit) Yr.
The Staff (Mr. Linsley in charge)
Biweekly meetings for presentation of special topics by members of the staff or visiting specialists.
Entomology and Parasitology; Food Technology

(GIVEN AT RIVERSIDE)

Graduate Courses

200A–200B. Seminar in Entomology, Including Biological Control. (1-1) Yr. The Staff (Entomology, Mr. Metcalf in charge) Biological Control, Mr. Clausen in charge)

201A–201B. Research in Entomology. (2-6; 2-6) Yr. Mr. Metcalf

205A–205B. Research in Biological Control (2-6; 2-6) Yr. Mr. Clausen

Food Technology

(Department Office, 108 Giannini Hall)

Maynard A. Joslyn, Ph.D., Professor of Food Technology.
Gordon Mackinney, Ph.D., Professor of Food Technology (Vice-Chairman of the Department).
Harold S. Olcott, Ph.D., Professor of Marine Food Technology.
William V. Cruess, Ph.D., Professor of Food Technology, Emeritus.

Departmental Major Adviser: Mr. Mackinney.

Preparation for the Major.—See page 80 of the Circular of Information.
The Major.—Course work leading to the degree of Bachelor of Science may be undertaken subject to the requirements of the College of Agriculture (see page 77 of the Circular of Information).

Upper Division Courses

112. Principles and Practices of Food Processing. (3) I. Mr. Mackinney
Prerequisite: Chemistry 1A–1B and 8; Bacteriology 1; and a course in botany or zoology.
Principles and technological processes involved in the preparation, preservation, and examination of fruit and vegetable products.

113. Chemical and Biochemical Aspects of Food Processing. (3) II.
Prerequisite: Chemistry 1A–1B, 8; Bacteriology 1. Mr. Olcott
Relation of food processing and handling to acceptability, color changes, enzyme activity, deterioration, flavor, vitamin retention, and other factors.

*118. Enzyme Technology. (3) I. Mr. Joslyn
Prerequisite: Biochemistry 102.
Control and utilization of enzymes in preparation and preservation of foods and food products.

120. The Natural Coloring Matters. (2) II. Mr. Mackinney
Lectures and laboratory. Prerequisite: 3 units of biochemistry or agricultural biochemistry, or upper division organic chemistry.
Chemistry of natural pigments and related compounds; spectrophotometric and chromatographic techniques; special emphasis on pigments in relation to foods.

199. Special Study for Advanced Undergraduates. (1-5) I and II.
Mr. Mackinney, Mr. Joslyn, Mr. Olcott

* Not to be given, 1959–1960.
* In residence spring semester only, 1959–1960.
Graduate Courses

(Concerning conditions for admission to graduate courses, see page 18)

*200A–200B. Seminar in Food Technology. (1–1) Yr.
    Mr. Joslyn, Mr. Mackinney, Mr. Olcott

237A–237B. Research in Food Technology. (1–9; 1–9) Yr.
    Mr. Joslyn, Mr. Mackinney, Mr. Olcott

Foreign Literature in Translation

The following courses offered in the departments of language and literature do not require a reading knowledge of any foreign language.

Classics
10A*-10B. Ancient Greek and Roman Civilization.
34. Epic Poetry: Homer and Vergil.
35. Greek Tragedy.
36. Plato.
100A–100B. Greek and Latin Literature in Translation.
178. Mythology.

Comparative Literature 151A–151B. The Literature of the Renaissance in Western Europe

French
*142–142B. French Literature of the Middle Ages.
146A*-146B. Readings in Contemporary French Literature.

German

Italian

Near Eastern Languages

Oriental Languages
*22. Indonesian Civilization.
*142C. Civilizations of Eastern Asia: China.
142K. Civilizations of Eastern Asia: Korea.
163. Readings in Pacific Literature in English Translation.
*182. Life and Times of Confucius.

Scandinavian
100A*-100B–100C. History of Scandinavian Literature.
106. History of Scandinavian Drama up to 1900.
107. The Plays of Ibsen.
108. Strindberg and His Writings.

* Not to be given, 1959–1960.
109. Scandinavian Drama of the Twentieth Century.
120A–120B. The Novel in Scandinavia.
*125. Masterpieces of Old Norse Literature.

**Slavic Languages and Literature**
39. Great Writers of Russian Literature.
130. Introduction to Russian Literature.
*131. Russian Literature (1880–1917).
*132. Russian Literature since 1917.
133A. Russian Novelists of the Nineteenth Century and Western European Literatures.
133C. Dostoevski.
133D. Tolstoy.
*133E. Turgenev.
133F. Chekhov.
*134. Russian Folklore.
135. The Russian Drama.
140. Survey of Slavic Literatures.
153. Polish Literature of the Post-Romantic Period.
154. Polish and Russian Romanticism.
*155. Mickiewicz.
160. Survey of Czech and Slovak Literature.
*161. Czech and Slovak Literature of the Nineteenth Century.
170. Survey of South Slavic Literatures.
*180A–180B. Survey of Russian Culture.
182. History of Polish Culture.

**Spanish**

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**FORESTRY**

(Department Office, 243 Walter Mulford Hall)

Percy M. Barr, Ph.D., Sc.D., Professor of Forestry.
Harold H. Biswell, Ph.D., Professor of Forestry.
Robert A. Cockrell, Ph.D., Professor of Forestry.
Robert N. Colwell, Ph.D., Professor of Forestry.
Fred E. Dickinson, Ph.D., Professor of Forestry.
Dietrich Muelder, D.F., Professor of Forestry.
Henry J. Vaux, Ph.D., Professor of Forestry (Chairman of the Department).
John A. Zivnuska, Ph.D., Professor of Forestry.
Frederick S. Baker, F.E., Professor of Forestry, Emeritus.
Emanuel Fritz, M.E., M.F., Professor of Forestry, Emeritus.
Joseph Kittredge, Ph.D., Professor of Forestry, Emeritus.
Myron E. Krueger, M.S., Sc.D., Professor of Forestry, Emeritus.
Arthur W. Sampson, Ph.D., Professor of Forestry, Emeritus.
Harold F. Heady, Ph.D., Associate Professor of Forestry.
*Edward C. Stone, Ph.D., Associate Professor of Forestry.
Paul J. Ziukay, Ph.D., Assistant Professor of Forestry.

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Arthur B. Anderson, Ph.D., Lecturer in Forestry.
David L. Brink, Ph.D., Lecturer in Forestry.
Paul Casamajor, M.F., Lecturer in Forestry for the fall semester.

* Not to be given, 1959–1960.
* In residence spring semester only, 1959–1960.
Eric L. Ellwood, Ph.D., Lecturer in Forestry.
Rudolf F. Grah, Jr., Ph.D., Lecturer in Forestry.
Joseph E. Marian, D.Tech., Sci., Lecturer in Forestry.
Marshall N. Palley, Ph.D., Lecturer in Forestry.
Arnold M. Schultz, Ph.D., Lecturer in Forestry for the fall semester.

Letters and Science List.—Courses 1, 103, 122, and 125 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

**LOWER DIVISION COURSES**

1. **Elements of Forestry.** (3) II. Mr. Grah
   Forests in their relation to national life; the life history of the tree and the forest; general principles of forestry.

49. **Forestry Field Practice Course.** (No credit)
   The Staff (Mr. Stone in charge)
   Prerequisite: one-half year of mechanical drawing, Engineering 21, Botany 1, and an average grade of C or higher. This course is prerequisite to all required courses in the School of Forestry.
   Approximately ten weeks of field laboratory work in forest surveys and mapping, forest mensuration, silviculture, logging, and milling operations at Meadow Valley near Quincy in the Plumas National Forest.

**UPPER DIVISION COURSES**

Course 49 is prerequisite to all required courses in the School of Forestry.

103. **Principles of Forest Ecology.** (4) I. Mr. Schultz
   Lectures and laboratory. Prerequisite: Botany 1 and Chemistry 1A.
   Basic factors controlling associations of plants under natural conditions.

104. **Silviculture.** (4) I. Mr. Muelder
   Lectures and laboratory. Prerequisite: course 103.
   Methods of governing growth and reproduction of forests through the application of ecological laws.

106. **Forest Planting.** (3) II. Mr. Colwell
   Lectures, laboratory, or field trips. Prerequisite: Botany 1.
   Artificial establishment of forests from collection of seed to planting of trees; the physiological, environmental, and genetic factors affecting survival and growth of forest seedlings; financial aspects of forest plantations.

108. **Dendrology.** (3) I. Mr. Zinke
   Lectures, laboratory, and field trips. Prerequisite: Botany 1.
   Identification by morphological characters of important forest trees of North America; their ecological and geographical distribution; field identification of many forest shrubs.

110. **Forest Mensuration.** (4) II. Mr. Palley
   Lectures and conferences. Prerequisite: a course in elementary statistics and course 49.
   Principles underlying log scaling and the estimation of timber volume and value; growth of stands; the application of statistical analysis to forest measurements.

112. **Lumber Manufacturing.** (3) I. Mr. Dickinson
   Senior and graduate students from other departments may be admitted with consent of the instructor.
   Organization and characteristics of the lumber industry; the manufacture of lumber from log pond to finished product; seasoning, grading, marketing.
114. Wood Technology. (3) I. Mr. Cockrell
Lectures and laboratory. Prerequisite: Chemistry 1A and Botany 1. Junior and senior students from other departments may be admitted with consent of the instructor.
Anatomy of wood; properties and uses; identification of commercial species.

115. Physical Properties of Wood. (3) I. Mr. Cockrell
Lectures and laboratory. Prerequisite: Physics 2A-2B or the equivalent.
Density, moisture relations, shrinking and swelling, strength, thermal, electrical, and acoustic properties of wood.

118. Forest Engineering. (3) II. Mr. Grah
Lectures and laboratory. Prerequisite: Engineering 21 and Physics 2A-2B.
Engineering methods involved in logging and forest management.

120. Management of Forest Properties. (4) II. Mr. Grah
Lectures and laboratory. Prerequisite: courses 104 and 110.
Economic and technical principles involved in the management of forest lands for the continuous production of timber crops.

121. Forest Economics. (3) I. Mr. Zivnuska
(Formerly given as 121A–121B.)
Prerequisite: 6 units of economics and senior standing. Senior and graduate students from other departments may be admitted with consent of the instructor.
Economic analysis of problems in the utilization of forest land and forest products.

122. Forest Policy. (3) II. Mr. Vaux
Prerequisite: 6 units of economics and senior standing.

125. Forest Influences. (3) I. Mr. Zinke
Lectures and laboratory or field trips. Prerequisite: course 103, Physics 2A–2B, senior standing. Recommended: Soil Science 100 and Geography 111.
The influence of forests and brush on soil moisture, run-off, stream flow, floods, erosion, local climate, and soil productivity for forest growth.

126. Production Methods in the Forest Industries. (3) II. Mr. Grah
Prerequisite: 6 units of economics and senior standing.
Production methods and principles involved in logging; cost analyses.

128. Forest Protection. (3) I. Mr. Casamajor
Lectures and one field trip. Junior and senior students from other departments may be admitted with consent of the instructor.
Forest fire behavior; ignition and spread of forest fires and factors by which they are influenced; forest fire control organization and equipment; methods of fire prevention and suppression.

130. Industrial Forestry. (3) II. Mr. Barr
Prerequisite: senior standing. Senior and graduate students from other departments may be admitted with consent of the instructor.
The application of forest management to large properties under private ownership; nature and development of the industrial forest enterprise; costs and returns; integration of forest industries; status and trends of American industrial forestry.
132. Forest Photogrammetry. (3) II.
Lectures and laboratory.
The construction of planimetric and topographic maps from vertical and oblique aerial photographs. The use of aerial photographs in mapping vegetation types and estimating timber volumes. Construction of aerial photo mosaics.

198. Directed Group Study. (1-5) I and II.
The Staff (Mr. Vaux in charge)
Prerequisite: senior standing and consent of the instructor.
Group study, or investigation, of special problems.

199. Special Study for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. Vaux in charge)
Prerequisite: senior honor students with adequate background in the subject proposed.
This course may also be taken during the summer at the Forestry Camp at Meadow Valley, Plumas County.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

201A–201B. Seminar in Forestry. (2–2) Yr. Mr. Muelder, Mr. Colwell
201A is not prerequisite to 201B.

202. Research in Forestry. (1–6) I and II. The Staff (Mr. Vaux in charge)
(Formerly numbered 202A–202B.)
Original study on special topics in the laboratory, or in the field.

203. Seminar in Forest Ecology. (2) I. Mr. Schultz
Prerequisite: course 103 and Botany 111.
Seminar on contemporary research in forest ecology.

204. Seminar in Silviculture. (2) I. Mr. Muelder
Prerequisite: course 104.
Regional silviculture; recent research findings and current needs.

205. Seminar in Wood Technology. (2) I. Mr. Cockrell
Prerequisite: course 114.

206. Seminar in Forest Management. (2) II. Mr. Barr
Prerequisite: course 120 and 6 units of economics.

207A–207B. Seminar in Forest Economics. (2–2) Yr. Mr. Zivnuska, Mr. Vaux
Prerequisite: 12 units of economics, agricultural economics, or forest economics. 207A not prerequisite to 207B.

208. Seminar in Wood Chemistry. (2) II. Mr. Anderson
Prerequisite: consent of the instructor.
Chemical constitution and isolation of the various chemical entities present in wood; the general biological role of these components and their application in forest products industries.

225. Seminar in Forest Influences and Watershed Management. (2) I.
Prerequisite: course 125 and consent of the instructor. Mr. Zinke
The influences of forests on soil properties, on water and its disposition, and on the local microclimate.
299. Special Study for Graduate Students. (1-4) I and II.

The Staff (Mr. Vaux in charge).

Reading and conferences for properly qualified graduate students under the direction of a member of the staff.

**SELECTED RELATED COURSES IN OTHER DEPARTMENTS**

- Economics of Natural Resources (Agricultural Economics 175)
- Taxonomy of Seed Plants (Botany 108)
- Elementary Plant Physiology (Botany 111)
- Principles of Plant Distribution (Botany 151)
- Production Organization and Management (Business Administration 140)
- Strength of Materials (Engineering 18A–18B)
- Route Surveying (Civil Engineering 102)
- Hydrology (Civil Engineering 160)
- Forest Entomology (Entomology 114)
- Principles of Genetics (Genetics 100)
- Elementary Meteorology (Geography 111)
- Natural Resources and Their Exploitation (Geography 153)
- Forest Pathology (Plant Pathology 100)
- Public Policy and Administration of Natural Resources (Political Science 185A)
- Soil Characteristics (Soil Science 100)
- Statistical Inference (Statistics 130A–130B)
- Introduction to Wildlife and Fisheries Management (Zoology 116)

**FRENCH**

(Department Office, 4125 Dwinelle Hall)

Clarence D. Brenner, Ph.D., Professor of French.

Francis J. Carmody, Ph.D., Professor of French.

Jacqueline de La Harpe, Docteur d'Lettres, Professor of French.

Warren Ramsey, Ph.D., Professor of French and Comparative Literature.

Ronald N. Walpole, Ph.D., Professor of French (Chairman of the Department).

Percival B. Fay, Ph.D., Professor of French, Emeritus.

Arnold H. Rowbotham, Ph.D., Professor of French, Emeritus.

Clifford H. Bissell, Ph.D., Associate Professor of French, Emeritus.

Mathurin Dondo, Ph.D., Associate Professor of French, Emeritus.

Alvin A. Eustis, Jr., Ph.D., Associate Professor of French.

Edward F. Meylan, Ph.D., Associate Professor of French.

Irving Putter, Ph.D., Associate Professor of French.

Marc J. Bensimon, Ph.D., Assistant Professor of French.

Frank P. Bowman, Ph.D., Assistant Professor of French.

Basil Guy, Ph.D., Assistant Professor of French.

Elie R. Vidal, Ph.D., Assistant Professor of French.

Paul M. Bertrand Augst, M.A., Acting Instructor in French.

Marie-Louise Dufrenoy, Ph.D., Associate in French.

Jean E. Guédenet, Licencié d'Lettres, Associate in French.

Jean Dagens, Docteur d'Lettres, Visiting Professor of French.

Manfred M. G. Sandmann, Ph.D., Lecturer in French for the fall semester.

* In residence spring semester only, 1959–1960.
Letters and Science List.—All undergraduate courses except 20 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Eustis, Mr. Putter.

Preparation for the Major.—Required: courses 1, 2, 3, 4, 25, or their equivalents. (Students who receive grade A or B in French 4 will be admitted to the upper division courses without the requirement of course 25.) History 4A–4B, Philosophy 20A–20B, English 1A–1B, and Latin are strongly recommended.

The Majors.—Two majors are offered in the department: Plan A, emphasis on literature; Plan B, emphasis on language and culture.

Plan A.—Required: courses 101A–101B (6 units), 109A–109B (6 units), and four semesters chosen from 112A, 112B, 120A, 120B, 121A, 121B (8 units). The remaining 4 units will consist of other upper division courses (except 108, 142, and 146).


Students who fail to maintain an average of 2 grade points or better for each unit of work undertaken in the upper division courses in the Department of French will, upon approval of the Executive Committee of the College of Letters and Science, be excluded from the major in French.

Honors.—For the honors program consult one of the major advisers.

LOWER DIVISION COURSES

In courses 1, 2, 3, and 4, three hours of basic study will be supplemented by two hours of specialized practical work.

1. Elementary French. Beginners' Course. (4) I and II.
   Sections meet five hours per week. Mr. Bowman in charge

French for Graduate Students. (No credit) I and II.
   (Formerly numbered 1G.) Mr. Bowman in charge
   First course (elementary).
   Second course (intermediate).
   Preparation for graduate reading examinations.

2. Elementary French (continuation of 1). (4) I and II.
   Sections meet five hours per week. Mr. Guy in charge
   Prerequisite: course 1 or its equivalent.

3. Intermediate French. (4) I and II. Mr. Vidal, Mr. Bensimon
   Sections meet five hours per week. Some sections emphasize reading, others conversation. Reading sections are not designed for prospective French majors.
   Reading sections: Mr. Vidal in charge; conversation sections: Mr. Bensimon in charge.
   Prerequisite: course 2 or its equivalent.

   Sections meet five hours per week. Mr. Bensimon in charge
   Prerequisite: course 3 (conversation) or its equivalent.

4R. Intermediate French. Reading. (4) I and II. Mr. Vidal in charge
   Sections meet five hours per week.
   Prerequisite: course 3 or its equivalent.
   Intended for students interested in reading short, representative works of certain great French writers, with classroom analysis in English. Not for prospective majors in French.
20. **French Pronunciation. (1) I and II.**
   Mr. Putter in charge
   Prerequisite: course 2 or the equivalent.
   A course in the pronunciation of French for students on the intermediate level.

25. **Advanced French. (3) I and II.**
   Miss Dufrenoy, Mr. Guèdenet
   Prerequisite: course 4, or a grade of A or B in course 4R.

**UPPER DIVISION COURSES**

The prerequisite to all upper division courses is 16 units of lower division courses, including course 4 with grade A or B, or course 25.

Courses 101A–101B and 109A–109B must usually be taken before any other upper division course, with the exception of courses 108 and 125.

101A–101B. **Intensive Reading, Grammar, and Composition. (3–3) Yr.**
   Beginning each semester.
   Mr. Bensimon in charge

108A*-108B. **Reading in French Literature. (3–3) Yr.**
   Mr. Meylan
   Prerequisite: course 4 or 4R, or the equivalent. Does not satisfy any requirement for the major in French.
   The masterpieces of French literature read in French, with classroom work in English.

   Mr. Putter (in charge), Mr. Bensimon, Mr. Bowman, Mr. Vidal
   109A. Middle Ages Through Seventeenth Century.
   Mr. Bensimon, Mr. Vidal.
   109B. Eighteenth and Nineteenth Centuries. Mr. Bowman.

112A–112B. **The Nineteenth Century. (2–2) Yr.**
   Mr. Putter

114A–114B. **Contemporary French Literature. (2–2) Yr.**
   Mr. Ramsey

115A–115B. **Modern French Drama. (2–2) Yr.**
   115A: Nineteenth Century; 115B: Twentieth Century.
   Mr. Brenner

*116A–116B. French Literature from 1885 to 1914. (2–2) Yr.*
   Mr. Carmody

120A–120B. **The Seventeenth Century. (2–2) Yr.**
   Mr. Eustis

121A–121B. **The Eighteenth Century. (2–2) Yr.**
   Mr. Guy

125. **Advanced French Pronunciation. (1) I and II.**
   Miss Dufrenoy, Mr. Augst

130A–130B. **Advanced Grammar and Composition. (3–3) Yr.**
   Prerequisite: course 101A–101B.
   Mr. Dagens, Mr. Meylan

131A–131B. **Advanced Literary Composition. (3–3) Yr.**
   Miss de La Harpe
   Prerequisite: course 101A–101B. Required for all candidates for the M.A. degree.
   A course in the development of an ability to write good literary French.

134A–134B. **Survey of French Culture and Institutions. (3–3) Yr.**
   Prerequisite: course 101A–101B.
   Mr. Guèdenet

* Not to be given, 1959–1960.
*160. Contemporary Literature. (2) II.
Prerequisite: courses 101A–101B and 109A–109B.

199. Special Study for Advanced Undergraduates. (1–3) I and II.
The Staff (Mr. Putter in charge)

COURSES IN WHICH NO KNOWLEDGE OF FRENCH IS REQUIRED

Lectures (in English) and collateral reading of representative works in English translation.

39A. To the End of the Eighteenth Century. (2) I.
Mr. Putter (in charge), Mr. Brenner, Mr. Eustis

39B. The Nineteenth Century. (2) II.
Mr. Putter (in charge), Mr. Brenner, Mr. Eustis, Mr. Meylan

39C. The Contemporary Period. (2) II.
Mr. Ramsey
Prerequisite: course 39B or consent of the instructor.

*142A–142B. French Literature of the Middle Ages. (2–2) Yr.
(Formerly numbered 122A–122B.) Mr. Walpole
142A. Epic, romance, history.
142B. Drama, lyric and allegorical poetry.

146A*–146B. Readings in Contemporary French Literature. (2–2) Yr.
(Formerly numbered 126A–126B.) Mr. Carmody
Prerequisite: junior or senior standing and other specially qualified students.
The masterpieces of French literature of today read in English translation.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)
Course 201A or 206A is required of all candidates for the M.A. degree.

201A–201B. Historical Grammar. (3–3) Yr. Mr. Walpole

*202A–202B. Studies in Medieval French Literature. (2–2) Yr.
Reading knowledge of Old French is required. Mr. Walpole

*204A–204B. Studies in the Eighteenth Century. (2–2) Yr. Mr. Carmody
204A. Voltaire and the Philosophers.
204B. Jean-Jacques Rousseau.

206A–206B. Reading and Interpretation of Typical Old French Texts.
(2–2) Yr. Mr. Vidal

Mr. Guy

(2–2) Yr. Mr. Putter

*210A–210B. Studies in the Eighteenth-Century Drama. (2–2) Yr.
Mr. Brenner

215A–215B. Seminar in Contemporary Literature. (2–2) Yr. Mr. Ramsey

* Not to be given, 1959–1960.


French; Genetics

*217A–217B. Studies in the French Renaissance. (2–2) Yr. Mr. Meylan

218A–218B. French Classicism. (2–2) Yr. Mr. Dagens

219A–219B. Aspects of French Romanticism. (2–2) Yr. Mr. Bowman

220A–220B. Explication de Textes. (2–2) Yr. Miss de La Harpe

230A–230B. French Literary Criticism. (2–2) Yr. Mr. Eustis

235. Methods of Literary Research with Special Reference to Bibliography. (1) II. Mr. Brenner

For prospective doctoral candidates.

298. Special Study for Graduate Students. (1–4) I and II. The Staff (Miss de La Harpe in charge)

RELATED COURSES

Romanticism in Western Europe (Comparative Literature *121).
The Literature of the Renaissance in Western Europe (Comparative Literature 151A–151B).
The Symbolist Movement in European Literature (Comparative Literature 201A–*201B).
Methods of Study in Comparative Literature (Comparative Literature 200).

See also courses listed under Romance Philology.

GENETICS

(Department Office, 343 Mulford Hall)

Everett R. Dempster, Ph.D., Professor of Genetics.
James A. Jenkins, Ph.D., Professor of Genetics.
I. Michael Lerner, Ph.D., Professor of Genetics and Poultry Husbandry (Chairman of the Department).
G. Ledyard Stebbins, Ph.D., Professor of Genetics.
Curt Stern, Ph.D., Professor of Genetics and Zoology.
Spencer W. Brown, Ph.D., Associate Professor of Genetics.
Patricia St. Lawrence, Ph.D., Assistant Professor of Genetics.

Letters and Science List.—All undergraduate courses in genetics are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Dempster.

The Major.—Course work leading to the degree of Bachelor of Science may be undertaken subject to the requirements of the College of Agriculture (see page 76 of the CIRCULAR OF INFORMATION). Students may elect to follow either the animal science curriculum (see page 79 of the CIRCULAR OF INFORMATION) or the plant science curriculum (see page 83 of the CIRCULAR OF INFORMATION).

* Not to be given, 1959–1960.
LOWER DIVISION COURSE

10. Heredity and Evolution. (3) II. Mr. Lerner
Designed for students not specializing in biology. Not open for credit to students who have had or are taking upper division genetics, botany, or zoology courses.
Survey of basic principles of inheritance, variation, and evolutionary change in plants, animals, and man.

UPPER DIVISION COURSES

*100. Principles of Genetics. (3) I. Mr. Jenkins
Prerequisite: general botany or general zoology. Course 100C may be taken concurrently. Not open to students who are taking, or who have received credit for, Zoology 114.
Introduction to genetics with some consideration of its applications in agriculture and biology.

100C. Principles of Genetics Laboratory. (1) I. Miss St. Lawrence
Prerequisite: course 100 or Zoology 114 (may be taken concurrently).
Laboratory work in elementary genetics to supplement course 100 or Zoology 114.

101. Cytogenetics. (3) II. Mr. Brown
Prerequisite: course 100; general cytology.
Genetics as related to cytological conditions.

102. Biometrical Genetics. (4) I. Mr. Dempster
Lectures and laboratory. Prerequisite: course 100, Statistics 2.
Genetics with special reference to the application of statistical methods.

103A-103B. Organic Evolution. (2-2) Yr. Mr. Stebbins
Lectures, student reports, discussion. Prerequisite: elementary genetics, elementary botany or zoology, and taxonomy or cytology. 103A is not prerequisite to 103B. 103A given in the fall semester of odd-numbered years; 103B given in the spring semester of even-numbered years.
Organic evolution from the dynamic point of view.

104. Physiological Genetics. (3) I. Miss St. Lawrence
Prerequisite: course 100, Chemistry 8, or their equivalents. Recommended: general cytology.
An introduction to biochemical and physiological genetics.

105. Principles of Population Genetics. (2) I. Mr. Lerner
Prerequisite: course 100 and elementary statistics. Offered in odd-numbered years.
A survey of genetic forces operating on Mendelian populations, with special emphasis on selection.

199. Special Study for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. Dempster in charge)

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

201. Advanced Cytogenetics. (3) II. Mr. Cameron
Lectures and laboratory. Prerequisite: course 101, may be taken concurrently; or consent of the instructor.
A study of chromosome morphology and behavior as related to problems in genetics.

* Not to be given, 1959–1960.
205. **Advanced Population Genetics. (2)** Mr. Dempster

Lecture and laboratory. Prerequisite: upper division work in statistics or biometrical genetics and consent of the instructor. Offered in even-numbered years.

A quantitative approach to the genetics of laboratory and domestic populations. Discussion and formulation of experimental designs and analyses, selection procedures, and mating plans.

280. **Graduate Seminar in Genetics.** (1-4) I and II.

(Formerly numbered 202.) The Staff (Mr. Dempster in charge)

Intensive study of special topics in genetics under the supervision of members of the staff.

289. **Research in Genetics.** (1-6) I and II.

(Formerly numbered 200.) The Staff (Mr. Dempster in charge)

**Staff Seminar in Genetics.** (No credit) I and II.

(Formerly numbered 201.) The Staff (Mr. Lerner in charge)

Weekly meeting for the presentation of special topics by members of the staff, visiting investigators, and graduate students.

**RELATED COURSES IN OTHER DEPARTMENTS**

Human Evolution and Fossil Man (Anthropology 152 and 152L)
Bacterial Genetics (Bacteriology 107)
Plant Cytology (Botany 330)
Biological Effects of Radiation (Medical Physics 131)
Cytology (Zoology 107 and 107C)
Genetics (Zoology 114)
Human Genetics (Zoology 115)
Genetics Review (Zoology *244)
Seminar in Advanced Genetics (Zoology 245)

**GEOGRAPHY**

(Department Office, 230 Giannini Hall)

John B. Leighly, Ph.D., LL.D., Professor of Geography (Chairman of the Department).

†James J. Parsons, Ph.D., Professor of Geography.

Carl O. Sauer, Ph.D., D.Phil. (h.c.), LL.D., Professor of Geography, Emeritus.

Clarence J. Glacken, Ph.D., Associate Professor of Geography.

John E. Kesseli, Ph.D., Associate Professor of Geography.

Erhard Rostlund, Ph.D., Associate Professor of Geography.

Paul Wheatley, Ph.D., Associate Professor of Geography.

James E. Vance, Jr., Ph.D., Assistant Professor of Geography.

* Edwin M. Loeb, Ph.D., Lecturer in Geography.

† Nicholas T. Mirov, Ph.D., Lecturer in Geography.

Herbert Wilhelmy, Ph.D., Visiting Professor of Geography.

**Letters and Science List.**—All undergraduate courses in geography are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

* Not to be given, 1959—1960.
† Absent on leave, 1959—1960.
1 In residence fall semester only, 1959—1960.
2 In residence spring semester only, 1959—1960.
Departmental Major Adviser: Mr. Glacken.

Preparation for the Major.—Required: Geography 1, 2, 4, and Mathematics C or the equivalent. Recommended: Botany 12, Geography 5A–5B, Geology 10, Paleontology 1, Soils 10, and a course in elementary statistics (Economics 2 or the equivalent).

The Major.—24 units of upper division work in geography, or from 18 to 21 units of upper division work in geography and from 3 to 6 units chosen under an approved plan from the following: Anthropology 101A–101B; Botany 151; Economics 110, 113, 114; Forestry 103, 125; History 161A–161B, 181A–181B; Sociology and Social Institutions 133, 145, 167; Soils 101, 101F, 105; Zoology 125.

Each program should normally include Geography 101 or 102, 105A, 121A or 121B, and 151.

LOWER DIVISION COURSES

1. Introduction to Physical Geography. (3) I and II. Mr. Wheatley
   Two lectures and two section meetings per week.

2. Introduction to Cultural and Historical Geography. (3) II. Mr. Glacken
   Two lectures and two section meetings per week.

4. Map Reading and Map Interpretation. (3) I. Mr. Kesseli
   One lecture and two two-hour laboratory periods per week.

5A–5B. Economic Geography. (3–3) Yr. Mr. Vance
   Two lectures and two section meetings per week. 5A is not prerequisite to 5B.
   The distribution of the world's resources and industries.
   5A. Geography of world agriculture.
   5B. Mineral resources, manufacturing regions, trade routes, and trade centers.

UPPER DIVISION COURSES

101. Field Geography. (3) I. Mr. Kesseli
   Field trips Saturdays. Admission only after consultation with instructor.
   Field study of a unit area with systematic mapping of the elements that constitute the natural region and of the forms of its utilization.

102. Field Geography. (3) II. Mr. Vance
   Field trips Saturdays. Admission only after consultation with instructor.
   Study of type areas of physical and cultural interest.

105A–105B. Cartography. (3–3) Yr. Mr. Leighly
   One lecture hour and two three-hour laboratory periods per week. Prerequisite: consent of the instructor.
   105A: Cartographic representation. 105B: Map projections.

108. Analysis of Land Forms. (3) I. Mr. Wilhelm
   Origin of land forms. Review of the varied interpretation of processes involved, with emphasis on recent views.

109. Topographical Photo Interpretation. (3) II. Mr. Kesseli
   One lecture hour and two two-hour laboratory periods per week. Prerequisite: consent of the instructor.
   The identification and classification of data on air photographs; the solution of selected problems in photogrammetry.

111. Elementary Meteorology. (3) I. Mr. Leighly
   Prerequisite: a knowledge of elementary physics and calculus is desirable.
113. Climatology. (3) II.  Mr. Leighly

121A. Geography of Eastern North America. (3) I.  Mr. Rostlund
121B. Geography of Western North America. (3) II.  Mr. Rostlund

*122A. Geography of Middle America. (3) I.  Mr. Parsons
122B. Geography of South America. (3) II.  Mr. Wilhelmy

*123A. Geography of Mediterranean Europe. (3) I.

123B. Geography of Northern Europe. (3) II.  Mr. Glacken

124. Geography of the Soviet Union. (3) I.  Mr. Mirov
125A. Geography of Southeast Asia. (3) II.  Mr. Wheatley
125B. Geography of the Far East. (3) I.  Mr. Glacken, Mr. Wheatley

126. The Geography of the Middle East. (3) I.  Mr. Wheatley
A study of the natural environments and resources of Turkey, Egypt, the Levantine states, Saudi Arabia, Iraq and Iran, followed by an outline of the successive stages in the creation of the present-day humanized landscapes.

127. Geography of Southern Africa. (3) II.  Mr. Loeb

130. Geography of the Tropics. (2) I.  Mr. Wilhelmy
An analysis of the resources of the warm and wet lands of the equatorial regions; the economic potentialities of the tropics and the obstacles to their exploitation inherent in the physical and cultural environment.

131. Geography of California. (3) II.  Mr. Kesseli

141. Economic Geography: Primary Production. (3) I.  Mr. Vance
Analysis of the distribution of agricultural and mineral raw materials in relation to world commerce.

142. Economic Geography: Industrial Localization. (3) II.  Mr. Vance
Factors and trends in the geographic distribution of manufacturing industries.

151. American Geographic Thought. (2) I.  Mr. Glacken
Prerequisite: three upper division courses in geography.
Reports and conferences on the objectives, subdivisions, and methods of geography by American geographers of the late nineteenth and the twentieth century.

153. Natural Resources and Their Exploitation. (3) II.  Mr. Rostlund
Conservative and destructive uses of habitat (occupied area) by cultures (economic systems) throughout human time, with emphasis on contemporary problems.

155. Urban Geography. (3) I.  Mr. Vance
A study of the origin, development, distribution, and regional variation of the world's cities, with emphasis on an analysis of the functions and patterns of American cities.

* Not to be given, 1959–1960.
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Geography; Geology

*161. Geography of Domesticated Plants and Animals. (3) II.
   A consideration of the processes, times, and places of appropriation of elements of flora and fauna into agricultural economics and of the successive geographic dispersal of the domesticated forms.

176. The Relations Between Nature and Culture. (2) I. Mr. Glacken
   A critical survey, from antiquity to the present, of leading theories of the effects of the physical environment on culture; the influence of these theories on such fields as geography, history, and anthropology; contemporary views of the nature of the physical environment and its relation to population and economic potentials.

H195. Special Study for Honors Candidates. (1–3) I and II. The Staff
199. Special Study for Advanced Undergraduates. (1–3) I and II.
   The Staff (Mr. Glacken in charge)

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

For facilities for research, see the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION.

201. Seminar in Latin-American Geography. (2) II. Mr. Wilhelmy

202. Seminar in Historical Geography. (2) I and II.
   Mr. Rostlund, Mr. Wheatley

203. Seminar in Cultural Geography. (2) II. Mr. Glacken

205. Seminar in Physical Geography. (2) I. Mr. Kesseli

*207. Seminar in History of Geography. (2) II. Mr. Leighly

*208. Seminar in Economic Geography. (2) II. Mr. Parsons

219A–219B. Research. (1–5; 1–5) Yr. The Staff (Mr. Leighly in charge)

GEOLOGY

(Department Office, 203A Bacon Hall)

Perry Byerly, Ph.D., Professor of Seismology and Director of the Seismographic Stations.
Charles M. Gilbert, Ph.D., Professor of Geology (Chairman of the Department).
Charles Meyer, Ph.D., Professor of Geology.
Adolf Pabst, Ph.D., Professor of Mineralogy.
1 Francis J. Turner, Sc.D., Professor of Geology.
John Verhoogen, M.E., Ph.D., Professor of Geology.
Howel Williams, Sc.D., Professor of Geology.
Norman E. Hinds, Ph.D., Professor of Geology, Emeritus.
Nicholas L. Taliaferro, Ph.D., Professor of Geology, Emeritus.

* Not to be given, 1959–1960.
1 In residence fall semester only, 1959–1960.
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Geology

Garniss H. Curtis, Ph.D., Associate Professor of Geology and Associate Research Professor in the Institute for Basic Research in Science.

Jack F. Evernden, Ph.D., Associate Professor of Geology and Associate Research Professor in the Institute for Basic Research in Science.

William S. Fyfe, Ph.D., Associate Professor of Geology.

Richard L. Ilay, Ph.D., Assistant Professor of Geology.

Lionel E. Weiss, Sc.D., Ph.D., Assistant Professor of Geology.

Mark N. Christensen, Ph.D., Instructor in Geology.

William L. Quaide, Ph.D., Lecturer in Geology.

Letters and Science List.—All undergraduate courses in geology, except 150, are included in the Letters and Science List of Courses. For regulations governing this list, see page 111.

MAJOR IN GEOLOGY

Departmental Major Advisers: Mr. Evernden (fall semester); Mr. Curtis (spring semester).

The Major Program.—Required courses: Mathematics 3A, 3B; Chemistry 1A; Physics 2A, 2B, 3A, 3B; Zoology 1A; Geology 5; Mineralogy 6; Paleontology 1 or Geology 3; Geology 101, 103, 118; Paleontology 112; Mineralogy 101, or Geology 116 plus 102B or 102C; Geology 104A and 104B, or Geology 107 and an upper division course in invertebrate paleontology. Additional recommended courses are Chemistry 1B, 5, and Mathematics 4A, 4B; if time permits, Physics 4A, 4B, and 4C are recommended as a substitute for Physics 2A, 2B, 3A, and 3B.

Other upper division courses selected to complete the requirements for the A.B. degree should be chosen with the advice of the major adviser. Recommended electives include: additional mathematics, geology, mineralogy, and paleontology; Geography 108 and 109; Chemistry 110A-110B and 122; Physics 105A-105B; Soil Science 101; and Geological Engineering 102 and 103. Students who intend to continue with graduate study in aspects of geology emphasizing mineralogy, petrology, or economic geology should, if possible, complete Geology 104A-104B in the undergraduate program.

Students interested in the geological sciences should also note the curricula in paleontology in the College of Letters and Science and the curricula in geological engineering in the College of Engineering.

The Honors Major Program.—A program leading to an honors major in geology has been arranged; for details consult the departmental major adviser.

MAJOR IN GEOPHYSICS

Departmental Major Advisers: Mr. Evernden (fall semester); Mr. Curtis (spring semester).

The Major Program.—Required courses: Chemistry 1A; Geology 5, 101, 103, 121 or 122A-122B; Mathematics 3A, 3B, 4A, 4B, 110; Mineralogy 6; Physics 4A, 4B, 4C, 105A, 110A, 110B.

Other upper division courses selected to complete the requirements for the A.B. degree should be chosen with the advice of the major adviser. Recommended electives include: Geology 121 or 122A-122B; Physics 105B; Electrical Engineering 106; Mathematics 119A–119B.

The Honors Major Program.—A program leading to an honors major in geophysics has been arranged; for details consult the major adviser.

1 In residence fall semester only, 1959–1960.

2 In residence spring semester only, 1959–1960.
GEOLGY

LOWER DIVISION COURSES

3. General Geology: Historical. (3) II. Mr. Hay
   Three lectures and one discussion section per week. Prerequisite: course 5 or 10.
   Origin and geological history of the earth and the evolution of its animal and plant inhabitants.

5. General Geology. (4) I. Mr. Hay
   Three lectures and one three-hour laboratory period per week. Prerequisite: Chemistry 1A. For majors in geology, geophysics, and engineering.
   A survey of materials and physical processes occurring in the earth, with special emphasis on their physical and chemical backgrounds.
   Students who have received credit for 3 units of geology without laboratory may satisfy the requirement for the major by completing the laboratory course 5L.

5L. General Geology Laboratory. (1) I. Mr. Hay
   One three-hour laboratory per week. Prerequisite: a lecture course in geology; Chemistry 1A.

10. Introduction to Geology. (3) I and II. Mr. Gilbert, Mr. Christensen
   Two lectures and one two-hour laboratory per week. Prerequisite: elementary chemistry. Not open to students who have completed any course in geology, or to students majoring in a physical science or in engineering.
   An introduction to the phenomena and basic principles of geology, with laboratory demonstrations illustrating the nature of minerals, rocks, fossils, and geological maps.

15. General Geology. (3) II. Mr. Verhoogen
   Two lectures and one three-hour laboratory period per week. Prerequisite: Chemistry 1A, Physics 2A-2B, Mathematics 3A-3B, or consent of the instructor. For majors in engineering. Not open to students who have passed course 5 or 10.
   A survey of materials and physical processes occurring in the earth. Similar in scope to course 5 but with some topics omitted.

UPPER DIVISION COURSES

101. Field Geology. (4) I and II.
   The Staff (Mr. Evernden and Mr. Curtis in charge)
   (Formerly numbered 102A.)
   One lecture per week and one three hour laboratory and field trips all day Saturday. Prerequisite: course 5 and Mineralogy 6.
   Geology of the Berkeley Hills and vicinity. Training in geologic field methods and mapping, in the solution of structural and geomorphic problems, in the interpretation of field and structural data, and in the preparation of geologic reports.

102B-102C. Field Geology. (1-1) Yr. Beginning either semester.
   Mr. Meyer, Mr. Quaide, Mr. Weiss, Mr. Gilbert
   One week long field trip. Prerequisite: courses 101 and 103.
   Additional training in geologic mapping and report writing; the geology of areas beyond the environs of San Francisco Bay.

103. Introduction to Petrology. (4) I and II. Mr. Christensen, Mr. Gilbert
   Two lectures and two three-hour laboratory periods per week.
   Prerequisite: course 5 and Mineralogy 6, or course 150.
Characteristics, origin, mode of occurrence, and nomenclature of rocks, and description of the more common types. Laboratory practice in determination of textures, mineral components, and systematic classification of rocks by observation of hand specimens.

104A–104B. Microscopic Petrography Laboratory. (3–3) Yr.  
Lecture and two three-hour laboratory periods per week. Prerequisite: Mineralogy 6; and for course 104B, course 103.
The optical properties of crystals, followed by determination of minerals and then of rocks by means of the microscope. Approximately one-third of the year is devoted to each of these three topics.

106A–106B. Economic Geology. (3–3) Yr.  
Two lectures and one three-hour laboratory period per week. Prerequisite: Chemistry 5 and course 103 (may be taken concurrently), or course 150.
The genesis and geological characteristics of economic mineral deposits.

107. Geology of North America. (2) II.  
Prerequisite: courses 3 and 103.
The sedimentary, igneous, and structural evolution of the continent.

111A–111B. Petroleum Geology. (3–3) Yr.  
Prerequisite: course 5, Physics 4A (or 2A–2B); course 101, or 150; course 103 is desirable. Students who have taken or are taking course 121 or 122 may not take course 111B for credit.
The geology of petroleum and of ground water; problems of subsurface structure and correlation.

116. Structural Geology. (2) II.  
Prerequisite: courses 5, 101.
Deformation of the earth’s crust; mountain growth; folding and faulting and their economic aspects; graphic solution of fault problems.

117. Geomorphology. (3) I.  
Two lectures and one additional conference hour per week. Students who have not completed course 101 or who are not taking it concurrently will be admitted only by consent of the instructor.
Nature, evolution, and classification of land forms; use of physiographic methods in elucidating the later geologic history of various regions and in interpreting conditions of the geologic past.

118. Advanced Summer Field Course. (4).  
Prerequisite: course 101 with a grade of C or better.
The aim of the course is to develop: (1) facility and accuracy in geological mapping; (2) ability to observe and interpret rocks, structures and physiographic features, and other geological phenomena; and (3) the capacity to execute independently a geological survey and prepare a suitable report. Satisfactory completion of this course satisfies the undergraduate thesis requirements for students whose major is geology.

120. Elementary Seismology. (2) I.  
Prerequisite: course 5 or 1, Physics 2A or the equivalent.
A general discussion of earthquakes.

121. Practical Seismometry. (4) II.  
Prerequisite: Physics 2A–2B, and Mathematics 4A, 4B.
Paths of seismic waves and their relation to the structure of the earth, with emphasis on problems of seismic prospecting; elementary theory of the seismograph; laboratory analysis of seismograms and interpretation of travel-time curves in terms of structure.

122A–122B. Principles of Geophysics. (2–2) Yr. Mr. Verhoogen
Two lectures per week, and occasional conference hours. Prerequisite: course 5 (or 1), Mathematics 110A–110B (may be taken concurrently), Physics 4A, 4B.
122A. General geophysics.
122B. Applications to geologic problems.

150. Geology for Engineers. (3) II. Mr. Weiss
Four all-day field trips in lieu of eight laboratory periods will be held on Saturdays during the latter half of the semester; students enrolling in this course must have Saturdays free during this period. Prerequisite: course 5 or 15.
Occurrence, association, and recognition of minerals and rocks, with particular reference to deposits of economic importance; elements of stratigraphy; geometry of rock formations and structures in the field.

199. Special Study for Advanced Undergraduates. (1–4) I and II.
The Staff (Mr. Curtis in charge)
For properly qualified senior students who wish to undertake selected readings or research under the guidance of a member of the department.

GRADUATE COURSES
(Concerning conditions for admission to graduate courses, see page 18)

201A–201B. Seminar in Geochemistry. (2–2) Yr. Mr. Fyfe
Prerequisite: consent of the instructor.
Principles and general problems of geochemistry. Course content varies from year to year.

204A–*204B. Elastic Waves. (2–2) Yr. Mr. Byerly
(204A formerly numbered 204.)
Prerequisite: Mathematics 119, Physics 105A–105B or the equivalent.
204A: Mr. Byerly; *204B: ———.
The theory of stress and strain, and wave motion in elastic solids, with special application to seismic waves.

205. Laboratory Investigation of Ores. (3) II. Mr. Meyer
Prerequisite: courses 104A–104B, 106A–106B or the equivalent, Mineralogy 101 or the equivalent.
Application of laboratory methods and interpretive procedures to problems of metalliferous geology.

206. Seminar in Geology of Metalliferous Deposits. (3) I. Mr. Curtis
Prerequisite: course 106A–106B or the equivalent.
Study of the literature of selected mining districts with laboratory demonstration of textural and mineralogic features, bearing on their origin.

207. Seminar in Volcanology. (2) I. Mr. Williams
The origin and nature of volcanic processes; principal types of activity as exemplified by modern volcanoes; characters and classification of lavas and pyroclastic rocks.

*208. Physics of Solids. (2) II. Mr. Verhoogen
A survey of physical and chemical properties of solids, with reference to rock-forming materials. Content will vary from year to year.

* Not to be given, 1959–1960.
209A–209B. Physical Stratigraphy and Tectonics. (2–2) Yr.
Prerequisite: consent of the instructor.
Critical study of original literature dealing with various aspects of physical stratigraphy and tectonics, with discussions and occasional lectures. Topics will vary from year to year.

210. Advanced Optical Mineralogy. (2) II.
Mr. Quaide
Two three-hour laboratory periods per week. Prerequisite: course 104A–104B.
Study of mineral grains by immersion methods; mineralogical examination of crushed rocks.

211. Petrofabric Analysis. (2) II.
Mr. Turner
Prerequisite: consent of the instructor.
The nature and interpretation of microscopic fabric of deformed rocks.

212. Universal-Stage Petrography. (2–1) II.
Mr. Turner
Prerequisite: course 210 or 214A, and consent of the instructor.
Use of the universal stage in petrographic determinations and in problems of optical mineralogy.

213. Seminar in Geomorphology. (2) II.
Prerequisite: course 117 or the equivalent.
The topics to be considered will vary from year to year.

214A–214B. Advanced Petrology. (2–4; 2–4) Yr.
Mr. Turner
Prerequisite: course 104A–104B, Mineralogy 101 (may be taken concurrently). Recommended: Chemistry 122. A reading knowledge of French or German is required of candidates for the Ph.D. degree.
Discussion of problems of petrogenesis. Microscopic study of suites of rock sections.
214A: igneous rocks; 214B: metamorphic rocks.

215. Sedimentology. (2–3) I.
Mr. Hay
Prerequisite: course 103, a course in field geology, and consent of the instructor; for the laboratory, course 104A–104B.
Discussion of problems in sedimentary petrogenesis. Laboratory study of sedimentary rocks. Content will vary from year to year.

216. Advanced Structural Geology. (2) I.
Mr. Weiss
Prerequisite: course 101, and consent of the instructor.
Geometrical investigation of deformed rocks; use of stereographic and equal area projections in structural geology; study of folding, lineation and related topics. Lectures, laboratory periods and field trips.

217. Advanced Seismometry. (2) II.
Mr. Byerly
The general mathematical theory of the seismograph; discussion of the problems of modern seismometry and of recent results.

218A–218B. Seminar in Seismology. (2–2) Yr.
Mr. Byerly
Critical study of original literature relating to seismological problems. The content will vary from year to year.

219. Seminar in General Geophysics. (2) II.
Mr. Verhoogen
A survey of the theory of the figure of the earth, its gravitational field, earth tides, isostasy, and internal constitution. The content will vary from year to year.

* Not to be given, 1959–1960.
220. Research. (1-5) I and II. The Staff (Mr. Gilbert in charge)

298. Directed Studies. (2) I and II. The Staff (Mr. Verhoogen in charge)
Selected readings in geology and geophysics.

**MINERALOGY**

**LOWER DIVISION COURSE**

6. Introduction to Mineralogy. (4) I and II. Mr. Weiss, Mr. Fyfe
(Formerly numbered 4A-4B.)
Two lectures and two three-hour laboratory periods per week. Prerequisite: Chemistry 1A and Physics 2A or the equivalent.
Determination of common rock-forming minerals, origin, relationships, and properties; study of simple crystals; use of blowpipe and chemical tests for minerals.

**UPPER DIVISION COURSES**

101. Paragenesis of Minerals. (3) II. Mr. Pabst
Prerequisite: Chemistry 5, Geology 103 (may be taken concurrently).
Geochemical treatment of the formation and association of minerals.

103. Mineralogy. (3) I. Mr. Pabst
Prerequisite: course 101.
The crystal chemistry of minerals, with problems on the derivation of formulas and cell contents from analyses.

**GRADUATE COURSES**

207A. Crystallography. (3) I. Mr. Pabst
Prerequisite: consent of the instructor.
Geometrical crystallography, including a discussion of space groups, Hermann-Mauguin symbols, the reciprocal lattice, the stereographic and gnomonic projections, crystal morphology and twinning.

207B. X-Ray Crystallography. (3) II. Mr. Pabst
Two lectures and one laboratory period per week. Prerequisite: course 207A or the equivalent.
Lattice geometry and identification of crystals by means of X-ray diffraction, with practice in the use of the powder, rotation, oscillation, Weissenberg, and precession methods.

Research. (See Geology 220).

**GERMAN**

(Department Office, 2323 Dwinelle Hall)

Madison S. Beeler, Ph.D., Professor of German and Linguistics.
C. Grant Loomis, Ph.D., Professor of German (Chairman of the Department).
Philip Motley Palmer, Ph.D., Professor of German.
Clair Hayden Bell, Ph.D., Professor of German, Emeritus.
Edward V. Brewer, M.A., Professor of German, Emeritus.
Arthur G. Brodeur, Ph.D., Professor of Germanic Philology and English, Emeritus.
Lawrence M. Price, Ph.D., Professor of German, Emeritus.
Archer Taylor, Ph.D., Professor of German, Emeritus.
Erwin G. Gudde, Ph.D., Associate Professor of German, Emeritus.
Franz Schneider, Ph.D., Associate Professor of German, Emeritus.
Marianne Bonwit, Ph.D., Associate Professor of German.
Andrew O. Jászi, Ph.D., Associate Professor of German.
†Karl S. Guthke, Dr. phil., Associate Professor of German.
James W. Marchand, Ph.D., Associate Professor of German.
Joseph Mileck, Ph.D., Associate Professor of German.
Blake L. Spahr, Ph.D., Associate Professor of German.
Eugene E. Reed, Ph.D., Assistant Professor of German.
Michael S. Batts, Ph.D., Instructor in German.
Eugene K. Grothegut, Ph.D., Instructor in German.
Hunter G. Hannum, A.B., Instructor in German.
Frederic C. Tubach, Ph.D., Instructor in German.
Edith Lewy Hecht, M.A., Associate in German.

Heinrich Schneider, Ph.D., Visiting Professor of German for the spring semester.

Letters and Science List.—All undergraduate courses in German are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Miss Bonwit.

Preparation for the Major.—Courses 1, 2, 3, 4, or their equivalents, completed satisfactorily.

The Major.—Requirement: 24 units in upper division courses, including one full year's course in composition and at least 6 units made up from 118A, 118B, 119A, 119B, 123A, 123B, 124, 135A, and 140. Six of the 24 units may be related work in other departments. Attention is also directed to the courses listed under “Foreign Literature in Translation,” page 196.

Honors.—To be recommended for honors at graduation, students must have completed with distinction the courses outlined for the major.

Higher Degrees.—See the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION.

GERMAN

LOWER DIVISION COURSES

1. Elementary German. Beginners’ Course. (4) I and II.
   Mr. Mileck in charge
   In addition to regular sections, five sections in the fall semester, and two sections in the spring semester, meet five hours per week for students primarily interested in conversational German. Enrollment in these sections is limited to fifteen students.

12. Elementary German. Intensive Course. (8) I and II.
   Two hours daily, four times per week.
   Mrs. Hecht, Mr. Tubach
   This course is equivalent to course 1 and 2.

2. Elementary German (continuation of 1). (4) I and II.
   Mr. Mileck in charge
   Prerequisite: course 1 or two years of high school German.
   In addition to regular sections, two sections in the fall semester, and four sections in the spring semester, meet five hours per week for students primarily interested in conversational German. Enrollment in these sections is limited to fifteen students.

3. Intermediate German. (4) I and II.
   Mr. Tubach in charge
   Prerequisite: course 2 or three years of high school German.
   Two sections are for students primarily interested in conversational German. Enrollment in these sections is limited to fifteen students.

† Sabbatical leave in residence, fall semester, 1959-1960.
4. Intermediate German. (4) I and II. Mr. Tubach in charge
   Prerequisite: course 3 or four years of high school German.
   One section is for students primarily interested in conversational German. Enrollment in this section is limited to fifteen students.

3S. Scientific German. (4) I and II. Mr. Batts in charge
   Prerequisite: course 2 or the equivalent. Open only to students in the colleges of Chemistry and Engineering, premedical and predental students, and students in the College of Letters and Science who are majoring or preparing for a major in one of the scientific departments.

*4S. Scientific German. (3) II.
   Prerequisite: course 3S or 3 or the equivalent.

4M. Medical German. (3) II.
   Prerequisite: course 3 or 3S or the equivalent.

39. Great Writers in German Literature.
   Any one of these courses is open to students in all departments of the University. No knowledge of German required.

39A. Medieval Period. (2) I, Mr. Spahr.

39B. Eighteenth Century. (2) I, Miss Bonwit.

39C. Nineteenth Century. (2) II, Mr. Loomis.

39D. Twentieth Century. (2) II, Mr. Loomis.

UPPER DIVISION COURSES
   Prerequisite: 16 units of lower division German courses.

100A. Twentieth-Century German Drama. (3) I. Mr. Mileck

100B. Twentieth-Century German Prose. (3) II. Mr. Mileck

104A. Nineteenth-Century German Prose. (3) I. Mr. Jászi

104B. Nineteenth-Century German Drama. (3) II. Mr. Jászi

106. The Early Works of Goethe and Schiller. (3) II. Mr. Loomis

*112. Survey of German Culture and Institutions. (3) II. Mr. Guthke
   Open to all upper division students who have a reading knowledge of German, and recommended for prospective teachers.

118A. History of German Literature in the Middle Ages. (3) I. Mr. Palmer
   Prerequisite: 6 units from any of the above-listed upper division courses.

118B. History of German Literature from the Reformation to Lessing. (3) II. Mr. Spahr
   Prerequisite: same as for course 118A. 118A is not prerequisite to 118B.

119A. German Literature in the Classical Period: with Emphasis on Goethe and Schiller. (3) I. Miss Bonwit
   Prerequisite: same as for course 118A.

* Not to be given, 1959–1960.
119B. German Literature from the Romantic Movement to 1900. (3) II.
(Formerly numbered 118C.) Miss Bonwit
Prerequisite: same as for course 118A. 119A is not prerequisite to 119B.

*123A–123B. Introduction to German Poetic Forms and Theories from
1624 to 1885. (1–1) Yr. Mr. Loomis
Prerequisite: same as for course 118A. 123A is not prerequisite to 123B.
Study of metrics, figures of speech, and stanzaic patterns, including odes,
songs, ballads, sonnets, epigrams, and the like.

124. German Poetry of the Twentieth Century. (2) I. Mr. Jászi
Prerequisite: same as for course 118A.

130A–130B. Advanced Grammar and Composition. (3–3) Yr. Mr. Marchand, Mr. Palmer
Not open to native Germans except with consent of the instructor.

131A–131B. Advanced Grammar and Composition. (2–2) Yr. Mr. Guthke
Prerequisite: grade B or higher in course 130A–130B.

135A. Middle High German. (3) I. Mr. Spahr
Prerequisite: same as for course 118A. This course should be taken with
or after course 118A.
Outlines of grammar; the Nibelungenlied and selected readings.

140. Introduction to Descriptive and Historical German Grammar. (3) II.
Prerequisite: same as for course 118A. Mr. Beeler
Designed for prospective teachers and those planning to take courses in
linguistics.

199. Special Study for Advanced Undergraduates. (1–3) I and II.
Miss Bonwit in charge

**GRADUATE COURSES**

(Concerning conditions for admission to graduate courses, see page 18)

Prerequisite: an undergraduate major in German or its equivalent. For ad­
vanced study in German literature and linguistics a reading knowledge of
French and of Latin is required, and a general acquaintance with German
history strongly advised.

203. Studies in Middle High German Literature. (2) II. Mr. Spahr
Prerequisite: course 135A.

205. German Literature during the Renaissance and Reformation. (3) II.
Mr. H. Schneider

206. German Literature during the Seventeenth Century. (2) I.
Mr. Loomis

*214. Lessing and His Time. (2) II. Mr. Guthke

*220. Goethe to the Period of the Italian Journey. (2) I.

221. Goethe from the Period of the Italian Journey to His Death. (2) II.
Mr. H. Schneider

*228. Early German Romanticism: 1795–1810. (2) II.

*229. Kleist, Büchner, Grabbe. (2) I.

* Not to be given, 1959–1960.
*230. Grillparzer, Hebbel, and Ludwig. (2) II.
  Mr. Loomis
  Theories of craftsmanship and presentation in the dramas of Grillparzer, Hebbel, and Ludwig.

238. German Realism, 1850–1900. (2) I.
  Miss Bonwit

239. Interpretation and Criticism of German Poetry. (2) I.
  Mr. Jászi
  Studies in Rilke.

*240. Twentieth-Century German Prose. (2) II.
  Mr. Mileck
  Thomas Mann, Hermann Hesse, and Franz Kafka.

*249. Seminar in German Literature. (2 or 3) I and II.
  The Staff (Mr. Palmer in charge)

298. Special Study for Graduate Students. (1–4) I and II.
  Mr. Palmer in charge

German Linguistics

For the courses in English philology, see the Department of English, page 181.

*260. Germanic Linguistics. (3) II.
  Mr. Beeler
  Prerequisite: some acquaintance with at least two of the older Germanic languages.
  Phonology, morphology, and lexicography of the Germanic languages; the relationship of the Germanic languages to one another; the reconstruction of Proto-Germanic; Proto-Germanic and Indo-European.

262. History of the German Language. (3) I.
  Mr. Marchand

*265. Gothic. (3) II.
  Mr. Marchand

275. Old High German. (3) II.
  Mr. Palmer

290. Seminar in Germanic Linguistics. (2 or 3) II.
  Mr. Marchand
  Topic: Early Yiddish and Hebrew-German Language and Literature (3).

German for Graduate Students. (No credit) I and II.
  (Formerly numbered 1G.)
  Mr. Spahr in charge
  First course.

German for Graduate Students. (No credit) I and II.
  (Formerly numbered 2G.)
  Mr. Spahr in charge
  Second course.

Related Courses

Romanticism in Western Europe (Comparative Literature *121).
The Symbolist Movement in European Literature (Comparative Literature 201A–201B).

Greek

For courses in the Greek language and literature, see under Department of Classics, page 89.

* Not to be given, 1959–1960.
HISTORY

(Department Office, 3229 Dwinelle Hall)

Walton E. Bean, Ph.D., Professor of History.
Woodbridge Bingham, Ph.D., Professor of History.
Carl Bridenbaugh, Ph.D., Litt.D., Margaret Byrne Professor of United States History.
*Delmer M. Brown, Ph.D., Professor of History (Chairman of the Department).
George H. Guttridge, M.A. (Cantab.), Sather Professor of History.
George P. Hammond, Ph.D., LL.D., Professor of History and Director of the Bancroft Library.
†Lawrence A. Harper, J.D., Ph.D., Professor of American History.
James F. King, Ph.D., Professor of History.
Lawrence Kinnaird, Ph.D., Professor of History.
David S. Landes, Ph.D., Professor of History and Economics.
Bryce Lyon, Ph.D., Professor of History.
*Henry F. May, Ph.D., Professor of History.
Engel Sluiter, Ph.D., Professor of History.
Raymond J. Sontag, Ph.D., Sidney Hellman Ehrman Professor of European History.
Kenneth M. Stampp, Ph.D., A. F. and May T. Morrison Professor of United States History (Acting Chairman of the Department).
John D. Hicks, Ph.D., LL.D., A. F. and May T. Morrison Professor of History, Emeritus.
Franklin C. Palm, Ph.D., Professor of Modern European History, Emeritus.
John J. Van Nostrand, Ph.D., LL.D., Professor of Ancient History, Emeritus.
Robert J. Brentano, D.Phil. (Oxon.), Associate Professor of History.
*William J. Bouwsma, Ph.D., Associate Professor of History.
†A. Hunter Dupree, Ph.D., Associate Professor of History.
Charles Jelavich, Ph.D., Associate Professor of History.
Adrienne Koch, Ph.D., Associate Professor of History.
Thomas S. Kuhn, Ph.D., Associate Professor of the History of Science.
Joseph R. Levenson, Ph.D., Associate Professor of History.
Martin E. Malia, Ph.D., Associate Professor of History.
Armin Rappaport, Ph.D., Associate Professor of History.
Nicholas V. Riasanovsky, D.Phil., Associate Professor of History (Vice-Chairman of the Department).
Paul B. Schaeffer, Ph.D., Associate Professor of European History.
Charles G. Sellers, Ph.D., Associate Professor of History.
Werner T. Angress, Ph.D., Assistant Professor of History.
Gene A. Brucker, Ph.D., Assistant Professor of History.
Richard T. Drinnon, Ph.D., Assistant Professor of History.
Robert C. Padden, M.A., Acting Assistant Professor of History.
Herbert F. Schurmann, Ph.D., Acting Assistant Professor of History.
*James R. Seuble, Ph.D., Assistant Professor of History.
*William G. Sinnigen, Ph.D., Assistant Professor of History.

Arnolfo Ferruolo, Dottore in Lettere, Associate Professor of Italian.
James S. Ackerman, Ph.D., Associate Professor of Architecture and Art.
Grady McWhiney, M.A., Visiting Instructor in History.
Stanley I. Mellon, Ph.D., Visiting Assistant Professor of History.
Harry C. Porter, Ph.D., Visiting Assistant Professor of History.
Hans Rosenberg, Ph.D., Visiting Shepard Professor of History.
Herbert H. Rowen, Ph.D., Visiting Associate Professor of History.

Letters and Science List.—All undergraduate courses in history are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Brucker, Chairman; Mr. Drinnon, Mr. Jelavich, Mr. Mellon, Mr. Padden, Mr. Schaeffer.

The Major.—The major program in history shall total at least 36 units of history and include the following:

(a) By the end of the sophomore year: (1) History 4A-4B; (2) one of the following: History 8A-8B; 17A-17B; 33A-33B; or 19A-19B.

(b) In the junior and senior years: (1) a minimum of 10 units of upper division history in the field of concentration. (2) History 101; (3) a history proseminar (a C course); (4) a minimum of 6 units of upper division history outside the field of concentration; (5) a one-year course in American history (this may be fulfilled by a course taken to fulfill another requirement, e.g., 8A-8B, 17A-17B, 33A-33B); (6) a grade of C or better in all courses taken to fulfill the major requirement.

Honors Program:

Honors Work in the Lower Division.—The department offers at the freshman and sophomore level honors courses History H4B and 33A-33B, which are open, with consent of the instructor, to qualified students whether or not they intend to major in history. An additional honors course, History H17A-H17B, will be offered in 1960-1961, and thereafter.

Honors Program for History Majors.—Students who complete a major in history with distinction are eligible for recommendation for honors upon passing the comprehensive examination. Attention is directed to course 198 (3 units, one semester) and to the Circular of Information, Berkeley, concerning honors.

New Honors Program (effective for juniors in 1960-1961, and for seniors in 1961-1962). Students with an over-all grade-point average of 3.0 may apply to the departmental honors committee for admission as candidates for honors. Applications will normally be filed (on a form available at the departmental office) before registration for the junior year, though they will be considered at any time up to the beginning of the senior year.

The major program for honors candidates will consist of the following:

(a) By the end of the sophomore year: (1) History 4A-4B, or 4A-H4B; (2) one of the following: History 8A-8B, 17A-17B, H17A-H17B, 19A-19B, or 33A-33B.

(b) In the junior year, 12 units of upper division history courses, normally including two, and in special cases, more than two, proseminars ("C courses"; see under course listings, Group II, B, "Proseminars in History"); but honors candidates will not take History 101.

(c) In the senior year, History 198A-198B (6 units per semester), the second semester of which is devoted to preparing a senior thesis (see under course listings, Group II, D, "Honors Courses").

Students who complete this program with work of an honors grade will be recommended for honors at graduation; and those who complete the program with special distinction will be recommended for high honors or highest honors.

Teacher-Training Curriculum.—The curriculum for the Certificate of Completion (with a teaching major in social studies) differs from that of the undergraduate major in history both in the list of prescribed courses and in the requirement of at least 2.75 grade points per unit. For further information concerning the teacher-training curriculum, see the Announcement of the School of Education, and consult the department's Social Science Adviser, Mr. Kinnaird.
Higher Degrees.—Students planning to work toward the degrees of M.A. and Ph.D., should consult the Announcement of the Graduate Division, Northern Section, and the Graduate Division bulletin entitled Announcement in the Social Sciences, and confer with the graduate adviser.

Lower Division Courses
In courses 4A-4B, 8A-8B, 17A-17B, and 19A-19B weekly sections of no more than 20 students are organized to give supplementary instruction in historical geography, map work, bibliography, and methods of historical study.

4A-4B. History of Western Civilization. (3-3) Yr.
Mr. Brucker, Mr. Jelavich, Mr. Mellon

H4B. History of Western Europe from 1648. (3) II.
Mr. Brucker
Prerequisite: consent of the instructor. Limited to ten students per section.
Reading, discussion, and reports, focusing on selected movements and epochs.

8A-8B. History of the Americas. (3-3) Yr.
Survey of western hemisphere history since 1492.
Mr. Sluiter

17A-17B. History of the United States. (3-3) Yr.
Mr. Bean, Mr. Sellers, Mr. McWhiney
Prerequisite: sophomore standing. A student may not receive credit for both courses 17A-17B and 171A-171B.

H17A-H17B. History of the United States. (3-3) Yr.
Prerequisite: sophomore standing and consent of the instructor. Limited to ten students per section.
Reading, discussion, and reports, focusing on selected movements and epochs. Offered in 1960-1961 and thereafter.

19A-19B. Introduction to the History of Asia. (3-3) Yr.
Mr. Bingham
(Formerly numbered 190A-190B.)
19A. To 1600.
19B. Since 1600.
Survey of political and cultural history of major countries of Asia from ancient to modern times. Development of civilizations of China, India, Iran, Arabia, Turkey, Mongolia, Japan, Southeast Asia. Relations with western Europe, Russia, and America.

33A-33B. American Studies. (3-3) Yr.
Miss Koch
Open to sophomores with consent of the instructor. Limited to fifteen students. Not open to students taking English 33A-33B or Political Science 33A-33B.
An honors course in the study of American culture. The class will study significant ideas and issues, drawing on material from history, literature, political science, philosophy, and other fields. The course will emphasize discussion and the writing of essays and will include occasional joint meetings with the staff and students of the two equivalent courses (English 33A-33B and Political Science 33A-33B).

Upper Division Courses
Group I—Unrestricted Courses
(Open to all students in the upper division; prerequisites as noted)

105A-105B. History of Scientific Thought and Technique. (3-3) Yr.
105A. Antiquity to Newton.
105B. Newton to Bohr.
Mr. Kuhn
Problems in the Development of Physical Science. (Philosophy 127A-127B) (3-3) Yr. Mr. Kuhn

111A-*111B. Ancient History. (3-3) Yr. Mr. Pritchett
111A. Greek history to the Roman conquest. II.
111B. Roman history to Justinian.

Problems of Government: Tiberius to Nero (Classics §128) (2) I. Mr. Syme

Economic History of Europe. (Economics 112A-112B) (3-3) Yr. Mr. Cipolla, Mr. Landes
This course is acceptable as a course requirement for the history major.

*115A-115B. Byzantium. (3-3) Yr. Mr. Sinnigen
115A. The Eastern Empire to 700.
115B. 700 to 1453.

121A-121B. Medieval History. (3-3) Yr. Mr. Schaeffer
The emphasis is on Western Europe.
I. 500 to 1100.
II. 1100 to 1500.

121. Medieval Culture. (3) II. Mr. Schaeffer
Intellectual and social history of medieval Europe from St. Augustine to Dante with special emphasis on the Renaissance of the twelfth century.

123. Medieval France. (3) I. Mr. Schaeffer
History of France from the barbarian conquest of Roman Gaul to the end of the fifteenth century.

125A-125B. Medieval Institutions. (3-3) Yr. Mr. Lyon

130. Italian Culture in Transition, 1450 to 1650. (3) II. Mr. Ackerman, Mr. Brucker. Mr. Ferruolo
Prerequisite: consent of the instructor.
Prominent developments in Italian history, society, literature, music, and the visual arts will be studied in mutual context, in order to provide the broadest possible view of the transition from renaissance to baroque. Two lectures and one discussion hour. Given in conjunction with the departments of Art, Architecture and Music.

131A-131B. The Renaissance and Reformation. (3-3) Yr. Mr. Brucker
History of Western Europe from the fourteenth to the end of the sixteenth century.

132A-132B. History of Europe in the Seventeenth and Eighteenth Centuries. (3-3) Yr. Mr. Rowen

134A–134B. Western Europe: Its Cultural History since the French Revolution. (3-3) Yr. Mr. Sontag

135A. History of Russia to 1689. (3) I. Mr. Riasanovsky
From the beginnings to 1689: Kievan and Moscovite Russia.

135B. History of Russia, 1689–1890. (3) I. Mr. Malia
From 1689 to 1890: Peter the Great through the Great Reforms.

* Not to be given, 1959–1960.
§ To be given one semester only.
History

136. History of Russia since 1890. (3) II. Mr. Malia
1890 to the present: The Russian revolutions and the Soviet regime.

*139A–139B. History of Southeastern Europe and the Near East.
   (3–3) Yr. Mr. Jelavich
   Principally the history of the Ottoman Empire, Turkey, Albania, Bulgaria, Greece, Jugoslov, and Rumania since the eighteenth century.

*140A–140B. The Habsburg Monarchy and the Succession States.
   (2–2) Yr. Mr. Jelavich
   Principally the history of the Austrians, Magyars, Czechs, Slovaks, Poles, Rumanians, Croats, and Slovenes since the French Revolution. Emphasis will be on the formation and development of the national states and the cultural and intellectual problems of the area.

141. History of Modern France. (3) I. Mr. Mellon

§142A–142B. Central Europe to 1806. (3–3) Yr. Mr. Rosenberg

143A–143B. History of Germany from 1806 to the Present. (3–3) Yr.
   143A. 1806 to 1890. Mr. Angress
   143B. 1890 to the present.

*144A–144B. European Diplomatic History. (3–3) Yr. Mr. Sontag
   International relations since 1815, studied in relation to economic, social, and cultural changes.

*145. The Revolutionary Era in Europe. (3) I. Mr. Mellon

*146. Europe since 1870. (3) II.

147A–147B. Social History of Western Europe. (3–3) Yr. Mr. Landes
   A comparison of British and French development, with special attention to the structure and values of the two societies, the shifting distribution of occupations and wealth, and the tensions consequent on rapid economic change.

150A–150B. Medieval England. (3–3) Yr. Mr. Brentano
   150A. To 1066.
   150B. 1066 to about 1500.
   Emphasis will be placed on constitutional and intellectual developments.

151A–151B. History of Modern England. (3–3) Yr. Mr. Guttridge
   Prerequisite: an elementary knowledge of the history of Western Europe.
   151A. 1500 to 1740.
   151B. 1740 to the present.

§153. Intellectual History of England, 1500–1640. (3) I. Mr. Porter

155A–155B. The British Commonwealth and Empire. (3–3) Yr.
   Prerequisite: course 151B or the equivalent. Mr. Porter
   155A. To 1870.
   155B. Since 1870.

*159. Recent History of Great Britain, 1900 to the Present. (3) II.

*160A–160B. History of Spain and Portugal. (3–3) Yr.

* Not to be given, 1959–1960.
§ To be given, 1959–1960 only.
161A–161B. Hispanic-American History. (3–3) Yr. Mr. King
Spanish and Portuguese America from fifteenth-century beginnings to the present. Balanced attention given to the growth of the colonial empires, the rise of the modern nations, the amalgamation of cultures, and the development of institutions and ways of life.

*162. History of the Caribbean Area. (3) I. Mr. King
Caribbean history from the eighteenth century to the present. The rise and decline of the sugar colonies and of slavery, revolution and independence, international relations, and evolving economic, social, and political patterns in colonies and free areas all receive attention.

163. History of Brazil. (3) I. Mr. Sluiter

*164. History of Argentina. (2) I. Mr. Scobie
Prerequisite: course 161B or permission of the instructor.
Emphasis is on the political and economic development of the Argentine nation, 1800 to the present. Some attention is also given to colonial origins, cultural and social developments, and questions of international relations.

*165A–165B. Modern Social History of Latin America. (3–3) Yr. Mr. Scobie
Prerequisite: course 165A or permission of the instructor is prerequisite for 165B.
165A. Social history of Mexico, Brazil and Argentina since 1880.
165B. Problems of environment, race, culture, economics, politics and international affairs throughout Latin America.

166A–166B. History of Mexico. (3–3) Yr. Mr. Padden
166A. Colonial Period.
166B. National Period.

167A–167B. The Diplomatic History of the United States. (3–3) Yr. Mr. Rappaport
167A. 1776–1880.
167B. 1880 to the present.

*168. History of Inter-American Relations. (3) I. Mr. King
History of the relations of the Hispanic-American nations among themselves and with the United States since independence. Emphasis will be placed on the Pan-American movement and the development of the Organization of American States.

170A. The American Colonies to 1763. (3) I. Mr. Bridenbaugh
170B. The American Revolution, 1763 to 1789. (3) II. Mr. Bridenbaugh
Prerequisite: this course is open only to students who have taken History 170A, unless written permission is granted by the instructor.

*171A–171B. History of the United States. (3–3) Yr. Mr. Harper
A student may not receive credit for both courses 17A–17B and 171A–171B.
171A. To the end of Reconstruction.
171B. From the end of Reconstruction to the present.

*172A–172B. Constitutional History of the United States. (2–2) Yr. Mr. Harper
Prerequisite: course 17A–17B or consent of the instructor.

*172C–172D. Constitutional History of the United States. (1–1) Yr. Mr. Harper
An extra hour of class discussion to be taken only with History 172A–172B.

* Not to be given, 1959–1960.
*173A. The Era of Sectional Conflict, 1820–1865. (3) I. Mr. Stampp
A survey of the social and economic institutions of the old South, of the forces which encouraged sectionalism, and of the Civil War.

*173B. Reconstruction and the New Nation, 1865 to 1900. (3) II.
(Formerly numbered 173C.) Mr. Stampp
A survey of the social and political aspects of Reconstruction, of the Negro's problems in freedom, of the New South, and of the Age of Big Business.

174A–174B. Recent History of the United States. (3–3) Yr. Mr. Drinnon
174A. 1900 to 1928.
174B. 1928 to the present.

*175A–175B. Intellectual History of the United States. (3–3) Yr.
Mr. May
The course is carried on primarily by the intensive study of selected source materials. An elementary knowledge of the political history of the United States is assumed.

*176A–176B. Social History of the United States. (3–3) Yr.
176A. 1763 to 1865.
176B. 1865 to the present.

*177A–177B. History of the United States, 1787 to 1845. (3–3) Yr.
177A. The Constitution and the Early Union to 1815. Mr. Sellers
177B. The Jacksonian Era.

178A*–178B. History of Science and Technology in American Society.
(3–3) Yr. Mr. Dupree
A survey of the role of science and technology as a force in American life, emphasizing the development of scientific ideas and institutions.
178A. Colonial times to 1865.
178B. 1865 to the present.

180A–180B. History of the American Political Tradition. (3–3) Yr.
Miss Koch
A study of the men whose ideas influenced the development of the American political tradition. Among the major influences to be considered are Franklin, Jefferson, John Adams, Hamilton, Lincoln, Thoreau, Holmes, Wilson, Franklin D. Roosevelt, John Dewey.

*181A–181B. The History of North America. (3–3) Yr. Mr. Kinnaird
181A. The Colonial Period.

*187A–187B. The West in United States History. (2–2) Yr.

*188. The Opening of the Pacific, 1513 to 1800. (3) II. Mr. Sluiter
A history of European penetration, occupation, rivalry, and influence in the Pacific Area from the sixteenth through the eighteenth centuries.

189A–189B. History of California. (2–2) Yr. Mr. Kinnaird
189A. Spanish and Mexican period.
189B. American period.

191A–191B. Social History of Asia. (3–3) Yr. Mr. Schurmann
Prerequisite: consent of the instructor. Recommended: A background in European and Asian history and a reading knowledge of either Chinese, Japanese, French, or German.

* Not to be given, 1959–1960.
History of social structure and forces of major East Asian societies.
191A. Social History of China.
191B. Social History of Japan.

194A–194B. History of China. (3-3) Yr. Mr. Levenson
194A. History of China to the fall of the Ming Dynasty (seventeenth century).
194B. History of China since the fall of the Ming Dynasty. Emphasis will be placed on the interplay of political, economic, and cultural forces in “traditional” and “transitional” China.

*195A–195B. History of Japan. (3-3) Yr. Mr. Brown
195B. Period of Western influence.

197A–197B. The History of India. (3-3) Yr. Mr. Hagar

Group II—Restricted Courses

A. HISTORICAL METHOD COURSE

Designed primarily for students whose major subject is history.

101. Introduction to Historical Method and Bibliography. (3) I and II. Mr. Brentano
Prescribed for history majors in the junior year. The course centers around the writing of a paper based upon original research and discussions of limited historical fields and general historical problems, particularly through the consideration of selected major historians.

*Theory of Historical Inquiry (Philosophy 147). (3) I. Mr. Strong

B. PROSEMINARS IN HISTORY

Designed primarily to give majors in history elementary training in historical research. Emphasis will be placed on writing and discussion. Prerequisite: History 101; a one-year upper division course in the same area of history; and the permission of the instructor. Enrollment is limited to 15 students.

101C. Problems in Historiography. (3) II. Mr. Brentano

*111C. Problems in Ancient History. (3) II. Mr. Sinnigen
Readings, discussions, and reports in one of the following fields of ancient history: Hellenic, Hellenistic, Roman Republic, Principate, and Late Empire.

125C. Problems in Medieval Institutions. (3) I. Mr. Lyon

*132C. Problems in the History of Europe in the Seventeenth and Eighteenth Centuries. (3) I. Mr. Bouwsma

133C. The Rise of the Dutch Republic and Empire. (3) II. Mr. Sluiter
Prerequisite: course 131B or 132A or consent of the instructor.
Economic, political, religious, and cultural history of the Netherlands from the Burgundian and Habsburg periods through the Dutch Revolt and the Golden Age of the Republic, including overseas expansion and the establishment of the Dutch Empire.

* Not to be given, 1959–1960.
136C–136D. Russian Intellectual History. (3–3) Yr.
Mr. Malia, Mr. Riasanovsky
A one-year proseminar course in social and political thought of the revolutionary movement, with some attention also to literature and philosophy: eighteenth century to 1917. Open to qualified graduates and undergraduates. Limited to thirty students.

139C. Problems in the History of Southeastern Europe and the Near East. (3) II. Mr. Jelavich

141C. Problems in the History of Modern France. (3) II. Mr. Mellon

143C. Problems in German History. (3) I. Mr. Angress
Prerequisite: consent of the instructor.
Students will examine selected topics of German history. Emphasis will be on discussion based on individual reading and interpretative essays.

*145C. Problems in the Revolutionary Era in Europe. (3) I. Mr. Mellon

151C. Burke and His Age, 1750 to 1800. (3) II. Mr. Guttridge
(Formerly numbered 157.)
Prerequisite: consent of the instructor.

§153C. Problems in the Intellectual History of England, 1500–1640. (3) II. Mr. Porter

*155C. History of Canada. (3) I.
(Formerly numbered 156.)
Prerequisite: consent of the instructor.
History of Canada from the early European settlements to its present status as a member nation of the Commonwealth. Emphasis will be placed both on internal developments and on the imperial connection with Great Britain.

*160C. Problems in the History of Spain. (3) I.

*161C. Recent Hispanic American History. (3) I.
Prerequisite: consent of the instructor.
Problems in Hispanic American history since 1889.

*165C. Problems in the Social History of Latin America. (3) I. Mr. Scobie

166C. Problems in the History of Mexico. (3) I and II. Mr. Padden

*167C. Problems in United States Diplomatic History. (3) I.
Mr. Rappaport
Reading, discussion, and the writing of critical essays on selected topics.

*170C. Problems in American Colonial History. (3) I and II. Mr. Bridenbaugh
Studies in original sources on the period 1730 to 1789.

173C. Problems in the Era of Sectional Conflict. (3) I and II.
Mr. Stampp, Mr. McWhiney

174C. Problems in the Recent History of the United States. (3) I and II. Mr. Drinnon

* Not to be given, 1959–1960.
§ To be given, 1959–1960 only.
*175C. Problems in American Intellectual History. (3) I. Mr. May
Prerequisite: consent of the instructor and some previous work in American intellectual history.
Intensive examination of a selected area of American intellectual history. Historical essays and research papers will be the main work of the course.

177C. Problems in the Early National Period of United States History. (3) II. Mr. Sellers

*178C. Problems in the History of Science and Technology in American Society. (3) II. Mr. Dupree

189C. Problems in the History of California and the West. (3) I. Mr. Kinnaird

190C. Historical Problems in Asian Interrelationships. (3) II. Mr. Bingham
Prerequisite: consent of the instructor.
I. Special emphasis on problems concerning China between 1500 and 1900.
II. Special emphasis on problems concerning Southeast Asia between 1500 and 1900.

*193C. Chinese Civilization of the Middle Dynasties. (3) II. Mr. Levenson
Prerequisite: courses 190A, 194A, or consent of the instructor.
History of the period 220 to 960, with emphasis on specific problems. Readings and discussions of Chinese sources in English translation, with particular attention to the nature and substance of the dynastic histories.

194C. Problems in the Intellectual History of Modern China. (3) II. Mr. Levenson
Traditionalism and iconoclasm in China since its sixteenth-century contact with the West. Attention will be focused on the distinction between the study of the intellectual history and the study of abstract ideas, and on the connection between intellectual change and social change. Analysis will be made of the links between formal philosophy, canons of esthetic taste, and popular points of view.

*195C. Problems in Japanese Intellectual History. (3) II. Mr. Brown
Individual studies in Japanese intellectual problems of the last one hundred years.

C. TEACHING COLLOQUIUM

171L. Proseminar in United States History. (3) I. Mr. Harper
An analysis of concepts and theories concerning factors underlying United States history. Admission only with consent of the instructor. Recommended for teachers or prospective teachers.

D. HONORS COURSE

198. Individual Conferences and Assigned Reading. (3) I and II. Mr. Schaeffer, Mr. Bingham
Limited to senior honors candidates in history, in their final semester before graduation. Intended as preparation for the comprehensive examination to be taken prior to graduation.
Not to be offered after 1960–1961.

*H198A–H198B. Senior Honors Colloquium. (6–6) Yr.
Limited to senior honors candidates in history, with no more than ten students per section.

* Not to be given, 1959–1960.
In the fall semester, intensive reading, discussion, and reports on a theme relating several fields of historical inquiry. Subjects vary from section to section and year to year. The spring semester will be devoted to preparing a senior thesis.

Offered in 1961–1962 and thereafter.

E. SPECIAL INDIVIDUAL STUDY

Open to those history majors, with at least a B average in all history courses taken, who wish to undertake special advanced study.

199. Special Study for Advanced Students. (1–4) I and II. The Staff

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 18)

Group I—Bibliography and Historiography Courses

201. Advanced Studies in the Sources and General Literature of the Several Fields of History. (3) I and II. The Staff

I. United States History, Mr. McWhiney, Mr. Sellers, Mr. Stampp; Latin-American History, Mr. King, Mr. Padden; Medieval and Early Modern European History, Mr. Rowen; Modern European History, Mr. Angress, Mr. Guttridge, Mr. Landes, Mr. Schaeffer.

II. United States History: Mr. Bridenbaugh, Mr. Drinnon, Mr. Dupree, Mr. Harper, Mr. Kinnaird, Mr. Stampp; Latin-American History: Mr. Sluiter; Medieval History: Mr. Lyon; Early Modern and Modern European History: Mr. Angress, Mr. Rosenberg.

202. Historical Method and Bibliography. (3) I and II. Mr. Harper, Mr. Mellon, Mr. Sontag

I: Mr. Harper, Mr. Mellon; II: Mr. Sontag.

Designed especially for candidates for higher degrees in history. Stress is laid on practical exercises.

Seminar in Theories of History (Philosophy 247). (3) II. Mr. Strong

Group II—Research Seminars

204. Seminar in the History of Science. (3) II. Mr. Kuhn

Seminar in the Relations of Science and Philosophy. (Philosophy 220). (3) II. Mr. Kuhn

205. Historical Auxiliaries to Medieval Studies. (3) I. Mr. Brentano

Emphasis upon diplomatic and practical paleography.

*211A–211B. Seminar in Ancient History. (3–3) Yr. Mr. Sinnigen

In 1959–1960 topics and research in the Age of Augustus.

A reading knowledge of French or German, and Latin or Greek is required.

*221A–221B. Seminar in Medieval History. (3–3) Yr. Mr. Schaeffer

*225A–225B. Seminar in Medieval English History. (3–3) Yr. Mr. Brentano

*231A–231B. Seminar in the Renaissance and Reformation. (3–3) Yr. Mr. Brucker

* Not to be given, 1959–1960.
232A*-232B. Seminar in European History in the Seventeenth and Eighteenth Centuries. (3-3) Yr. Mr. Rowen

235A-235B. Seminar in Russian History. (3-3) Yr. Mr. Malia, Mr. Riasanovsky

While meant to cover a broad field and serve various interests, the seminar centers on Russian thought and politics in the nineteenth century.

*236A-236B. Seminar in the History of Russian Revolution and the Soviet Regime. (3-3) Yr. Mr. Malia

239A*-239B. Seminar in Central and Southeastern Europe. (3-3) Yr. Mr. Jelavich

241A-241B. Seminar in Modern French History. (3-3) Yr. Mr. Mellon

243A-243B. Seminar in Modern German History. (3-3) Yr. Mr. Rosenberg, Mr. Angress

244A*-244B. Seminar in European Diplomatic History. (3-3) Yr. Mr. Sontag

§249. Seminar in European Intellectual History. (3) II. Mr. Malia

251A-251B. Seminar in English History. (3-3) Yr. Mr. Guttridge

Reading and research in selected topics, 1660 to 1832.

*255A-255B. Seminar in the History of the British Empire and Commonwealth. (3-3) Yr.

*260A-260B. Seminar in the History of Spain. (3-3) Yr. Prerequisite: course 160A-160B, a reading knowledge of Spanish, and French or German.

261A*-261B. Seminar in Hispanic-American History. (3-3) Yr. Mr. King

266A*-266B. Seminar in Mexican History. (3-3) Yr. Mr. Padden

267A-267B. Seminar in the Diplomatic History of the United States. (3-3) Yr. Mr. Rappaport

Prerequisite: course 167A-167B.

270A*-270B. Seminar in American Colonial History. (3-3) Yr. Mr. Bridenbaugh

*271A-271B. Seminar in the History of the American West. (3-3) Yr.

272A*-272B. Seminar in Economic and Legal History of the U.S. (3-3) Yr. Mr. Harper

273A*-273B. Seminar in the History of the Old South, the Civil War, the Reconstruction. (3-3) Yr. Mr. Stampp

274A-274B. Seminar in the Recent History of the United States. (3-3) Yr. Mr. Drinnon, Mr. Bean

*275A-275B. Seminar in the Intellectual History of the United States. (3-3) Yr. Mr. May

Recommended: History 175A-175B or the equivalent.

*276A-276B. Seminar in American Social History, 1700 to 1900. (3-3) Yr.

* Not to be given, 1959-1960.

§ To be given one semester only, 1959-1960.
History; Italian

277A*-277B. Seminar in the Early National Period of United States History. (3-3) Yr. Mr. Sellers

278A*-278B. Seminar in the History of Science and Technology in America. (3-3) Yr. Mr. Dupree

281A-281B. Seminar in North American History. (3-3) Yr. Mr. Kinnaird

282A-282B. Spanish Borderlands. (3-3) Yr. Mr. Hammond
Prerequisite: graduate standing and consent of the instructor.
Includes the northern area of Mexico as well as those parts of the United States influenced by Spanish culture.

283A*-283B. Seminar in Hispanic-American History. (3-3) Yr. Mr. Sluiter

290A-290B. Seminar in the History of Asia. (3-3) Yr. Mr. Bingham

291A*-291B. Seminar in the Social History of Asia. (3-3) Yr. Mr. Schurmann

294A*-294B. Seminar in the History of Modern China. (3-3) Yr. Mr. Levenson

*295A-295B. Seminar in Japanese History. (3-3) Yr. Mr. Brown

*297A-297B. Seminar in the History of India. (3-3) Yr.

Advanced Study in Economic History (Economics 210A-210B). (3-3) Yr. Mr. Cipolla, Mr. Landes, Mr. Mosk

Topics in Economic History (Economics 212A-212B). (3-3) Yr. Mr. Landes, Mr. Rosovsky

This is a lecture course.

Group III—Individual Research and Study

298. Directed Research. (1-6) I and II. The Staff

299. Independent Study. (3-6) I and II. Graduate Advisers

Individual study, in consultation with the graduate adviser, intended to provide opportunity for M.A. and Ph.D. candidates to bring together their work in a particular field during the semester immediately prior to the examinations. 1959-1960: I and II. Mr. Angress, Mr. Bean, Mr. Rappaport, Mr. Sellers, Mr. Sluiter, Mr. Bingham, Mr. Lyon, Mr. Sontag.

ITALIAN

(Department Office, 4226 Dwinelle Hall)

Michele De Filippis, Ph.D., Professor of Italian, Emeritus.
Arnolfo B. Ferruolo, Dottore in Lettere, Associate Professor of Italian (Chairman of the Department).
Aldo D. Seaglione, Dottore in Lettere, Associate Professor of Italian.
Nicholas J. Ferrella, Ph.D., Assistant Professor of Italian.
John A. Scott, M.A. (Oxon.), Assistant Professor of Italian.
Remo Ceserani, Dottore in Lettere, Instructor in Italian.
Franco Fido, Dottore in Lettere, Instructor in Italian.
Cecilia Ross, Ph.D., Associate in Italian.

* Not to be given, 1959-1960.
Letters and Science List.—All undergraduate courses in Italian are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Perella.

The Major.—16 units of lower division courses: Italian 1, 2, 3, 4, or their equivalents. 24 units of upper division courses in the department: 101A-101B, 103A-103B, 109A-109B, and at least 6 more units of upper division courses.

The department recommends a supplementary choice of appropriate courses in the following departments: Art, Classics, English, French, German, History, Music, Philosophy, Spanish and Portuguese. A reading knowledge of Latin is also recommended.

Honors.—To be recommended for honors, students are required to take course 199 in their senior year, and must have completed with distinction the program for majors.

Lower Division Courses

1. Elementary Italian. (4) I and II. Mr. Ferruolo (in charge)
   One lecture and four section meetings per week.

2. Elementary Italian (continuation of 1). (4) I and II.
   Mr. Ferruolo (in charge)
   One lecture and four section meetings per week.
   Prerequisite: course 1 or the equivalent.

3. Intermediate Italian. (4) I and II.
   Mr. Fido (in charge)
   Five meetings per week.
   Prerequisite: course 2 or the equivalent.

4. Intermediate Italian (continuation of 3). (4) I and II.
   Mr. Ceserani
   Five meetings per week.
   Prerequisite: course 3 or 13.

13. Intermediate Italian Conversation. (4) I and II.
    Mr. Fido
    Five meetings per week.
    Prerequisite: course 2 or the equivalent.

39A-39B. Italian Literature in English Translation. (3-3) Yr.
    Beginning each semester.
    Mr. Scott, Mr. Perella
    A survey of the most important works in Italian literature from Dante to the present, with lectures in English and readings of representative works in translation.

Upper Division Courses

For the majors of the department, the prerequisite for all upper division courses is 16 units in the lower division or their equivalents. For other upper division students, the prerequisite is a reading knowledge of Italian.

(3-3) Yr.
    Mr. Fido

103A-103B. A Survey of Italian Literature. (3-3) Yr.
    Mr. Scott
    A study of representative authors and works, with a consideration of the more important aspects of Italian literary history in their philosophical and historical background. Lectures in English and readings in Italian.
109A–109B. Dante's *Divina Commedia*. (3–3) Yr. Mr. Scaglione

The text will be read in its entirety and in the original. Lectures in English.

110A–110B. Italian Literature of the Fourteenth Century. (3–3) Yr. Mr. Ceserani

A study of the literature of the Trecento, with special emphasis on Dante's minor works, Petrarch's poetry, and Boccaccio's *Decameron*. Lectures in English and readings in Italian.

112A–112B. Italian Literature of the Renaissance. (3–3) Yr. Mr. Ferruolo

A study of the main trends in the literature of the fifteenth and sixteenth centuries. Authors to be discussed will include Lorenzo De'Medici, Poliziano, Castiglione, Leonardo, Machiavelli, Ariosto, and Tasso. Lectures in English and reading in Italian.

114A–114B. Modern Italian Literature: from 1750 to 1850. (3–3) Yr. Mr. Fido, Mr. Perella

A study of the drama, the novel, and the poetry of this period; in particular, the works of Goldoni, Alfieri, Mauzoni, Foscolo, and Leopardi. Lectures in English and readings in Italian.

115A–115B. Modern Italian Literature: from 1850 to the Present. (3–3) Yr. Mr. Perella, Mr. Fido


199. Special Study for Advanced Undergraduates. (1–3) I and II. Mr. Ferruolo, Mr. Scaglione

This course is specifically designed for students who wish individually to pursue a program of reading and study not covered by any other course. The number of units of credit is determined by the instructor.

**Graduate Courses**

(Concerning conditions for admission to graduate courses, see page 18)

201A–201B. Italian Philology. (2–2) Yr. Mr. Ceserani

*203. Methods of Literary Study and Stylistic Analysis. (2) II. Mr. Fido

204. Italian Literary Criticism. (2) II. Mr. Scott

209. Studies in the *Divina commedia*. (2) II. Mr. Scaglione

*211. Seminar on Petrarch. (2) I. Mr. Ferruolo

A study of the fundamental aspects of Petrarch's work, in relation to the rise and development of Humanism.

213. Boccaccio and the Novella. (2) I. Mr. Scaglione

A study of the various types of the Italian novella, from Boccaccio to Bandello. The evolution of the genre and its forms.

*215. Chivalric Poetry in Italy. (2) II. Mr. Scaglione

The relationship between the genre and its French medieval sources, with a study of its evolution in Italy, through Pulci, Boiardo, and Ariosto.

217. Studies in the Renaissance. (2) II. Mr. Ferruolo

* Not to be given, 1959–1960
218. Seminar on the Baroque. (2) I.  Mr. Perella
A study of Baroque literature in Italy, with emphasis on the pastoral drama, Marino, and the Marinisti.

*221. Romanticism in Italy. (2) I.  Mr. Perella
A study of the Romantic movement in Italy in its relationship to European Romanticism, with emphasis on Foscolo, Leopardi, and Manzoni.

299. Special Study for Graduate Students. (1-3) I and II.  Mr. Ferruolo, Mr. Scaglione
This course is specifically designed for students who wish individually to pursue a special program of study and research not covered by any other course or seminar. The number of units of credit is determined by the instructor.

Italian for Graduate Students. (No credit) I.  Mr. Scott
(Formerly numbered 1G.)
First course.

RELATED COURSES

The Literature of the Renaissance in Western Europe (Comparative Literature 151A–151B).
Humanistic Literature in Latin (Romance Philology 204).
Italian Culture in Transition, 1450–1650 (History 130).

JOURNALISM

(Department Office, 5205 Dwinelle Hall)

Robert W. Desmond, Ph.D., Professor of Journalism.
Charles M. Hulten, M.A., Professor of Journalism (Chairman of the Department).
†Philip F. Griffin, M.A., Associate Professor of Journalism.
Albert G. Pickerell, Ph.D., Associate Professor of Journalism.
Jordan Brotman, Ph.D., Assistant Professor of Journalism.
Walter Gieber, Ph.D., Assistant Professor of Journalism.
Jean S. Kerrick, Ph.D., Assistant Professor of Journalism.

Letters and Science List.—All courses except 131, 152, and 181 series. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Brotman, Miss Kerrick; Graduate Adviser: Mr. Hulten.

Preparation for the Major.—(1) English 1A–1B or Speech 1A–1B; (2) one year course selected from Economics 1A–1B, History 4A–4B, 17A–17B, Political Science 1 and 2; (3) one semester course selected from Anthropology 2A, Psychology 1A, Sociology and Social Institutions 1; and (4) Journalism 21. Recommended: Students are urged to elect other lower division courses that will best prepare them for upper division study in fields of their interest other than journalism. The faculty of the department will be happy to consult with students regarding these choices.

The Major.—The candidate must submit his program to a departmental adviser for approval. The major consists of 24 units.

* Not to be given, 1959–1960.
Courses in journalism must include 131, 140 or 141, and one of the courses in the 181 series. Unless special departmental approval is obtained, only one part of 181 may be offered in completion of the requirements for the major. Continuance in the major is contingent upon the maintenance of an average grade of at least C in all courses offered for the major.

Higher Degree.—Students interested in graduate study in journalism are invited to consult the Dean of the Graduate Division or the Graduate Adviser for the department.

**LOWER DIVISION COURSE**

21. Elementary News Writing. (3) I and II.
   Mr. Desmond, Miss Kerrick, Mr. Gieber
   Prerequisite: English 1A–1B or Speech 1A–1B.
   Journalistic writing, including its evolutionary development, its social and its compositional problems.

**UPPER DIVISION COURSES**

*121. The Reporter and the News. (3) II.
   Mr. Griffin
   Prerequisite: English 1A–1B, or Speech 1A–1B, and course 21 or consent of the instructor. Not open for credit to students who have received credit for courses 120A or 120B.
   The reporter's functions and responsibilities as a communicator in all media; interrogation and evaluation of data.

131A–131B. The Editing Process. (3-3) Yr.
   Mr. Griffin, Mr. Gieber
   Lecture and laboratory. Prerequisite: course 21 or the equivalent. Prescribed in the junior year for journalism majors. 131A is not prerequisite to 131B.
   131A: Laboratory study of news presentation, including reporting and editing.
   131B: Organization and administration of news functions. A field study of a community and its news outlet is required.

140. History of Journalism. (3) I.
   Mr. Gieber
   Study of the development of journalism, particularly in the United States, with an introduction to the important papers and personalities.

141. The Press and Society. (3) II.
   Mr. Hulten
   An examination of the press as an important institution in the nation and in the world.

145. Great Figures in Journalism. (2) II.
   Mr. Desmond
   The careers of persons who have played roles in the evolution of the press in the United States and other countries.

147. Analytical Studies in Journalism. (3) I.
   Miss Kerrick
   Prerequisite: consent of the instructor.
   A study of recent reports of quantitative research relating to journalism, with special attention to methods developed. A semester report demonstrating familiarity with the purpose and method of such research will be required.

151. Literature of the Press. (3) II.
   Mr. Brotman
   A survey of significant writing in the American and British press, from Stephen Crane to Rebecca West, George Orwell, and John Hersey. Journalism as an innovative force in the emergence of literary forms and styles.

* Not to be given, 1959–1960.
152. **Magazine Article Writing.** (3) II.  
Mr. Brotman  
Prerequisite: upper division standing and consent of the instructor.  
Writing for magazines, specialized publications, and newspaper feature sections. Magazine publishing practices as they affect the professional writer.

165. **The Press, the Law and the Constitution.** (3) I.  
Mr. Pickerell  
Introduction to historical development of freedom of press and speech; development of rights to publish news and comment, restrictions to rights affected by controls over defamation, licensing and taxation, access to information, and the doctrine of privacy.

181. **Senior Course in Journalistic Problems.** Mr. Brotman, Mr. Pickerell  
Prerequisite: course 131 or, for 181J, consent of the instructor. Restricted to majors with senior standing, except that certain nonmajors may be admitted to 181J with the consent of the instructor. Unless departmental approval is given, only one part of 181 may be taken in satisfaction of the major.

1811. **Radio Journalism.** (3) II.  
Mr. Brotman  
(Formerly numbered 180.)  
Two hours of lecture and one two-hour laboratory per week.

1811J. **Newspaper Advertising.** (3) I.  
Mr. Brotman  
(Formerly numbered 171.)  
Two hours of lecture and one two-hour laboratory per week.

*181K. **Problems of Publishing.** (3) II.  
Mr. Pickerell  
(Formerly numbered 170.)  
Two hours of lecture and one two-hour laboratory per week.

181L. **Reporting of Public Affairs.** (3) II.  
Mr. Pickerell  
(Formerly numbered 184.)  
Two hours of lecture and one two-hour laboratory per week.

190A–190B. **Press and World Affairs: Comparative World Journalism.**  
(3–3) Yr.  
Mr. Desmond  
190A is not prerequisite to 190B.  
190A: Press and World Affairs.  
May not be taken for credit by students who have received credit for 190.  
Examination of sources and flow of news throughout the world; influences that affect information reaching people.  
190B: Comparative World Journalism.  
Comparative study of press systems, especially those in Europe with those in the Western Hemisphere.

195. **Critical Reviewing for the Press.** (3) I.  
Mr. Brotman  
Prerequisite: senior standing and consent of the instructor.  
Theory and technique of reviewing current literature, drama, film, and the arts. The reviewer's function in sustaining standards of artistic excellence, guiding popular taste, and providing constructive criticism for working artists. Practice in writing reviews.

196. **Theories and Problems in the Conduct of International Information Programs.** (3) I and II.  
Mr. Hulten  
Prerequisite: senior or graduate standing and consent of the instructor.  
A study of governmental efforts at international persuasion; problems of message content, and propaganda directed at the peoples of the world by various countries.

* Not to be given, 1959–1960.
199. Special Study for Advanced Students. (1–4) I and II.
Mr. Brotman
Prerequisite: for students whose major is journalism, at least a B average in all journalism courses undertaken or consent of the instructor; for others, at least a B average in all courses undertaken and consent of the instructor.

GRADUATE COURSES

Prerequisite: courses 121 or 131 and 140. Admission to all graduate courses is at the discretion of the instructor. See also page 18.

201. Research Methods in Journalism. (2) I and II.
Miss Kerrick
Required of all candidates for the Master of Journalism degree.
Materials and techniques of journalistic research. Study of bibliographical method, historical and sociological investigation, quantitative and qualitative analysis.

220. The Newspaper and Public Affairs. (3) I.
Mr. Hulten
A seminar requiring investigation in the theory and practice of the newspaper press in reporting public affairs, and in the interrelationships between public agencies and the press. With field work.

231. The Newspaper and Its Audience. (3) II.
Miss Kerrick
A seminar in the development and performance of the newspaper press, with special reference to audience problems. With reports from students.

240. Seminar in History of Journalism. (3) II.
Mr. Gieber

Mr. Pickerell
Critical analysis of the place of the press, radio, films, and television in shaping the public mind; effects on public opinion of practices in these media; propaganda and information techniques of governments, political parties, pressure groups, and other organized bodies.

265. The Law of Communications. (3) II.
Mr. Pickerell
A seminar inquiring into contemporary legal controls affecting the press, radio and films, with special attention to issues of press freedom, contempt of court, the law of libel, and privilege. Case studies.

270. Economic Organization of the Press. (3) I.
Mr. Pickerell
A seminar analyzing the business practices and financial structure of the newspaper press and its relationship to the community in which it operates. Case studies.

290. Seminar in Comparative World Journalism. (3) I.
Mr. Desmond

299. Special Research Projects and Field Study in Communications.
(1–4) I and II.
Mr. Hulten
May be taken both semesters.
Individual investigation of a selected topic, conducted under guidance of a member of the faculty.

RELATED COURSES IN OTHER DEPARTMENTS

Field Work in Legislative Process (Political Science 400A–400B).
Introduction to Social Science (Social Science 1A–1B).
LANDSCAPE ARCHITECTURE

(Department Office, 101 Agriculture Hall)

H. Leland Vaughan, B.S., Professor of Landscape Architecture (Chairman of the Department).
Francis J. Violich, B.S., Professor of City and Regional Planning and Landscape Architecture.
John W. Gregg, B.S., D.L.A., Professor of Landscape Architecture, Emeritus.
Harry W. Shepherd, B.S., Professor of Landscape Architecture, Emeritus.
Roy B. Litton, Jr., M.L.A., Associate Professor of Landscape Architecture (Acting Chairman of the Department to December 30, 1959).
May K. Arbegast, M.S., Assistant Professor of Landscape Architecture.
Robert J. Tetlow, M.S., Assistant Professor of Landscape Architecture.
Donald B. Austin, M.L.A., Acting Instructor in Landscape Architecture.

Departmental Major Advisers: Mr. Litton, Mr. Vaughan.

Preparation for the Major.—For courses required in preparation for the major, see page 82 of the CIRCULAR OF INFORMATION. For further information, consult the BULLETIN OF THE COLLEGE OF AGRICULTURE*.

The Major.—Required: Landscape Architecture 49 and a minimum of 35 units in landscape architecture, selected with the approval of the major adviser, including courses 1, 2, 20, 111A, 111B, 120, 130, 131, 132A, and 132B.

In the design course sequence (1, 130, 131, and 132A), a grade of C or better is required for advancement to the succeeding course. A grade of D will require repetition of the course for which no further unit credit can be granted. Improvement in grade, however, will be recognized in all cases, but grade points received as earned are granted only for lower division courses, in accordance with University regulations.

LOWER DIVISION COURSES

1. Theory and Elementary Design. (4) I and II.
   Mr. Tetlow, Mr. Vaughan
   Lecture and laboratory. Prerequisite: Architecture I N or equivalent.
   Theory and principles of landscape architecture; elementary problems in analysis and design.

2. History and Literature of Landscape Architecture. (2) I. Mr. Litton
   Limited to major students in landscape architecture.
   Study and analysis of landscape design through the ages, with emphasis on its relation to climate, topography, and society in various times and localities.

11. Delineation. (1) I and II.
    Mr. Tetlow
    Laboratory. Limited to major students in landscape architecture and in city and regional planning.
    Study of the methods of graphic communication in landscape architecture.

20. Introduction to Plant Materials and Planting Design. (3) II.
    (Formerly numbered 113A.) Mrs. Arbegast
    Lecture, laboratory, and field trips. Prerequisite: general botany.
    Identification of common trees and shrubs; study of form, color, texture and other characteristics essential to understanding the use of plants in design.

* Also known as the PROSPECTUS OF THE COLLEGE OF AGRICULTURE.
* In residence spring semester only, 1959–1960.
49. Summer Travel and Observation Course. (No credit.)

The Staff (Mr. Tetlow in charge)

Limited to major students in landscape architecture.
Six weeks of field trips, study, and analysis of outstanding works in site planning and landscape design throughout central California.

UPPER DIVISION COURSES

Architecture 1N and 2N, Art 2A, Botany 1, Engineering 21, Landscape Architecture 1, 2, 20, or their equivalents, are prerequisite to all upper division courses in landscape architecture for majors in landscape architecture.

100. Survey of Landscape Architecture. (3) I and II.

Mr. Chase, Mr. Litton

Lecture and laboratory. Prerequisite: advanced standing in architecture, decorative art or city and regional planning. Not open to majors in landscape architecture.
An introduction to the history, theory and materials of landscape architecture; contemporary application and practice.

111A-111B. Landscape Construction. (3-3) Yr.

Mr. Tetlow, Mr. Chase

Lectures and laboratory.
Problems of design and construction; calculations and graphic solutions to problems involving grading and surfacing; simple structures; irrigation and drainage.

120. Plant Materials and Elementary Planting Design. (3) I.

(Formerly numbered 112A.)
Mrs. Arbegast

Lecture, laboratory, and field trips. Prerequisite: course 20 or the equivalent.
Reading assignments on ecology and plant geography; identification of trees, shrubs, vines and ground covers; elementary problems in planting design.

121. Plant Materials and Planting Design. (3) I.

(Formerly numbered 113B.)
Mrs. Arbegast

Lecture, laboratory, and field trips. Prerequisite: courses 20 and 120, or equivalent.
Horticultural considerations, problems in planting design, planting plans and specifications.

122. Advanced Planting Design and Plant Materials. (3) II.

(Formerly numbered 112B.)
Mrs. Arbegast

Lecture, laboratory, and field trips. Prerequisite: courses 20 and 120, or equivalents.
Planting design problems of complex nature; study of succulents, palms, tropical plants, ferns, and natives.

130. Theory and Design. (3) I.

(Formerly numbered 101A.)
Mr. Austin

Lecture and laboratory.
Theory and principles of landscape architecture; practice in analysis and design with reference to problems of limited scope.

131. Theory and Intermediate Design. (3) II.

Mr. Litton, Mr. Violich

Lecture and laboratory. Prerequisite: course 130, or enrollment in the Department of City and Regional Planning.
Theory and principles of landscape architecture; practice in analysis and design with special reference to problems of residential sites and related public and private use areas.

132A-132B. Advanced Design and Construction. (4-4) Yr.
(132A formerly numbered 114.)
Lecture and laboratory. Prerequisite: course 131.
Analysis and design of complex site projects; practice in preparation of working drawings for construction and planting as integral parts of the design process; introduction to office procedure, contract documents, specifications, and estimates.

134. Park and Recreation Area Planning. (4) I. Mr. Violich, Mr. Austin
(Formerly numbered 115.)
Lecture, laboratory, seminars, and field trips. Prerequisite: City and Regional Planning 100 or 110.
Principles, standards and procedures in planning of areas for park recreation use; problems in design of park recreation sites and systems, with particular emphasis on their relation to city, state or region as a whole.

135. Site Planning. (4) II.
(Formerly numbered 116.)
Lecture, laboratory, seminars, and field trips. Prerequisite: City and Regional Planning 100 or 110 and advanced standing in architecture or landscape architecture.
Principles, standards and procedures in planning large-scale site developments under single authority, and involving interprofessional collaboration; with special reference to the landscape architect’s role.

198. Directed Group Study. (1-5) I and II.
The Staff (Mr. Vaughan in charge)
Prerequisite: consent of the instructor.
Group study or investigation of special problems.

199. Special Study for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. Tetlow in charge)

GRADUATE COURSES
(Concerning conditions for admission to graduate courses, see page 18)

201A-201B. Graduate Design and Theory. (1-6; 1-6) Yr.
Advanced problems and research. The Staff (Mr. Litton in charge)

203. Urban Design and Landscape Architecture. (3) II.
Lecture and laboratory. Prerequisite: graduate standing in landscape architecture.
Landscape architecture in the design of specific development projects within the context of general plan policy. Relation of urban design to urban general planning. Laboratory problems and seminars in collaboration with City and Regional Planning 258.

298. Group Study. (1-6) I and II.
The Staff (Mr. Litton in charge)
Prerequisite: graduate standing in landscape architecture or city and regional planning.
Group study or investigation of advanced special problems.
LATIN

For courses in the Latin language and literature, see under Department of Classics, page 89.

LAW

(Department Office, 225 Law Building)

Edward L. Barrett, Jr., B.S., LL.B., Professor of Law.
Rex A. Collings, Jr., A.B., M.A., LL.B., Professor of Law.
Albert A. Ehrenzweig, Dr.Jur., J.D., LL.M., J.S.D., Walter Perry Johnson Professor of Law.
Richard W. Jennings, A.B., M.A., LL.B., James W. and Isabel Coffroth Professor of Law.
Sam Kagel, A.B., LL.B., Professor of Law.
Adrian A. Kragen, A.B., LL.B., Shannon Cecil Turner Professor of Law.
William T. Laube, Jr., A.B., J.D., LL.M., A. F. and May T. Morrison Professor of Law.
Albert A. Ehrenzweig, Dr.Jur., J.D., LL.M., J.S.D., Walter Perry Johnson Professor of Law.
Richard W. Jennings, A.B., M.A., LL.B., James W. and Isabel Coffroth Professor of Law.
Sam Kagel, A.B., LL.B., Professor of Law.
Adrian A. Kragen, A.B., LL.B., Shannon Cecil Turner Professor of Law.
William T. Laube, Jr., A.B., J.D., LL.M., A. F. and May T. Morrison Professor of Law.
*David W. Louisell, B.S.L., LL.B., Professor of Law.
Frank C. Newman, A.B., LL.B., LL.M., J.S.D., Professor of Law.
William Lloyd Prosser, A.B., LL.B., LL.D., Elizabeth Josselyn Boalt Professor of Law (Chairman of the Department).
Stefan A. Riesenfeld, B.S., LL.B., Dr.Jur., Dott. in giur., S.J.D., Emanuel S. Heller Professor of Law.
Sho Sato, A.B., LL.B., Professor of Law.
Arthur H. Sherry, A.B., LL.B., Professor of Law and Criminology.
Barbara Nachtrieb Armstrong, A.B., J.D., Ph.D., LL.D., A. F. and May T. Morrison Professor of Municipal Law, Emeritus.
William Warren Ferrier, A.B., J.D., Professor of Law, Emeritus.
Alexander M. Kidd, A.B., LL.B., Elizabeth Josselyn Boalt Professor of Law, Emeritus.
Jerome A. Cohen, A.B., LL.B., Acting Associate Professor of Law.
Edward C. Halbach, Jr., A.B., J.D., Acting Associate Professor of Law.
Geoffrey C. Hazard, Jr., B.A., LL.B., Acting Associate Professor of Law.
John R. Hetland, B.S.L., LL.B., Acting Associate Professor of Law.
Ira M. Heyman, A.B., LL.B., Acting Associate Professor of Law.

Brent M. Abel, A.B., LL.B., Lecturer in Law.
John P. Austin, A.B., LL.B., Lecturer in Law.
Spurgeon Avakian, A.B., LL.B., Lecturer in Law.
Newell C. Barnett, A.B., LL.B., Lecturer in Law.
Valentine Brooke, A.B., LL.B., Lecturer in Law.
John W. Cowee, B.S., B.A., M.B.A., Ph.D., LL.B., Associate Professor of Insurance.
Folger Emerson, A.B., LL.B., Lecturer in Law.
George T. Frampton, A.B., LL.B., Visiting Professor of Law.
David Hardy, A.B., LL.B., Lecturer in Law.
Robert Cronley Ilharris, A.B., LL.B., Lecturer in Law.
Tevis Jacobs, A.B., J.D., Lecturer in Law.
William N. Keeler, A.B., J.D., Lecturer in Law.
Joseph Chanslor Kimble, A.B., LL.B., Lecturer in Law.
Scott C. Lambert, LL.B., Lecturer in Law.

† In residence fall semester only, 1959-1960.
Dana Latham, A.B., LL.B., Lecturer in Law.
William D. McKee, B.S., LL.B., Lecturer in Law.
James E. Sabine, A.B., LL.B., Lecturer in Law.
Justin Sweet, A.B., LL.B., Visiting Associate Professor of Law.
Samuel Taylor, A.B., LL.B., Lecturer in Law.

CURRICULUM OF THE SCHOOL OF LAW

For admission requirements and for the requirements for the degree of Master of Laws (LL.M.) and of Doctor of the Science of Law (J.S.D.), consult the Announcement of the School of Law.

Nonresidents of California enrolled as students in the School of Law pay a fee of $260 each semester, which includes the incidental fee charged all students.

PROFESSIONAL CURRICULUM

First Year

200A–200B. Contracts. (3–3) Yr. Mr. Laube, Mr. Sweet
202. Crimes. (3) II. Mr. Cohen, Mr. Collings
206A–206B. Pleading and Procedure in Civil Cases. (3–3) Yr. Mr. Hazard
208A–208B. Property. (3–3) Yr. Mr. Hetland, Mr. Heyman
210. Equity. (3) I. Mr. Cohen, Mr. Newman
212A–212B. Torts. (3–3) Yr. Mr. Collings, Mr. Prosser
214A–214B. Introduction to Law. (½–½) Yr. Mr. Sato and Law Associates

Second Year

220. Administrative Law: First Course. (3) II. Mr. Cohen, Mr. Newman
222A–222B. Business Associations. (3–3) Yr. Mr. Frampton, Mr. Jennings
224A–224B. Constitutional Law. (2–2) Yr. Mr. Barrett, Mr. Heyman
227. The Legal Profession. (1) I. Mr. Riesenfeld (in charge), Mr. Ehrenzweig, Mr. Keeler
230. Marital Property. (2) I. Mr. Collings, Mr. Sweet
232. Security Transactions. (2) I. Mr. Hetland, Mr. Riesenfeld
234A–234B. Wills and Future Interests; Trusts. (3–2) Yr. Mr. Frampton, Mr. Halbach
237. Income Taxation. (3) II. Mr. Kragen, Mr. Sato

Third Year

*240. Administrative Law: Second Course. (2) I. Mr. Newman
242. International and Maritime Law. (2) II. Mr. Riesenfeld
243. Commercial Paper. (2) I. Mr. Laube

* Not to be given, 1959–1960.
244. Creditors' Remedies. (3) II. Mr. Riesenfeld
245. Comparative Jurisprudence. (2) I. Mr. Ehrenzweig
246. Conflict of Laws. (3) I. Mr. Ehrenzweig
247. Corporation Finance and Securities Regulation. (2) II. Mr. Jennings
248. Selected Problems in Corporations and Partnerships. (2) I. Mr. Frampton, Mr. Jennings
249. Sales. (2) II. Mr. Laube
250A–250B. Evidence. (2–2) Yr. Mr. Sherry
*251. Selected Problems in Comparative Jurisprudence. (2) II. Mr. Ehrenzweig
252. Selected Problems in Constitutional Law. (2) I and II. Mr. Barrett
253. Family Law. (2) II. Mr. Sweet
254. Federal Jurisdiction. (2) II. Mr. Barrett
*256. Selected Problems in Property and Future Interests. (2) II. —
257. Insurance. (2) II. Mr. Cowee
258. Law of International Organization. (2) I. Mr. Cohen
*259. International Conflict of Laws in the United States. (2) II. Mr. Ehrenzweig
262. Labor Law. (2) I. Mr. Kagel
263. Negotiation, Conciliation, Arbitration. (2) II. Mr. Kagel
*264. Modern Social Legislation. (2) II. —
*265. Advanced Legal Writing. (1–2) I and II. Mr. Prosser
266. Legislation. (2) I and II. Mr. Newman
268. State and Local Government Law. (2) I. Mr. Sato
270. Government Control of Business. (2) I. Mr. Riesenfeld
274. Restitution. (2) II. Mr. Hetland
276. Fair Trade Practices and Copyrights. (2) II. Mr. Kragen
278. Selected Problems in Criminal Law and Administration. (2) I. Mr. Sherry
279. Natural Resources Law. (2) I. Mr. Sato
282. Estate and Gift Taxation. (2) I. Mr. Kragen
283. Selected Problems in Estate Planning. (2) II. Mr. Halbach
284. Selected Problems in the Taxation of Business Enterprise. (2) I. Mr. Kragen

Graduate Curriculum
285A–285B. Seminar in Administrative Law and Procedure. (2–2) Yr. Mr. Newman, Mr. Riesenfeld

* Not to be given, 1959–1960.
286A–286B. Seminar in Business Associations. (2–2) Yr. Mr. Jennings
287A–287B. Seminar in Commercial Transactions. (2–2) Yr.
Mr. Laube, Mr. Prosser, Mr. Riesenfeld
288A–288B. Seminar in Constitutional Law. (2–2) Yr. Mr. Barrett
289A–289B. Seminar in Criminal Law and Procedure. (2–2) Yr.
Mr. Collings, Mr. Sherry
290A–290B. Seminar in International and Maritime Law. (2–2) Yr.
Mr. Riesenfeld
291A–291B. Seminar in Labor Law and Procedure. (2–2) Yr. Mr. Kagel
292. Seminar in Legal Education. (1) I and II.
The Staff (Mr. Newman in charge)
293A–293B. Seminar in Legal History and Jurisprudence. (2–2) Yr.
Mr. Ehrenzweig, Mr. Riesenfeld
294A–294B. Seminar in Legislation and Legislative Procedure. (2–2) Yr.
Mr. Newman
295A–295B. Seminar in Practice and Procedure. (2–2) Yr.
Mr. Barrett, Mr. Hazard, Mr. Louisell
296A–296B. Seminar in Property and Trust Administration. (2–2) Yr.
Mr. Sato
297A–297B. Seminar in Public Finance and Taxation. (2–2) Yr.
Mr. Kragen
298A–298B. Seminar in Roman and Comparative Law. (2–2) Yr.
Mr. Ehrenzweig, Mr. Riesenfeld
299. Research in Legal Problems. (1–5) I and II.
The Staff (Mr. Ehrenzweig in charge)

LIBRARIANSHIP

(Department Office, 425 Library)

Donald Coney, M.A., Professor of Librarianship.
J. Periam Danton, Ph.D., Professor of Librarianship (Chairman of the Department).
LeRoy C. Merritt, Ph.D., Professor of Librarianship (Vice-Chairman of the Department).
* Edward A. Wight, Ph.D., Professor of Librarianship.
Edith M. Coulter, M.A., B.L.S., Professor of Librarianship, Emeritus.
*Anne E. Markley, M.A., Associate Professor of Librarianship.
Fredric J. Mosher, Ph.D., Associate Professor of Librarianship.
Ray E. Held, Ph.D., Assistant Professor of Librarianship.

Mae J. Durham, B.L.S., Lecturer in Librarianship.
Bertha D. Hellum, B.L.S., Lecturer in Librarianship.
Vivian Prince, B.L.S., M.L.S., Lecturer in Librarianship.
George A. Vdovin, M.L.S., Lecturer in Librarianship.

* In residence spring semester only, 1959–1960.
Librarianship

The School of Librarianship offers curricula leading to the degrees of Master of Library Science, Doctor of Library Science, and Doctor of Philosophy.

Applicants for admission to any of the curricula should send to the Dean of the School transcripts of their academic records in order that their qualifications for admission to the School may be determined. Graduate standing, without deficiencies, in the University of California, which is determined by the Dean of the Graduate Division, is required for admission. (For regulation concerning such status, see Announcement of the Graduate Division, Northern Section.)

Program for the First Professional Degree (Master of Library Science)

To secure adequate opportunity for those who enroll in the School, only a limited number will be accepted for the first-year curriculum. No one should come to Berkeley without previously having made application to the School and having received notice of acceptance. Early application is desirable. Selection is based primarily on scholarship.

The work is organized as a professional curriculum and particular subjects may not, as a rule, be taken separately. The courses are planned to occupy a student's entire time and only the exceptional or previously experienced should expect to do any outside work.

Preliminary Preparation.—A good general education is the best basis for librarianship. The Dean of the School will be glad to give advice in reference to undergraduate courses. Two modern foreign languages (not less than 8 college semester units of each) are required for admission. German and French are particularly recommended. Ability to use the typewriter with accuracy and a fair degree of speed is expected of all students. Experience in library work is highly desirable but is not required for admission.

Applicants are required to take the Aptitude Test of the Graduate Record Examination and should do so, if possible, not later than the spring of the year of application.

Applications from those who obtain less than a 2.5 grade-point average in their last two years of college or university work cannot be considered.

Applications from those over thirty-five years of age will be considered only when the applicants hold responsible library positions from which they can obtain leaves of absence. Exceptions to this rule may be considered only under unusual circumstances, such as the possession of a doctor's degree, or successful experience in a related field.

State Credential for School Librarians.—The California State Department of Education accepts the completion of the first year's work in satisfaction of its technical requirements for the special credential in librarianship, but candidates for it must also do directed practice work in school libraries during the second semester. Students undertaking this work register and receive credit for Education 323, 4 units. To meet additional requirements of the State Department of Education for this credential, candidates should take the following courses (totaling at least 9 units) before enrollment in the School, or after the completion of the first year's work: educational psychology (Education 100A, 4 units); a course dealing with elementary and secondary education (Education 100B, 3 units); and 2 elective units.

In 1959-1960, courses in librarianship will be offered in summer sessions, and in the fall and spring semesters. Students may begin the first-year curriculum only with the fall semester or summer sessions. Advanced curricula may be commenced in either the fall or spring semesters, or in summer sessions.

First-Year Courses

The 28-unit program of each student must include the following basic courses: 201, 202, 203, 204; the remaining units are to be elected from other
courses in the first-year curriculum and must include not fewer than four or more than six upper division or graduate courses in appropriate subjects approved by the Dean of the School of Librarianship.

201. Introduction to Cataloguing and Classification. (4) I. Miss Prince
Survey of the history, theory, methods, and principles of organizing library collections for use; library classification systems; principles of subject cataloguing; rules for the description and entry of general materials in library catalogues; functions and arrangement of library catalogues.

202. Bibliography and Reference Materials. (3) I. Mr. Held, Mr. Mosher
Lectures, discussions, and reports on assigned problems.
Basic reference materials, including national and subject bibliography.

203. Introduction to Librarianship. (3) I. Mr. Danton, Mrs. Hellum
Introductory survey of the evolution of libraries and basic information about the principal fields of library service with emphasis on major trends and problems. Introduction to administrative theory and practice as applied to libraries. Readings and written reports.

204. Selection and Acquisition of Library Materials. (2) I. Mr. Merritt
Theories, principles, and practice of selecting books and other library materials. Techniques of acquisition by public, school, and academic libraries.

205. Special Problems in the Selection of Materials and Evaluation of Collections. (2) II. Mr. Merritt
Prerequisite: course 204.
Problems in selecting records, motion pictures, maps, and other library material in special format; special problems in selecting material in particular subject fields; methods of evaluating library collections and the effectiveness of the selection process.

206. School Library Administration. (2) II. Mrs. Durham
A general survey of elementary and secondary school libraries. Emphasis on the function, administration, organization, services, materials, and the planning and equipment of school libraries in relation to the modern school. Lectures, committee and individual reports, readings, class discussions, and field trips. Experiences gained in practice work are utilized.

207. Municipal and County Library Administration. (2) II. Mr. Wight
Government, organization, and administration of municipal, county, and regional public libraries. Library service programs in relation to varying community patterns. Lectures, readings, reports, field trips.

208. College and University Library Administration. (2) II. Mr. Held
A general introduction to the organization and administration of college and university libraries and their place in the institutions of which they are a part. Problems and practices with respect to the library's government, functions, staff, collections, finances, and building are considered by means of written assignments, readings, and class discussion.

209. Library Work with Children. (2) II. Mrs. Durham
Lectures and discussion.
A general survey of children's books and reading preferences. Historical backgrounds and development; types of children's literature; levels of interest; criticism and evaluation; illustration; trends; book selection; storytelling; organization and administration of a children's room in a public library.
Librarianship

211. Development of the Book. (2) II. Mr. Mosher
Prerequisite: consent of the instructor.

212. Reference and Government Publications. (4) II. Mr. Held, Mr. Mosher
A continuation of course 202. Sources of information in subject fields. Emphasis is placed on types of information in foreign, national, state, and municipal documents. Problems in informational service.

214. Special Problems in Cataloguing and Classification. (2) II. Miss Prince
Prerequisite: course 201 or equivalent.
Materials requiring special description and analysis—films, phonorecords, music, monographs in series, maps, etc.; Library of Congress classification and subject cataloguing systems; arrangement of large catalogues—di­c­tionary, divided, and classified; the cataloguing department; current problems; literature of cataloguing and classification.

215. Reading and Reading Interests. (2) II. Mr. Merritt
Prerequisite: course 204.
Reading interests, habits, and needs of different types and groups of readers. The nature of reading; problems of reading; selection of reading by children, young people, college students, and public library patrons. The role of the library in adult education.

217. Bibliography of Science and Technology. (2) II. Mr. Vdovin
Prerequisite: basic college courses in chemistry and physics.
Scientific and technical literature, with emphasis on reference and biblio­graphical aids. Periodical and serial literature and its use and control through abstracts and indexes.

Programs for Advanced Degrees

Librarians who already hold a professional bachelor's degree from an ac­credited library school may earn the Master of Library Science degree by taking 24 units of professional and academic graduate courses.

Librarians who already hold a professional bachelor's or master's degree may become candidates for the Doctor of Library Science or the Doctor of Philosophy degrees.

Advanced Courses

†218. Advanced Cataloguing. (2) I and II. Miss Prince
Prerequisite: course 214.
Modern trends and problems in cataloguing, with emphasis on cooperative cataloguing, cataloguing policies, and the cataloguing of manuscripts and other special classes of library materials; study of areas of investigation and research in the field of cataloguing; discussion and reports.

†219. Advanced Classification. (2) I and II. Miss Prince
History and theory of classification; comparative study of library classi­fication systems leading, in the latter half of the semester, to intensive study and use of the Library of Congress system; individual problem or paper.

†220A. Descriptive Bibliography. (2) I and II. Miss Prince
Prerequisite: courses 201, 202, 211, 212, 214, or equivalent (the last three either previously or concurrently).

† Either 218, 219, or 220A will be given during the fall and spring semesters, 1959–1960.
Historical and analytical bibliography as methods of investigation, based on McKerrow and Esdaile; methods of bibliographical description, based on Bowers; study of the bibliography of book rarities, with emphasis on American and western imprints.

220B. Subject Bibliography. (2) II. Miss Prince
Prerequisite: courses 201, 202, 212, either previously or concurrently.
The history of bibliographical organization; methodology of enumerative bibliography, including form, style, and procedure; individual oral and written reports on the status of bibliographical control in selected subject fields, including location of special library collections and related research materials.

221. Book Collecting for University Libraries. (2) I. Mr. Merritt
Prerequisite: courses 205 and 208. Required of all master's degree candidates who intend to specialize in the college and university library field.
Problems connected with the acquisition, development, and maintenance of the book, periodical, and other collections of university libraries.

225. History of Libraries. (2) Mr. Danton, Mr. Held
225A. History of Ancient and Medieval Libraries. I. Mr. Held.
225B. History of Scholarly Libraries. II. Mr. Danton.
225C. History of Popular Libraries. I. Mr. Held.

226. History of Printing. (2) Mr. Mosher
Prerequisite: course 211 or the equivalent.
226A. Origins of Printing and Publishing in Europe. I.
226B. History of Books and Printing from the Sixteenth Century. I.
226C. History of Printing and Publishing in the United States. I.

*228. Problems in Reading. (2) I. Mr. Merritt
Prerequisite: course 215.
Analysis of reading of college students and the general adult population in terms of characteristics and interests of readers, distribution and content of publications, methods of stimulating reading, and the effects of reading; the library and adult education.

230. Library Administration. (2) I. Mrs. Hellum
The basic advanced course in the principles and practice of library administration. Analysis of the organization and management of modern libraries of various types.

232. University Library Administration. (2) II. Mr. Coney
Prerequisite: courses 208, 230, or equivalent as determined by the instructor. Required of all advanced degree candidates who intend to specialize in the college and university library field.
Study of current issues in personnel, finance, service, and the organization of materials and work. Individual projects, work periods, consultation, reports, and class discussion.

233. Junior College Library Administration. (2) II. Mr. Merritt
Prerequisite: course 230.
Problems and practices of secondary school libraries, with emphasis on the collections and instructional program of the junior college library.

234. Problems in Public Library Administration. (2) II. Mr. Wight
Prerequisite: courses 207 and 230. Required of all candidates for advanced degrees who intend to specialize in the public library field.

* Not to be given, 1959–1960.
† Either 226A or 226B or 226C will be given during the fall semester, 1959–1960.
Detailed application of the principles of public administration to the management and operation of public libraries. Case study approach through critical analysis of the functions and problems of selected libraries. Assignments adapted to special interests of students.

238. Library in the Community. (2) I. Mrs. Hellum
Analysis of the community for the librarian. Social backgrounds, economic and educational levels, and community groups, as they affect library use. Methods of integrating the library with the community.

240. Content Analysis. (2) II. Mr. Merritt
Problems in methods of determining maturity level, social and moral attitudes, and other educational and propagandistic assumptions in books, magazines, and other library materials.

245. Bibliographic Organization and Retrieval of Information. (2) I. Mr. Vdovin
Prerequisite: courses 201, 202, 203, 212.
Bibliographic control of information with emphasis on periodical and serial literature. Development of serial publication; literature use; basic information theory; traditional indexing procedures; mechanical and electronic aids; classification, alphabetic arrangement and unarranged headings as devices for information organization and retrieval.

251. Methods of Research in Librarianship. (2) I and II. Mr. Held, Mr. Mosher, Mr. Wight
History and function of research in contemporary society. Values and meaning of research. Techniques of bibliographical, historical, and sociological research, and their implications for the definition and investigation of library problems.

299. Special Study. (1-8) I and II. Mr. Danton (in charge), Mr. Coney, Mr. Held, Mr. Merritt, Mr. Mosher, Mr. Wight
Individual direction of student’s choice, planning and writing of a special study. This course must be taken for a total, in all semesters, of 4 units or more.

**LINGUISTICS**

(Doorment Office, 4210 Dwinelle Hall)

Madison S. Beeler, Ph.D., Professor of Linguistics and German.
C. Douglas Chrétien, Ph.D., Professor of Linguistics.
Murray B. Emeneau, Ph.D., Professor of General Linguistics and Sanskrit.
Mary R. Haas, Ph.D., Professor of Linguistics and Siamese (Chairman of the Department of Linguistics).
William F. Shipley, B.A., Acting Assistant Professor of Linguistics.
Denzel R. Carr, Ph.D., Professor of Oriental Languages.
Yuen Ren Chao, Ph.D., Litt.D., Agassiz Professor of Oriental Languages and Literature.
John J. Gumperz, Ph.D., Assistant Professor of Hindi.
Sydney M. Lamb, Ph.D., Lecturer in Linguistics.
Yakov Malkiel, Ph.D., Professor of Romance Philology.
James W. Marchand, Ph.D., Associate Professor of German.
David W. Reed, Ph.D., Associate Professor of English.
Gene M. Schramm, Ph.D., Instructor in Near Eastern Languages.
Francis J. Whitfield, Ph.D., Professor of Slavic Languages and Literatures.
Letters and Science List.—All undergraduate courses in Linguistics are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Shipley.

Preparation for the Major.—Required: 5 or 6 units of lower division courses in Latin or Greek (if Latin was taken in high school, Greek is recommended); 12 units of lower division courses in French or German. Recommended: Anthropology 2A–2B, Linguistics 35.

The Major.—Required: 24 to 26 units in linguistics and allied fields. Seventeen units of this requirement are to consist of the following courses without substitution: Linguistics 100, 130, 140, 150; Sanskrit 190A–190B. The remaining 7 to 9 units (three courses) must be selected from among the following: Linguistics 145, 170; English 110, 131; German 140; Anthropology 120.

Honors Program in Linguistics.—A candidate for honors with the bachelor's degree will elect, in each semester of the senior year, Linguistics H195 for 2 units. These units will be in addition to the units required to be chosen from the list of optional courses. For the first semester, Linguistics H195 shall consist of an approved program of independent study by which the student attains reasonable mastery of an appropriate topic in descriptive or historical linguistics. He shall demonstrate this mastery by presenting an acceptable term paper in which he summarizes and analyzes the material he has covered. For the second semester, Linguistics H195 shall represent another program of independent study like that pursued in the first semester.

The degrees of Master of Arts and Doctor of Philosophy will be conferred upon qualified graduate students who complete the requirements, for which prospective candidates should consult the chairman of the department or the Dean of the Graduate Division. The basic requirement looking toward these degrees is the undergraduate major in linguistics. Undergraduate majors in specific languages or in other fields may be accepted, contingent upon department approval in individual cases.

Courses in specific languages are offered by the departments of Classics (Greek, Latin, Sanskrit), English (Celtic, Old English, Middle English), French (French, Old French), German (German, Gothic, Old High German, Middle High German), Italian, Near Eastern Languages (Akkadian, Arabic, Coptic, Egyptian, Hebrew, Hindi, Persian, Sumerian, Syriac, Turkish, Urdu), Oriental Languages (Cantonese, Classical Chinese, Indonesian/Malay, Japanese, Korean, Mandarin, Mongolian, Thai, Tibetan), Romance Philology (Late Latin, Old Provençal), Scandinavian (Danish, Norwegian, Swedish, Old Icelandic, Old Swedish), Slavic (Bulgarian, Czech, Polish, Russian, Serbo-Croatian, Ukrainian, Old Church Slavic), Spanish and Portuguese (Spanish, Portuguese, Old Spanish). See also list of Related Courses in Other Departments, page 254.

LOWER DIVISION COURSE

35. Language and Linguistics. (3) I. Mr. Shipley
   Prerequisite: sophomore standing.
   How languages differ from one another in form and content; the structure of language. How languages change; the reconstruction of former languages. Bird's-eye view of the languages of the world and their relationships.

UPPER DIVISION COURSES

100. Principles of Descriptive and Historical Linguistics. (3) I. Mr. Chrétien
   The classical works of Sapir and Bloomfield. Modern developments.
Linguistics

130. Phonetics and Phonemics. (2) I and II. Miss Haas, Mr. Shipley
   I: Miss Haas; II: Mr. Shipley.
   Two lectures and two hours of section work per week. Prerequisite:
   upper division status.

140. Linguistic Analysis. (3) II. Mr. Emeneau
   Prerequisite: course 130 or equivalent course in phonetics and phonemics.
   Lectures and practice in analysis of morphology and syntax.

145. Types of Linguistic Structure. (2) II. Mr. Shipley
   Prerequisite: course 130 or equivalent course in phonetics and phonemics.
   A rapid general survey followed by a more detailed presentation of selected
   Far Eastern and American Indian Languages.

150. Introduction to Indo-European Comparative Grammar. (3) I.
   Mr. Beeler
   Prerequisite: a fair knowledge of at least one of the older Indo-European
   languages (e.g., Latin) and one of the modern Indo-European languages
   other than English or a Romance language.

170. American Indian Languages. (2) II. Miss Haas
   A brief survey of the native languages of North America; grammatical
   structure of selected languages; the application of the comparative method
   to American Indian languages.

H195. Special Study for Honors Candidates. (1–5) I and II. The Staff

199. Special Study for Advanced Undergraduates. (1–5) I and II.
   The Staff

GRADUATE COURSES

†200. Proseminar. (2) II. Mr. Chrétien
   Introduction to research.

†207. Statistical Linguistics. (2) II. Mr. Chrétien

220A–220B. Linguistics Laboratory. (3–3) Yr. Mr. Shipley
   Open to qualified language students and students of anthropology who
   have had course 130 and either 140 or 145. May be repeated without duplica-
   tion of credit with consent of the instructor.
   The technique of recording and analyzing a foreign language by working
   directly with a native speaker.

230. Seminar in Descriptive Linguistics. (2) I and II. The Staff
   May be repeated with consent of the instructor.

†250. Seminar in Historical Linguistics. (2) I and II. The Staff
   May be repeated with consent of the instructor.

260. Seminar in American Indian Linguistics. (2) I and II. Miss Haas
   May be repeated with consent of the instructor.

†270. Problems in Pacific Linguistics. (2) I and II. Mr. Chrétien

†280. Seminar in Applications of Linguistics. (2) I and II. Mr. Shipley
   Prerequisite: open to qualified graduate students in linguistics and the
   language departments with consent of the instructor. May be repeated with­
   out duplication of credit with consent of the instructor.
   Research in the relationship between linguistic methodology and language
   teaching and translation. The mastery of oral production and aural compre-

† To be given if a sufficient number of students enroll.
hension by means of bilingual phonemic presentation. The mastery of grammatical control by means of bilingual structural analysis.

298. Special Study. (1-5) I and II. The Staff

299. Directed Research. (1-5) I and II. The Staff (Miss Haas in charge)

RELATED COURSES IN OTHER DEPARTMENTS

Language and Culture (Anthropology 120).
Language (English 25).
The English Language (English 110).
American English (English 131).
Modern English (English *211J).
Germanic Linguistics (German *260).
Seminar in Linguistic Structures of South Asia (Near Eastern Languages 275).
Semitic Linguistic Structures (Near Eastern Languages *161).
Languages of Eastern Asia (Oriental Languages 100).
Introduction to Malayo-Polynesian Linguistics (Oriental Languages *118).
Malayo-Polynesian Linguistics (Oriental Languages *208).
Linguistic History of the Roman Empire (Romance Philology *200).
Late Latin Language and Literature (Romance Philology 201).
General Romance Linguistics (Romance Philology 202).
Linguistic Geography Applied to Romance Dialectology (Romance Philology *205).
Seminar in Comparative Slavic Linguistics (Slavic Languages and Literatures 220).
History of the Spanish Lexicon (Spanish 131).

MATHEMATICS

(Department Office, 301 Campbell Hall)

Stephen P. Diliberto, Ph.D., Professor of Mathematics.
Alfred L. Foster, Ph.D., Professor of Mathematics.
Bernard Friedman, Ph.D., Professor of Mathematics.
Leon A. Henkin, Ph.D., Professor of Mathematics (Vice-Chairman of the Department).
Gerhard P. Hochschild, Ph.D., Professor of Mathematics.
† Harry D. Huskey, Ph.D., Professor of Mathematics and Electrical Engineering.
John L. Kelley, Ph.D., Professor of Mathematics (Chairman of the Department).
Derrick H. Lehmer, Ph.D., Professor of Mathematics.
† Hans Lewy, Ph.D., Professor of Mathematics.
Michel Loève, Docteur des Sciences, Professor of Mathematics and Statistics.
Charles B. Morrey, Jr., Ph.D., Professor of Mathematics and Research Professor in the Institute for Basic Research in Science.
Anthony P. Morse, Ph.D., Professor of Mathematics.
‡ Edmund Pinney, Ph.D., Professor of Mathematics.
Murray H. Protter, Ph.D., Professor of Mathematics and Research Professor in the Institute for Basic Research in Science.

* Not to be given, 1959–1960.
‡ In residence spring semester only, 1959–1960.
Raphael M. Robinson, Ph.D., Professor of Mathematics.
Maxwell A. Rosenlicht, Ph.D., Professor of Mathematics.
Abraham Seidenberg, Ph.D., Professor of Mathematics.
Edwin H. Spanier, Ph.D., Professor of Mathematics.
Alfred Tarski, Ph.D., Professor of Mathematics and Research Professor in the Institute for Basic Research in Science.
František Wolf, Ph.D., Professor of Mathematics.
Benjamin A. Bernstein, Ph.D., Professor of Mathematics, Emeritus.
Thomas Buck, Ph.D., Professor of Mathematics, Emeritus.
Griffith C. Evans, Ph.D., Professor of Mathematics, Emeritus.
Sophia L. McDonald, Ph.D., Professor of Mathematics, Emeritus.
Charles A. Noble, Ph.D., Professor of Mathematics, Emeritus.
Raymond H. Sciobereti, Ph.D., Associate Professor of Mathematics, Emeritus.
Pauline Sperry, Ph.D., Associate Professor of Mathematics, Emeritus.
Arthur R. Williams, Ph.D., Assistant Professor of Mathematics, Emeritus.
William G. Bade, Ph.D., Associate Professor of Mathematics.
Errett A. Bishop, Ph.D., Associate Professor of Mathematics.
Hans J. Bremermann, Ph.D., Associate Professor of Mathematics.
Paul L. Chambré, Ph.D., Associate Professor of Mathematics and Engineering Science.
Jacques Hadamard, Ph.D., Associate Professor of Mathematics.
H. Otto Cordes, Ph.D., Associate Professor of Mathematics.
Rene J. de Vogelaere, Ph.D., Associate Professor of Mathematics and Associate Research Mathematician in the Computing Center.
Istvan Fáry, Ph.D., Associate Professor of Mathematics.
Harley Flanders, Ph.D., Associate Professor of Mathematics.
†Henry Helson, Ph.D., Associate Professor of Mathematics (Vice-Chairman of the Department to December 30, 1959).
Jacob Feldman, Ph.D., Assistant Professor of Mathematics.
†Bertram Kostant, Ph.D., Assistant Professor of Mathematics.
R. Sherman Lehman, Ph.D., Assistant Professor of Mathematics.
Maurice Sion, Ph.D., Assistant Professor of Mathematics.
Paul Emery Thomas, Ph.D., Assistant Professor of Mathematics.
Jean François Trèves, Ph.D., Assistant Professor of Mathematics.
Robert L. Vaught, Ph.D., Assistant Professor of Mathematics.
John W. Woll, Jr., Ph.D., Assistant Professor of Mathematics.
Charles Ballantine, Ph.D., Instructor in Mathematics.
Colin W. Clark, Ph.D., Instructor in Mathematics.
Marvin J. Greenberg, Ph.D., Instructor in Mathematics.
Denis Rutovitz, Ph.D., Instructor in Mathematics.
Avrum Weinzweig, Ph.D., Instructor in Mathematics.

Karol Borsuk, Ph.D., Visiting Professor of Mathematics.
Shaul R. Foguel, Ph.D., Visiting Assistant Professor of Mathematics.
Roger J. Godement, Ph.D., Visiting Professor of Mathematics.
Yitzhak Katznelson, Ph.D., Lecturer in Mathematics.
Antoni A. Kosinski, Ph.D., Visiting Assistant Professor of Mathematics.
Azriel Levy, Ph.D., Visiting Assistant Professor of Mathematics.
Arthur N. Milgram, Ph.D., Visiting Professor of Mathematics.
John Milnor, Ph.D., Visiting Professor of Mathematics.
John R. Myhill, Ph.D., Associate Professor of Philosophy.
Henry Scheffé, Ph.D., Professor of Statistics.
Wanda Szmielew, Ph.D., Visiting Associate Professor of Mathematics.
John V. Wehausen, Ph.D., Associate Professor of Engineering Science.

1 In residence fall semester only, 1959–1960.
2 In residence spring semester only, 1959–1960.
Letters and Science List.—All undergraduate courses in mathematics are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Bade, Mr. Bishop, Mr. Chambré, Mr. Cordes, Mr. Feldman, Mr. Pinney, Mr. Seidenberg, Mr. Trèves. Adviser for major in teaching of mathematics: Mr. Flanders.

THE MAJOR IN MATHEMATICS

Preparation for the Major in Mathematics.—Before taking the upper division courses for the major, the student is required to have a basis of knowledge equivalent to courses 3A–3B, 4A–4B, 8. It is desirable, therefore, that he should have completed in high school two years of algebra, plane geometry, and trigonometry, in order to anticipate the prerequisites for these courses.

The Major in Mathematics.—In the 24 units of upper division work required for the major in mathematics, a student is supposed to acquire some competence in algebra, analysis, geometry, and the foundations of mathematics. The major must include Mathematics 111A, 135A, 130A or 140, and 122. Mathematics 185 is a desirable part of the major program; this course, together with 150A–150B is equivalent to the graduate course 201A–201B. Courses in number theory, 115A–115B, and numerical analysis, 128A–128B (relating to large-scale digital computers), are also available. Attention is directed to Philosophy 12A–12B for those who are interested in logic. Statistics 112 and 113 will be of interest to many students. Special attention is also directed to the course in analytic mechanics, Physics 105A–105B.

Requirements for the major in teaching of mathematics should be discussed with the adviser for this program.

Subject to the requirement of competence in the major, and with the approval of the adviser, the student is at liberty to take theoretical courses in statistics, physics, astronomy, or other sciences as part of his major in mathematics, as well as other upper division courses in mathematics. Course 201A–201B forms a desirable part of the program for senior students with facility for mathematics.

LOWER DIVISION COURSES

C. Trigonometry. (2) I and II.
Prerequisite: plane geometry; one and one-half years of high school algebra or course D. Students who enter with credit for one term of high school trigonometry will receive 1 unit credit for Mathematics C.
Plane trigonometry.

D. Intermediate Algebra. (2) I and II. Mr. Clark
Prerequisite: one year of high school algebra. One and one-half years of high school algebra is advised. Not open to students who have received credit for two years of high school algebra, or course 3A or 8.

G. Solid Geometry. (2) I and II. The Staff

3A. Analytic Geometry and Calculus, First Course. (3) I and II.
Mr. Nelson, Mr. Seidenberg, Mr. Thomas
Prerequisite: two years of high school algebra or course D (passed with a grade of C or better), plane geometry, plane trigonometry. Students may not receive credit for 3A after having completed 3R or 16A–16B.
All prospective registrants in Mathematics 3A, except those who have passed Mathematics D (with grade C or better) in regular session at Berkeley the semester prior to registering in 3A, and those who have been admitted to the College of Engineering, must take the qualifying examination, which is given on Tuesday of registration week of each regular session. Students who fail this examination will be required to take Mathematics 3R, in lieu of 3A.

Elements of analytic geometry, introduction to differential calculus.

§3C. Introduction to Mathematical Analysis, First Course. (3) I.
Mr. Flanders
Prerequisite: same as for 3A, consent of the instructor, and high grade on the 3A qualifying examination.
First course on an experimental four-semester alternative calculus sequence for able students with strong mathematical background and interest. Emphasis on theory, rigor, and hard problems. Recommended as preparation for the major, particularly for honors candidates. Enrollment limited to twenty students.
Real numbers, functions and limits, continuity, derivatives, several variables, implicit functions, trigonometric and exponential functions.

3R. Analytic Geometry and Calculus, First Course. (3) I and II.
Mr. Bade, Mr. Foster
Prerequisite: two years of high school algebra or course D (passed with a grade of C or better), plane geometry, plane trigonometry. Students may not receive credit for 3R after having completed 3A or 16A–16B.
A remedial course for students who fail the qualifying examination for Mathematics 3A, meeting five hours per week. The course includes a review of algebra, followed by the subject matter of course 3A.

3B. Analytic Geometry and Calculus, Second Course. (3) I and II.
Prerequisite: courses 3A or 3R, or 16A–16B. Mr. Fáry, Mr. Morse
Continuation of 3A. Introduction to differential and integral calculus, with applications.

§3D. Introduction to Mathematical Analysis, Second Course. (3) II.
Prerequisite: course 3C or consent of the instructor. Mr. Flanders
Continuation of 3C. Taylor's Theorem, integration, indefinite integrals, multiple integrals, change of variable.

3H. Analytic Geometry and Calculus, Second Course. (3) I and II.
Prerequisite: course 3A with high attainment; admission on recommendation of the department.
Course substantially the same as 3B, but designed for students with special facility for mathematics.

3. Analytic Geometry and Calculus, First and Second Courses. (6) I and II.
Prerequisite: same as for 3A, including the qualifying examination, passed with higher attainment.

4A. Analytic Geometry and Calculus, Third Course. (3) I and II.
Prerequisite: course 3B. Mr. Diliberto
Continuation of 3B. Thorough technique of differential and integral calculus.

§ To be given one semester only, 1959–1960.
Mathematics

*†4C. Introduction to Mathematical Analysis, Third Course. (3) I.
Prerequisite: course 3D or consent of the instructor.  Mr. Flanders
Continuation of 3D. Infinite sequences, vector analysis, surface integrals, linear ordinary differential equations.

4G. Analytic Geometry and Calculus, Third Course. (3) I and II.
Mr. Katznelson, Mr. Weinzeig
Prerequisite: course 3B or 3H with high attainment; admission on recommendation of the department.
Course substantially the same as 4A, but designed for students with special facility for mathematics.

4B. Analytic Geometry and Calculus, Fourth Course. (3) I and II.
Prerequisite: course 4A. Mr. Hochschild
Continuation of 4A. Geometry and analysis of functions of several variables, partial derivatives, multiple integrals.

*†4D. Introduction to Mathematical Analysis. Fourth Course. (3) II.
Prerequisite: course 4C or consent of the instructor. Completion of the 3C-4D sequence is equivalent to 3A-4B, 119, 122.
Taylor and Fourier series, integral transforms, special functions, partial differential equations, potentials, integral equations, first variation.

4H. Analytic Geometry and Calculus, Fourth Course. (3) I and II.
Mr. Kosinski
Prerequisite: course 4A or 4G with high attainment; admission on recommendation of the department.
Course substantially the same as 4B, but designed for students with special facility for mathematics.

4. Analytic Geometry and Calculus. Third and Fourth Courses. (6) II.
Prerequisite: same as for 4A. Mr. Ballantine

5. Mathematics for Liberal Arts Students. (3) I and II.
Not open to students who have had 3A or 16A. Mr. Lehman
Designed to give conceptions of modern mathematics to students who have no technical background. The content varies to include one or more of the following topics: algebra, geometry, set theory, logic, number theory, statistics, mathematical methods in science.

8. Theory of Algebraic Equations. (3) I and II.
Mr. Greenberg, Mr. Lévy, Mr. Robinson
Prerequisite: two years of high school algebra (or course D) and course 3A.
Determinants, equations of third and fourth degrees, theory of equations.

11. Introduction to Linear Algebra. (3) I.
Mr. Scheffé
Prerequisite: course D or the equivalent. A student may not receive credit for course 11 if he has credit for 190B.

Philosophy 12A. Logic.
This course, given in the Department of Philosophy, is prerequisite to course 125A-125B and is recommended for all mathematics majors.

* Not to be given, 1959-1960.
† To be given one semester only, 1960-1961.
14A–14B. Calculus and Advanced Calculus. (5–5) Yr. Beginning each semester.
Prerequisite: course 3B. Students may not receive credit for 14A after completing 4A and 4B; they may not receive credit for 14B after completing 110A and 110B.
14A covers the subject matter of 4A and two-thirds of 4B; 14B covers the remaining third of 4B and 110A–110B.

16A–16B. Analytic Geometry and Calculus. (3–3) Yr.
16A given each semester.
Prerequisite: two years of high school algebra or course D, plane geometry, plane trigonometry. Students may not receive credit for 16A taken concurrently with or following 3A or 3R, nor for 16B taken concurrently with or following 3B. Students may not remove deficiencies in 3A or 3R by taking 16A nor in 3B by taking 16B.
16A. Straight lines, parabolas, derivates, maximum and minimum of algebraic and transcendental functions. Applications.
16B. Integration, partial differentiation, maximum and minimum of functions of several variables, the method of least squares.

Upper Division Courses

Prerequisite: courses 4A–4B, 8. Course 101A is not prerequisite to 101B. Designed for students who are preparing to teach mathematics in secondary schools. Selected topics in algebra and geometry, with particular emphasis on historical development.

104. Intermediate Analysis. (3) I and II.
Prerequisite: course 14B or 110A–110B.
A course in intermediate analysis, following 14B, as a preparation for more advanced courses in mathematics. This course, together with 14B, includes the material covered in 119 and 122.

110A–110B. Advanced Engineering Mathematics. (2–2) Yr.
Prerequisite: course 4A–4B. Primarily for students in engineering. A student may not receive credit for 110A or 110B after completing 14B, nor for 110B taken concurrently or after 119.
Note. Both courses 110A and 110B will be given for the last time in the fall semester. Course 110A will be open only to students who have previously completed 110B, and course 110B will be open only to students who have previously completed 110A.
Conjugate functions, hyperbolic functions, Fourier series, differential equations. 110A is not prerequisite to 110B.

111A–111B. Algebra. (3–3) Yr. Beginning each semester.
Prerequisite: course 4A–4B.
111A. Linear dependence, matrices, characteristic values, quadratic forms. 111B. Groups, theory of equations, introduction to Galois theory, elements of ring theory.

Discrete Probability (Statistics 112). (3) I.
*114. Introduction to the Theory of Potential. (3) II.
Prerequisite: 110A–110B or the equivalent.
Newtonian and vector potential, differential operators, problems related to Maxwell's equations.

115A–115B. The Theory of Numbers. (3-3) Yr.
Prerequisite: course 8.
Divisibility, congruences, theory of prime numbers, Diophantine analysis, partitions.

117. Analysis of Mathematical Problems. (3) I.
Mr. Helson
Prerequisite: upper division standing in mathematics and consent of the instructor. Intended primarily for honor students. Enrollment limited to fifteen students.
An undergraduate seminar in methods of attack on mathematical problems, without regard to particular field.

118. Analysis of Mathematical Problems. (3) II.
Mr. Flanders
Prerequisite: upper division standing in mathematics and consent of the instructor. Intended primarily for honor students. Enrollment limited to fifteen students.
An undergraduate seminar in methods of attack on mathematical problems, without regard to particular field.

119. Differential Equations. (3) I and II.
Mr. Bishop, Mr. Flanders
(Formerly numbered 119A.)
Prerequisite: course 4B. Beginning with the first Summer Session, 1959, only 1 unit of credit will be allowed for students who have credit for course 110B.

*121. Mathematical Introduction to Economics. (3) I.
Prerequisite: course 4A–4B.
Monopoly, competition, theory of dimension, taxation, utility, economic dynamics.

122. Advanced Calculus. (3) I and II.
Mr. Bade, Mr. Feldman, Mr. Rutovitz, Mr. Trèves
(Formerly numbered 122A.)
Prerequisite: course 4B. Beginning with the first Summer Session, 1959, only 1 unit of credit will be allowed for students who have credit for course 110A.

125A–125B. Mathematical Logic. (3–3) Yr.
Mr. Myhill
(Formerly numbered 109A–109R.)
Prerequisite: Philosophy 12A and course 3B or 8.
Elements of mathematical logic; sentential connectives, quantifiers, identity. Introduction into metalogical problems. Examples of formalized mathematical theories.
Boolean algebras: fundamental notions and postulates, verification of identities, infinite operations, atomic elements, ideals, representation problem. Connections between logic and Boolean algebras.

* Not to be given. 1959–1960.
128A-128B. Numerical Analysis. (3-3) Yr. Beginning each semester.
(128A is equivalent to course formerly numbered 128.)
Mr. Lehmer, Mr. De Vogelaere

Prerequisite: course 110A or 119A. 128A is not prerequisite to 128B.

Finite differences, interpolation, polynomial approximations, nonlinear
equations, integration of differential equations, partial differential equations,
systems of linear equations, linear programming, and Monte Carlo methods,
with emphasis on the practical aspects of computation, programming of
problems on large calculators.

130A-130B. Projective Geometry. (3-3) Yr.
(130A formerly numbered 9; 130B formerly numbered 112A.)
Prerequisite: course 3A-3B.
Mr. Rosenlicht, Mr. Weinzweig

Projective geometry as an extension of high school geometry. Projective
invariants: harmonic tetrads; cross-ratio. Desargues' and Pappus' theorem.
Axiomatic foundation of projective geometry. Introduction of coordinates in
the plane. Synthetic and analytic treatment of conics. Higher dimensional
spaces.

135A-135B. Foundations of Mathematics. (3-3) Yr.
(Formerly numbered 127A-127B.)
Prerequisite: recommended Philosophy 12A.
Mr. Lévy

Elements of set theory: operations on sets; relations, functions, set theo­
retical equivalence; cardinals, ordinals; ordering, well ordering; intro­
duction into axiomatic foundations.

Elements of theoretical arithmetic; natural numbers; successive extensions
—integers, rationals, real numbers; basic arithmetical operations; applica­
tions of continuity principle.

140. Metric Differential Geometry. (3) I and II.
(Formerly numbered 112B.)
Prerequisite: course 4A-4B.
Mr. Kosinski

Vector analysis. Study of curves and surfaces in three dimensions.

150A-150B. Theory of Functions, First Course. (3-3) Yr.
Prerequisite: course 4B. Designed primarily for students who will work
for higher degrees in mathematics and statistics. It may be followed by 201B.
Mr. Robinson, Mr. Sion

Thorough critical development of analysis: limit theorems, Jacobians,
measure, generalizations of integral, complex, and real variables.

185. Introduction to the Theory of Functions of a Complex Variable. (3)
I and II.
Mr. Bishop, Mr. Bremermann, Mr. Clark, Mr. Thomas, Mr. Woll

Prerequisite: course 122 or 150A or 110A-110B and consent of the in­
structor.

Residue theorem; applications to definite integrals. Conformal mapping.
Concepts and theorems as well as manipulation will be stressed. Each term
a special section will be given for mathematics majors.

190A-190B. Survey of Algebra and Analysis. (3-3) Yr.
Mr. Lehman, Mr. Woll

For upper division and graduate students in social sciences. Students may
not receive credit for 190B if he has credit for course 11.

The first semester covers analytic geometry, calculus, and difference
equations. The second semester includes partial differentiation, matrices, and
selected topics related to current literature in social science.
199. Special Study for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. Cordes in charge)
Investigation of special problems under the direction of members of the department. In particular, this course offers an opportunity to students with facility for mathematics to anticipate some of the advanced courses by individual study.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

201A–201B. Function Theory. (3-3) Yr. Beginning each semester.
Mr. Loève
Prerequisite: course 111A and 119. Students with facility for mathematics may take this course in the senior year. It includes the material of courses 150A–150B and 185.
Point sets in Euclidean space, measure, generalizations of integral, including Lebesgue and Lebesgue-Stieltjes integrals; classical theorems on the complex variables; application of real variable theory to complex variable.

202. Foundations of Analysis. (3) I and II.
Mr. Fáry
(Formerly numbered 210A.)
Prerequisite: course 150A or 201A or consent of the instructor.
Set theory, the real number system, topological spaces, metric spaces, compactness, completeness, function spaces.


203. Measure and Integration. (3) I and II.
Mr. Kelley
(Formerly numbered 210B.)
Prerequisite: course 150B or 201B or consent of the instructor.
General theory of measure and integration, including the Fubini theorem on product measures and the Radon-Nikodym theorem on absolutely continuous set functions.

205A–205B. Theory of Functions of a Complex Variable. (3-3) Yr.
Mr. Godement
Prerequisite: courses 201A–201B or 150A–150B with 185.
The theory of analytic functions and topics such as meromorphic functions, entire functions, modular functions, and Abelian integrals, analytic theory of differential equations, inequalities, etc., to be selected by the instructor.

206. On Hilbert Space. (3) II.
Mr. Kelley
(Formerly numbered 211A.)
Prerequisite: courses 150A–150B and 185 or 201A–201B or consent of the instructor.
The elementary theory of Banach spaces, with special emphasis on Hilbert space; linear operators; the spectral theorem for bounded self adjoint operators.

207. Linear Operations. (3) II.
(Formerly numbered 211B.)
Prerequisite: course 206 or consent of the instructor.
Completely continuous operators, differential operators, unbounded symmetric operators, perturbation theory and additional topics selected by the instructor.

215A–215B. Algebraic Topology. (3-3) Yr.
Mr. Spanier
Study of homology groups of polyhedra: exact sequences for subcomplexes, simplicial mappings, and invariance. Two-dimensional manifolds, cohomology,
introduction to homotopy groups; Brouwer's fixed point theorem, Hopf's extension theorem, cup and cap products, Poincaré duality, singular homology, De Rham's theorem.

**217. Special Functions and Asymptotic Integration.** (3) I.  
Prerequisite: course 185.  
A thorough study of the properties of the Bessel, Legendre, and hypergeometric functions and of the asymptotic evaluation of integrals by the methods of stationary phase and steepest descents.

**219A-219B. Ordinary Differential Equations.** (3-3) Yr.  
Mr. Diliberto  
Prerequisite: courses 111A, 119 (formerly 119A), 122 (formerly 122A) or 150, and 185 (which may be taken concurrently).  

**220A-220B. Higher Mathematics for Physical Sciences.** (3-3) Yr.  
Mr. Chambré  
Prerequisite: courses 110A-110B, 122 (formerly 122A), and 185, or consent of the instructor. 185 may be taken concurrently. Primarily for students in engineering.  

**220C-220D. Higher Mathematics for Physical Sciences.** (3-3) Yr.  
Mr. Friedman  
Prerequisite: courses 119 (formerly 119A), 122 (formerly 122A), and 185, or their equivalents, or consent of the instructor. Primarily for students in physics and mathematics.  

**221A-221B. Logarithmic and Newtonian Potential.** (3-3) Yr.  
Prerequisite: course 201A-201B or the equivalent.  
Relation to distributions of mass, analysis of harmonic functions, tensor invariants in Euclidean and Riemannian metric spaces.

**222A-222B. Partial Differential Equations.** (3-3) Yr.  
Mr. Milgram  
Prerequisite: either 201A-201B, or 150A-150B and 185. Course 220A-220B or 220C-220D recommended.  
Theory of initial value and boundary value problems for hyperbolic, parabolic, and elliptic partial differential equations, with emphasis on nonlinear equations.

**225A-225B. Metamathematics.** (3-3) Yr.  
Prerequisite: courses 125A-125B and 135A.  

* Not to be given, 1959-1960.
*230A–230B. Algebraic Geometry. (3–3) Yr.

*235A–235B. Set Theory. (3–3) Yr.
Prerequisite: courses 125A and 135A–135B.

240A–240B. Differential Geometry. (3–3) Yr. Mr. Milnor
Prerequisite: graduate standing or consent of the instructor.

245A–245B. General Algebraic Systems. (3–3) Yr. Mr. Vaught
Prerequisite: courses 111A–111B, 125A–125B, and 135A.

250A–250B. Algebra. (3–3) Yr. Beginning each semester.
Prerequisite: course 111A–111B. Mr. Hochschild, Mr. Rosenlicht
Topics selected from the following list: finite groups, Abelian groups, polynomial and Noetherian rings, valuations, algebraic and transcendental field extensions, Galois theory, multilinear algebra, rings and linear algebras, ideal theory, algebraic number theory.

252. Representation of Groups and Algebras and Selected Topics. (3) II.
Prerequisite: course 111A–111B.
The classical representation theory of groups and algebras (initiated by Schur), with emphasis on finite groups. Certain applications to physical problems.

255A–255B. Foundations of Geometry. (3–3) Yr. Mr. Borsuk
Prerequisite: courses 125A, 130A, 135A.


Advanced Probability (Statistics 265A–265B).

270. Technical Hydrodynamics. (3) I. Mr. Wehausen
Theoretical analyses of motion of frictionless and viscous fluids, flow of compressible fluids at sub- and supersonic velocities.

* Not to be given, 1959–1960.
290. Seminars. (2-6) I and II.

The Staff (Mr. Lewy in charge)
Topics in foundations of mathematics, theory of numbers, numerical calculation, analysis, geometry, algebra, and their applications, by means of lectures and informal conferences; work based largely on original memoirs. During 1959-1960, there will be, in particular, lecture seminars on the following subjects, in charge of the persons indicated:

(a) Algebraic structure theory, selected topics, I, II, Mr. Foster; (c) Selected topics of analysis, I, II, Mr. Cordes; (f) Scattering and wave propagation, I, II, Mr. Friedman; (g) Topics in measure theory and functional analysis, I, II, Mr. Godement; (h) Metamathematics, I, II, Mr. Henkin; (s) Algebraic geometry, selected topics, I, II, Mr. Seidenberg; (t) Distributions and general theory of partial differential equations, I, II, Mr. Trèves.

295. Individual Research Leading to Higher Degrees. (2-6) I and II.
The Staff (Mr. Lewy in charge)

Mathematical Colloquium. (No credit) I and II.
The Staff (Mr. Wolf in charge)
Meetings for the presentation of original work by members of the staff and graduate students.

RELATED COURSES IN OTHER DEPARTMENTS

Logic. (Philosophy 12A-12B) (3-3) Yr.
Statistics. See Department of Statistics.

MILITARY SCIENCE AND TACTICS

(Department Office, 149 Harmon Gymnasium)

John T. Malloy, Colonel, Infantry; Professor of Military Science and Tactics (Chairman of the Department).
Andrew Blase, Lieutenant Colonel, Artillery; Associate Professor of Military Science and Tactics.
Wilburn H. Boze, Major, Ordnance Corps; Associate Professor of Military Science and Tactics.
Albert R. Escola, Major, Military Police Corps; Associate Professor of Military Science and Tactics.
Sammy J. Black, Captain, Corps of Engineers; Assistant Professor of Military Science and Tactics.
Clayton V. Fitzgerald, Captain, Infantry; Assistant Professor of Military Science and Tactics.
Marshall C. Hays, Captain, Artillery; Assistant Professor of Military Science and Tactics.
Earl L. Hoag, First Lieutenant, Signal Corps; Assistant Professor of Military Science and Tactics.
Ray R. Hoke, Captain, Infantry; Assistant Professor of Military Science and Tactics.
Howard H. Mann, Captain, Infantry; Assistant Professor of Military Science and Tactics.
Clayton L. Wretlind, Captain, Quartermaster Corps; Assistant Professor of Military Science and Tactics.

LOWER DIVISION COURSES

The lower division or basic courses meet the requirement established by the Board of Regents for military training in the first and second undergraduate
years. Enrollment is limited to students who are male citizens of the United States, able-bodied, and under twenty-three years of age at the time of initial enrollment. A first-year or second-year student claiming exemption because of noncitizenship, physical disability, age, or prior military service will present a petition to the Registrar on the prescribed form for such exemption. Pending action on his petition, the student will enroll in the course prescribed for his year and enter upon the work thereof. These courses consist of three hours of formal instruction per week for two academic years. Instruction is given in subjects common to all branches of the Army. Uniforms and textbooks, as required, are provided by the Government and must be returned in good condition on completion of the course.

The A part of a course is not a prerequisite for the B part of a course in either basic or advanced Military Science and Tactics.

1A. Military Science I. (2) I. The Staff (Mr. Hays in charge)
Organization of the Army and R.O.T.C.; individual weapons and marksmanship; leadership, drill and command.

1B. Military Science I. (2) II. The Staff (Mr. Hays in charge)
American military history; leadership, drill and command.

21A. Military Science II. (2) I. The Staff (Mr. Mann in charge)
Prerequisite: courses 1A, 1B, or the equivalent.
Map and aerial photograph reading; crew-served weapons and gunnery; leadership, drill and command.

21B. Military Science II. (2) II. The Staff (Mr. Mann in charge)
Prerequisite: courses 1A, 1B, or the equivalent.
Crew-served weapons and gunnery; the role of the Army in national defense; leadership, drill and command.

UPPER DIVISION COURSES

Students who successfully complete the basic course or who have received credit in lieu thereof may apply for enrollment in the advanced course. For admission to the upper division or advanced course, a student must:

1. Be a male citizen of the United States and be regularly enrolled in the University.
2. Be able to complete the course before the age of twenty-eight years.
3. Have attained upper division standing in the University.
4. Successfully complete such survey and screening tests as may be prescribed.
5. Pass successfully a prescribed physical examination.
6. Be selected by the Professor of Military Science and Tactics and the Chancellor at Berkeley.
7. Execute a written agreement with the Government to complete the two-year advanced course, including attendance at summer camp, and to accept a reserve commission.

The advanced course consists of five hours of formal instruction per week for two academic years. Instruction is given in subjects common to all branches of the Army. It includes a summer camp of six weeks' duration (3 units of University credit), held between the two academic years of the advanced course. The number enrolled may vary from year to year and may be dependent upon a quota allotted annually.
Military Science and Tactics

An officer-type uniform is furnished to the student which becomes his personal property upon successful completion of the advanced course. Each student receives during the two-year period a monthly monetary allowance at a daily rate equal to the value of the commuted ration, as announced by the Department of the Army. Students attending the summer camp receive pay at the rate of $78 per month, railroad fare to and from camp, quarters, clothing, uniforms, meals, and medical services. Acceptance by the student of any of the monetary allowances listed above will make completion of the advanced course a prerequisite to graduating from the University, unless he is excused from this requirement by authority of the Secretary of the Army.

Successful completion of the advanced course, R.O.T.C., and requirements for a bachelor's degree (actual award of the degree may be waived in exceptional circumstances), qualifies the student for appointment and commission by the President as a second lieutenant in the United States Army Reserve.

Based upon the needs of the service and the professional training, aptitude, and preference of the individual, the graduate is commissioned in one of the branches of the Army. During the second year of the advanced course each student is asked to choose the arm or service, giving alternate choices, in which he desires to be commissioned. All choices are reviewed by a faculty board, composed of both civilian and military personnel, which submits its recommendations to the Department of the Army.

Those students who have successfully completed the first year of the advanced R.O.T.C. course and who have been selected by the Professor of Military Science and Tactics and the Chancellor at Berkeley for scholastic excellence and outstanding qualities of leadership may be designated “Distinguished Military Students.” Such Distinguished Students may be further designated “Distinguished Military Graduates” upon graduation and, upon application, may be considered for direct commission in the Regular Army.

For further information about the Reserve Officers' Training Corps, consult the Professor of Military Science and Tactics in 149 Harmon Gymnasium.

131A. Military Science III. (3) I. The Staff (Mr. Escola in charge)
Prerequisite: courses 21A and 21B, or the equivalent.
Leadership; military teaching methods; organization, functions, and missions of the branches of the Army; leadership, drill and command; one all-day field trip.

131B. Military Science III. (3) II. The Staff (Mr. Escola in charge)
Prerequisite: courses 21A and 21B or the equivalent.
Small-unit tactics and communications; leadership, drill and command; one all-day field trip.

141A. Military Science IV. (3) I. The Staff (Mr. Boze in charge)
Prerequisite: courses 131A and 131B.
Command and staff; estimate of situation and combat orders; military intelligence; military team; training management; leadership, drill and command.

141B. Military Science IV. (3) II. The Staff (Mr. Boze in charge)
Prerequisite: courses 131A and 131B.
Supply and evacuation; troop movements; motor transportation; military justice; military administration; service orientation; leadership, drill and command.
MUSIC

(Department Office, 104 Morrison Hall)

David D. Boyden, M.A., Mus.D. (h.c.), Professor of Music (Chairman of the Department).

*Charles C. Cushing, M.A., Professor of Music.
William D. Denny, M.A., Professor of Music.
Edward B. Lawton, Jr., A.B., Professor of Music.
†Edward E. Lowinsky, Ph.D., Professor of Music.
Joaquin Nin-Culmell, Diplôme de fin d'Etudes, Schola Cantorum; Premier Accessit de Composition Musicale, Conservatoire National, Paris, Professor of Music.
Ernest Bloch, Professor of Music, Emeritus.
Albert I. Elkus, M.L., LL.D., Professor of Music, Emeritus.
Vincent H. Duckles, Ph.D., Associate Professor of Music.
Arnold Elston, Ph.D., Associate Professor of Music.
Andrew W. Imrie, M.A., Associate Professor of Music.
Joseph W. Kerman, Ph.D., Associate Professor of Music.
Edgar H. Sparks, Ph.D., Associate Professor of Music.
Lawrence H. Moe, Ph.D., Assistant Professor of Music and University Organist.
†Seymour J. Shifrin, M.A., Assistant Professor of Music.
Mary Groom Jones, Associate in Music.
Abe Sherman, A.B., Associate in Music.

The Griller Quartet of the University of California:

Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses; a total of not more than 8 units from courses 42, 43, 46, 48, 142, 143, 146, and 148 will be accepted as Letters and Science credit. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Denny.

Preparation for the Major.—Entering students who plan to major in music should confer with Mr. Imrie or Mr. Moe. Required: Freshman year: I: Music A, 2A, 3A; II: Music B, 2B, 3B; Sophomore year: I: Music C, 2C, 3C; II: Music D, 2D, 3D. Students intending to major in music must acquire some ability in piano playing. Those who are deficient in this respect will be advised concerning further study after an advisory examination to be given during registration week. Students are also urged to learn at least

† Sabbatical leave in residence, fall semester; absent on leave, spring semester, 1959–1960.
§ In residence fall semester only, 1959–1960.
one other instrument. Instruction in piano, organ, voice, and orchestral instruments is offered by University Extension.

Undergraduate students transferring from other colleges should consult with the department major adviser before enrolling in any music course.

The Major.—The courses applicable to the major are arranged in three groups. The Theory courses provide an introduction to the materials of musical composition through analysis of representative musical works and practical exercises in the technique. The History and Literature courses provide a study of musical literature and the chief periods of its development. The Performance courses provide an opportunity to gain familiarity with musical literature through group performance.

The 24 upper division units required for the major must include:

I. Theory.—Course 101A—101B.

II. History and Literature.—Course 121A—121B and one semester course from 114, 115, 116, 117, 118, 119, 120A, 120B.

III. Performance.—Two courses from 140, 141, 142, 143, 144, 145, 146, 148, 149. Each of these courses may be repeated once without duplication of credit. The requirement may be satisfied by repeating the same course.

Students are advised to acquire facility in reading French, German, or Italian. In addition, the department recommends as supplementary choices among free electives: History 130, Philosophy 136A—136B and other related courses in the fields of anthropology, architecture, art, English, history, philosophy, speech, and foreign literatures.

The department does not offer individual vocal or instrumental instruction. However, it will consider recommending to the Dean a reduction of the minimum unit load for those students who wish to continue intensive private study and to take longer than the usual four years to obtain the A.B. degree. See section concerning study-list regulations in the Circular of Information.

Students who fail to maintain an average of two grade points for each unit of work undertaken in the upper division in the Department of Music will, upon approval of the Executive Committee of the College of Letters and Science, be excluded from the major in music.

Honor Students in the Upper Division.—Students in the honors group who have completed the major in music with distinction may receive honors at graduation.

Teacher-Training.—Adviser: Mr. Sparks. Candidates for the general secondary credential, after receiving the A.B. degree, must spend two graduate semesters at this University. The teaching major, normally completed by the end of this period, specifically requires: (a) the courses in Theory and History and Literature required for the music major; (b) courses 108, 111, 112A—112B; (c) 4 units chosen from 140, 141, 142, 143, 144, 145, 146, 148, 149, 2 units of which must be in 144. Only 1 unit of 148 may apply; (d) ability in piano equivalent to that attained in four semester hours of instruction and competence in either voice or one orchestral or band instrument, and 9 units from 328A, 328B, 329A, 329B, 329C, 329D, 329E. At the discretion of the adviser, portions of this work may be waived. Students without previous experience in playing an orchestral or band instrument are urged to undertake work in the 329 courses as soon as possible, preferably in the lower division. Credit of 3 to 5 units in the teaching methods courses will satisfy the requirement of elective units in education.

The candidate for practice teaching in instrumental music must demonstrate ability in performance on strings, brass, and woodwinds equivalent to that which he would attain from two semesters of course 329A and one semester each of courses 329B, 329C, 329D. For further information, including grade-point requirements, see the Announcement of the School of Education.
Major in Music Education.—Adviser: Mr. Sparks. This curriculum leads to the A.B. degree in four years and to a general secondary credential in five years, or a special credential in four and one-half years. The curriculum coordinates (1) the State requirements for the general secondary and special credentials; (2) the general requirements of the University; and (3) training in music, embodying (a) the main requirements of the music major, including group performance, (b) instrumental and vocal methods, (c) conducting and orchestration, and (d) instruction in individual instruments or the voice. Instruction under (d) is undertaken in University Extension. For details of this curriculum, see page 68, CIRCULAR OF INFORMATION.

Minor in Music.—Students may consult Mr. Sparks concerning requirements for the minor. In every case, the preparation must include some ability in piano, studies in musicianship and harmony, and experience in choral or instrumental performance.

Higher Degrees.—See the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION, and the special announcements issued by the department concerning the M.A. and Ph.D. degrees.

GROUP I

Courses open to all students in the University

LOWER DIVISION COURSES

10. Basic Musicianship. (2) I and II. The Staff (Mr. Sparks in charge)
   Fundamentals of music, with singing, ear training, harmonization of melodies, and conducting.

   Mr. Commanday, Mr. Sparks
   Two lectures and one section meeting per week. Course 27A or consent of the instructor is prerequisite to course 27B.
   Lectures, illustrations, and readings designed to furnish a general appreciation of music. Weekly section meetings for listening, discussion, and written work.

Performance

Audition for enrollment in any performance course will be required during the period of registration. Further information may be obtained at the departmental office.

All courses in this group may be repeated once without duplication of credit.

40. Opera Workshop. (2) I and II.

41. University Symphony Orchestra. (2) I and II. Mr. Griller
   Two two-hour rehearsals per week.

42. University Chamber Band. (1) I. Mr. Berdahl
   One two-hour rehearsal per week.

43. University Concert Band. (2) II. Mr. Berdahl
   Two hour-and-a-half rehearsals and one section hour per week.

44. University Chorus. (2) I and II. Mr. Lawton
   Two hour-and-a-half rehearsals and one section hour per week.

46. Chamber Music Ensemble. (1 or 2) I and II.
   The Griller Quartet (Mr. Griller in charge)
   Two to four class hours per week.
   Study and interpretation of chamber music for strings and for strings, winds, and piano.
Music

48. Piano Ensemble. (1) I and II. Mrs. Petray
Two class hours per week.
Study and interpretation of four- and eight-hand piano literature.

UPPER DIVISION COURSES

110. Basic Musicianship. (2) II. Mr. Kyme
Prerequisite: course 10 or consent of the instructor.
A continuation of course 10 for general students who wish to attain additional facility.

127A. Introduction to Opera. (3) II.
Prerequisite: course 27A-27B or consent of the instructor.
Critical study of seven operas, such as Dido and Aeneas, Gluck's Orfeo, Don Giovanni, Fidelio, Tristan, Otello, Pelléas, and Wozzeck, emphasizing the contributions of music to a total dramatic effect.

*127B. The Symphonies of Beethoven. (3) I. Mr. Elkus
Prerequisite: course 27A-27B or consent of the instructor.
Study of the nine symphonies, showing the development of Beethoven's style. Lectures, listening, and reference to selected nonsymphonic works.

127C. Introduction to Contemporary Music. (3) I. Mr. Elston
Prerequisite: course 27A-27B or consent of the instructor.
Study of representative works of the twentieth century; lectures, guided listening, and reading assignments.

127D. Bach and Handel. (3) I. Mr. Boyden
Prerequisite: course 27A-27B or consent of the instructor.

Performance

For particulars, see lower division performance courses.
All courses in this group may be repeated once without duplication of credit.

140. Opera Workshop. (2) I and II.
Prerequisite: consent of the instructor.

141. Advanced University Symphony Orchestra. (2) I and II.
Prerequisite: consent of the instructor. Mr. Griller

142. University Chamber Band. (1) I.
Prerequisite: consent of the instructor. Mr. Berdahl

143. Advanced University Concert Band. (2) II.
Prerequisite: consent of the instructor. Mr. Berdahl

144. Advanced University Chorus. (2) I and II.
Prerequisite: 4 units in course 44. Mr. Lawton

145. Repertory Chorus. (2) I and II.
Prerequisite: consent of the instructor. Enrollment limited to thirty-two students. Mr. Moe

146. Advanced Chamber Music Ensemble. (1 or 2) I and II.
The Griller Quartet (Mr. Griller in charge)
Prerequisite: consent of the instructor.

148. Advanced Piano Ensemble. (1) I and II. Mrs. Petray

* Not to be given, 1959–1960.
*149. Collegium Musicum. (1 or 2) I and II. Mr. Kerman
The course will be coordinated with course 145. Open to a limited number of qualified instrumentalists who can demonstrate proficiency on their instruments.
Performance of rarely heard ensemble music.

**GROUP II**

Courses primarily for students whose major subject is music

**LOWER DIVISION COURSES**

**A-B. Musicianship.** (2-2) Yr. The Staff (Mrs. Petray in charge)
(A formerly numbered A-B.)
(B formerly numbered 1A-1B.)
Elements of music, with ear training, sight singing, and dictation.

**C-D. Musicianship.** (1-1) Yr. Mrs. Petray, Mr. Sherman
(C formerly numbered 100A.)
(D formerly numbered 100B.)
Prerequisite: course A-B or consent of the instructor.
A continuation of course A-B, which is prerequisite.

**2A-2B. The Masterworks of Music.** (1-1) Yr. Mr. Sparks
Prerequisite: the ability to read music or consent of the instructor.
Guided listening and discussion.

**2C-2D. The Masterworks of Music.** (2-2) Yr. Mr. Imbrie
Prerequisite: courses 2A-2B and 3A-3B, or consent of the instructor.
A continuation of course 2A-2B, which is prerequisite.

**3A-3B. Elementary Harmony.** (3-3) Yr. Mr. Lawton (in charge), Mr. Imbrie, Mr. Kerman, Mr. Nin-Culmell
Prerequisite: courses A-B and 2A-2B (may be taken concurrently), or consent of the instructor.
Exercises in writing and at the keyboard.

**3C-3D. Intermediate Harmony.** (3-3) Yr. Mr. Denny (in charge), Mr. Shifrin
A continuation of course 3A-3B, which is prerequisite.

**UPPER DIVISION COURSES**

**Theory**

**101A-101B. Counterpoint.** (3-3) Yr. Mr. Elkus, Mr. Elston
Prerequisite: course 3D.
The first semester will be devoted to modal, the second semester to tonal counterpoint.

*102A. Keyboard Harmony.** (2) I. Mr. Sparks
Prerequisite: course 3D.

*102B. Score Reading.** (2) II. Mr. Kerman
Prerequisite: course 3D.

**105A-105B. Principles of Composition.** (3-3) Yr. Mr. Imbrie
Prerequisite: course 101B.

**106A-106B. Canon and Fugue.** (3-3) Yr. Mr. Denny
Prerequisite: course 101B.

* Not to be given, 1959-1960.
Music

107A–107B. Studies in Musical Analysis. (3–3) Yr.
Prerequisite: course 3D.
Structure in relation to harmonic, polyphonic, rhythmic, and thematic treatment.

108. Instrumentation. (3) I.
Prerequisite: course 3D. Teacher-training students are advised to take this course in their junior year.
A study of the instruments of the orchestra, leading to practice in scoring for instrumental combinations.

*109. Orchestration. (3) II.
Prerequisite: course 108.

111. Band Instrumentation. (2) II.
Prerequisite: course 108.
A study of the instruments of the band; practice in scoring for selected wind instruments and for concert band.

112A–112B. Conducting. (2–2) Yr.
Prerequisite: course 108 (may be taken concurrently).
112A: Choral Conducting.
112B: Instrumental Conducting.

History and Literature

Survey of Western Music

121A–121B. History and Literature of Music. (3–3) Yr.
Prerequisite: course 2D and 3D, or consent of the instructor.
A study of the development of music from antiquity to the present; lectures, listening, technical analysis, and written reports.

Historical Periods

Courses in this group will be given in rotation. Prerequisite: course 2D and 3D, or consent of the instructor.

*114A. Survey of Medieval Music (to 1430). (3) I.
Mr. Lowinsky

*115A. Survey of Renaissance Music (1430—1600). (3) II.
Mr. Lowinsky

*116A. Survey of Baroque Music. (3) I.
Mr. Boyden
A survey of musical literature from Monteverdi to Handel and J. S. Bach.

*116E. The Performance of Baroque Music. (3) II.
Mr. Boyden
Prerequisite: experience in playing an instrument or in singing, and a reading knowledge of French, German, or Italian.

*116F. The Music of Johann Sebastian Bach. (3) II.
Mr. Kerman

Classic Period (1750—1827)

117A. Survey of Classic Music. (3) I.
Mr. Kerman
The music of the early classic schools and of Haydn, Mozart, and Beethoven.

* Not to be given, 1959–1960.
Music

*117B. The Operas of Mozart. (3) II.  Mr. Kerman
*117C. The String Quartets of Beethoven. (3) II.  Mr. Sparks

Romantic Period (1820-1900)

118A. Survey of Romantic Music. (3) II.  Mr. Elston
From Weber and Schubert to the end of the nineteenth century.

*118C. The Songs of Schubert. (3) I.  Mr. Kerman
Study of the songs will be related to Schubert's work as a whole and to the development of song composition from Mozart to Strauss and Debussy.

*118D. Wagner's Ring of the Nibelung. (3) II.  Mr. Shifrin

Modern Period (1900-)

*119A. Survey of Modern Music. (3) I.  Mr. Imbrie
*119B. Selected Modern Works. (3) II.  Mr. Cushing
*119C. Modern French Music. (3) II.  Mr. Cushing
Critical and analytical studies of selected works of French composers from 1870 to the present, with special reference to Fauré, Debussy, and Ravel.

*119D. Chamber Music of the Twentieth Century. (3) I.  Mr. Imbrie
A critical and analytical study of works by Milhaud, Strawinsky, Bartók, Sessions, and Schönberg.

§119F. Opera of the Twentieth Century. (3) I.
The history of opera from Debussy and Richard Strauss to the present. Analysis of representative works.

Forms and Mediums

*120A. Choral Literature: Josquin des Prez to Handel. (3) I.  Mr. Lawton
*120B. Choral Literature: Bach to the Present Day. (3) II.  Mr. Lawton

Special Study Courses

198. Group Special Study for Advanced Undergraduates. (2 or 3) I and II.
The Staff (Mr. Lawton in charge)

199. Special Study for Advanced Undergraduates. (1-3) I and II.
The Staff (Mr. Denny in charge)

Graduate Courses

Consent of the instructor must be obtained before enrollment in any graduate course. For further conditions concerning admission to graduate courses, see page 18.

200A–200B. Introduction to Musical Scholarship. (3–3) Yr.  Mr. Duckles
Bibliography; individual research projects and a class problem.

202. Seminar: Contemporary Music. (2) II.  Mr. Nin-Culmell
The topic for 1959–1960 is Falla's late works: El Retablo de Maese Pedro, the Harpsichord Concerto, Sonnet to Córdoba, Psyché, and the orchestral Homages.

* Not to be given, 1959–1960.
§ To be given, 1959–1960 only.
203. Seminar in Composition. Mr. Denny, Mr. Nin-Culmell

203A. Technical Projects. (2) I and II. Mr. Nin-Culmell

203B. Free Composition. (2) I and II. Mr. Denny
Prerequisite: courses 105B and 106B, or the equivalent. Students taking the course for the first time shall enroll in both 203A and 203B, unless expressly excused by consent of both instructors.

*205. Seminar in Choral Scoring. (2) II. Mr. Lawton

*210A–210B. Seminar in Mensural Notation. (3-3) Yr. Mr. Duckies, Mr. Sparks

213A–*213B. Seminar: Music of the Renaissance. (3-3) Yr. Mr. Kerman

*214A–214B. Seminar: The Sonata in the Nineteenth Century. (3-3) Yr. Mr. Sparks

215A–*215B. Seminar: Research in Music History. (3-3) Yr. Mr. Boyden
The topic for the spring semester, 1959-1960, is: studies in the concerto.

230. Studies in Musical Source Materials. (3) II. Mr. Duckies
Problems in paleography, analysis, description, and editing of manuscripts and early prints in the University of California Library.

250. Seminar in the Technique of Musicological Research. (2-4) I. Mr. Lowinsky
Prerequisite: courses 200A-200B, 210A-210B, and a reading knowledge of French, German, and Latin.

298. Special Studies. (2-4) I and II. The Staff (Mr. Lawton in charge)
Open to properly qualified graduate students for research or creative work. Such work shall not serve in lieu of regular courses of instruction.

Teaching Methods Courses†

328A–328B. Vocal Technique and Methods of Teaching Voice. (2-2) Yr. Mrs. Jones
Prerequisite: some ability at the piano. May be repeated once without duplication of credit.
Principles of vocal and choral technique; voice-testing; care of adolescent voices; transposition; evaluation of teaching materials.

*328C. Advanced Vocal Technique. (1) I. Mrs. Jones
A continuation of course 328B, which is prerequisite.

329. Instrumental Methods. Mr. Berdahl, Mr. Kyme, Mr. Lord

329A. Stringed Instruments. (1) I and II. Mr. Kyme

329B. Brass Instruments. (1) I. Mr. Lord

329C. Woodwind Instruments. (1) II. Mr. Berdahl

329D. Percussion Instruments. (1) I.

* Not to be given, 1959–1960.
† See the Announcement of the School of Education.
329E. Ensemble: Literature for School Orchestra and Band. (1) II. Mr. Lord
Methods of teaching orchestra and band instruments; repertory and pro­gram planning for secondary schools. Each course may be repeated once without duplication of credit.

330. Choral Repertory. (1) II.
Prerequisite: consent of the instructor.
A study of choral literature, with special reference to repertory suitable for the secondary schools. Problems of performance; editorial techniques. Students will conduct the works studied.

NATURAL RESOURCES AND SOCIETY

The following is a partial list of courses that relate physical resources to social and technological change. Students of both the social and natural sciences may find in this list courses that will help them to appreciate the relations between these two in the field of conservation and development of natural resources. For the more specialized aspects of resource use and management, see offerings of individual departments.

Agricultural Economics 25. Comparative World Agriculture.
175. Economics of Natural Resources.
208. Seminar in Natural Resources Policies.
Economics 126. Economics of Extractive Industries.
*188. Population and Migration.
Engineering
Civil Engineering 159. Water Institutions and Economics.
Forestry 122. Forest Policy.
Geography 153. Natural Resources and Their Exploitation.
176. The Relations between Nature and Culture.
Political Science 185A. Public Policy and Administration of Natural Resources.
Sociology and Social Institutions 135. Social Change in Underdeveloped Countries.
Zoology 113. Natural History of the Vertebrates.
116. Introduction to Wildlife and Fisheries Management.

NAVAL SCIENCE

(Department Office, 47 Harmon Gymnasium)

William C. Meyer, Captain, U.S.N., Professor of Naval Science (Chairman of the Department).
Clarence J. Busick, Major, U.S.M.C., Associate Professor of Naval Science.
John E. Mishan, Commander, U.S.N., Associate Professor of Naval Science.
Robert F. Steed, Lieutenant Commander, U.S.N., Associate Professor of Naval Science.
Charles F. Horne, III, Lieutenant, U.S.N., Assistant Professor of Naval Science.

* Not to be given, 1959–1960.
Courses in this department are designed for students who are regularly enrolled members of the Naval Reserve Officers' Training Corps. Details concerning enrollment are available in 47 Harmon Gymnasium, office of the Department of Naval Science. Candidates must be able to complete all requirements of the Naval R.O.T.C. curriculum, without serious interference from or with other academic work which is required for the bachelor's degree.

All students enrolled in the Naval Reserve Officers' Training Corps are required to engage in drill or practical exercises two hours per week.

**Note.**—Second-year N.R.O.T.C. students are required to take Psychology 33.

### LOWER DIVISION COURSES

**1A. Naval Orientation. (3) I.**
Enrollment limited to freshman N.R.O.T.C. students.
Introduction to: the naval service; elements of naval leadership; basic seamanship; characteristics of naval ships; naval justice; fundamentals of national defense organization; naval communications; fundamental concepts of seapower; naval discipline; naval logistics.

**1B. Evolution of Sea Power. (3) II.**
Enrollment limited to freshman N.R.O.T.C. students.
Evolution of seapower and its influence upon global history; basic elements of naval strategy and tactics; evolution of amphibious doctrine; basic geopolitics as applied to naval warfare; history of the U.S. Navy; indoctrination for active sea duty.

**2A. Naval Weapons. (3) I and II.**
Study of basic weapons systems, their capabilities and limitation, including gun systems, antisubmarine warfare systems, guided missiles, nuclear weapons and space technology.

**101A. Naval Engineering. (3) I.**
Principles of nuclear propulsion, steam turbine propulsion, diesel engine propulsion, electrical systems, auxiliary machinery, refrigeration, distilling plants, ship construction, ship stability and control of damage, shipboard atomic defense.

**101B. Navigation. (3) II.**
Terrestrial navigation (navigation instruments and equipment; dead reckoning; piloting; Loran); celestial navigation (the theory and technique of surface navigation).

**102A. Naval Operations. (3) I.**
Fundamentals of naval operations, including tactical communications and tactical instructions; maneuvering board; rules of the nautical road; meteorology.

**102B. Naval Leadership. (3) II.**
Prerequisite: Psychology 33.
103M. Evolution of the Art of War. (3) I. Mr. Busick
Survey of the historical development of weapons, tactics, and material; and illustrates the classic principles of war by a study of selected battles and campaigns.

104M. Basic Strategy and Tactics. (3) II. Mr. Busick
Designed to survey modern strategical and tactical principles, using contemporary historical events as illustrative material.

105M. Amphibious Warfare. (3) I. Mr. Busick
Open to members of the Armed Forces only.
Broad introduction to the specialized field of amphibious warfare by a limited treatment of the factors pertaining to its planning and execution.

106M. Amphibious Warfare and Naval Officer Orientation. (3) II. Mr. Busick
Examination of certain amphibious operations of World War II. The last half of this course is designed to prepare the student for his first active duty and includes naval justice and leadership.

107S. Naval Finance and Accounting. (3) I. Mr. Van Zee
Open to junior students only.
Supply Corps organization; naval funds and appropriations; property appropriation and cost accounting systems, controls, and reports ashore.

108S. Supply Management Afloat. (3) II. Mr. Van Zee
Prerequisite: course 107S.
The naval supply systems; organization and management of afloat logistics; accounting systems, controls, and reports afloat.

109S. Retail, Cost, and Subsistence Management. (3) I. Mr. Van Zee
Open to senior students only.
Navy Supply Corps programs in retail and cost management operations; subsistence planning and performance analysis. Case studies and literature serving to implement managerial objectives.

110S. Supply Administration and Management. (3) II. Mr. Van Zee
Prerequisite: course 109S.
Overview of naval supply echelons, systems, and techniques; advanced subsistence management; principles in naval justice and leadership.

NEAR EASTERN LANGUAGES
(Department Office, 205 Dwinelle Hall Annex)

Madison S. Beeler, Ph.D., Professor of German and Linguistics (Acting Chairman of the Department of Near Eastern Languages).
*Walter J. Fischel, Ph.D., Professor of Semitic Languages and Literature.
Henry L. F. Lutz, Ph.D., D.D., LL.D., Professor of Egyptology and Assyriology, Emeritus.
William Popper, Ph.D., LL.D., Professor of Semitic Languages, Emeritus.
William M. Brinner, Ph.D., Assistant Professor of Near Eastern Languages.
*Jacob J. Finkelstein, Ph.D., Assistant Professor of Assyriology.

1 In residence fall semester only, 1959–1960.
Near Eastern Languages

John J. Gumperz, Ph.D., Assistant Professor of South Asian Languages.
Gene M. Schramm, Ph.D., Assistant Professor of Semitic Languages.

Klaus Baer, Ph.D., Lecturer in Egyptology.
John A. Boyle, Ph.D., Visiting Associate Professor of Persian.
Masud Hussain Khan, Ph.D., Lecturer in South Asian Languages.

Letters and Science List.—All undergraduate courses in this department are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: The Ancient Near East: Mr. Finkelstein and Mr. Schramm; Arabic and Islamic Studies: Mr. Brinner; South Asian Languages: Mr. Gumperz.

The Major.—A student may elect a major emphasizing the Ancient Near East, Arabic and Islamic Studies, or South Asian Languages. Major students in this department are strongly urged to take at least 12 units of French, German, or Russian.


LOWER DIVISION COURSES

Elective courses not requiring a knowledge of any Near Eastern language.

*1. Cultural and Linguistic Patterns of the Near East. (2) II. Mr. Brinner
   (Formerly numbered 115.)
   A survey of the growth, structure and differentiation of ethnic, religious and linguistic groups in the Arab countries, in Israel, Turkey and Iran throughout the ages.

*12. Great Books of Hebrew Literature. (1) I and II. Mr. Fischel
   (Formerly numbered 110.)
   A survey of Hebrew Classics, covering post biblical, medieval, and modern literature in various centers of the Orient and Europe.

15A–15B. Hebrew Civilization. (2–2) Yr. Mr. Schramm
   (15A formerly numbered 129; 15B formerly numbered 130.)
   A survey of the development of Hebrew civilization from its origin through the European Renaissance.
   15A. Ancient Israel, from the Patriarchal to the Roman Period.
   15B. From the Roman Period to the European Renaissance.
   15A is not prerequisite to 15B.

* Not to be given, 1959–1960.
*25. Great Books of Islamic Literature. (1) II. Mr. Fischel
(Formerly numbered 111.)
A survey of the major political, historical and philosophical masterpieces
of Arabic, Persian, and Turkish literature from the rise of Islam until
modern times.

Language Courses

10A-10B. Elementary Hebrew. (4-4) Yr. Mr. Schramm
(Formerly numbered 21A-21B.)
Biblical Hebrew grammar and reading.

20A-20B. Elementary Arabic. (4-4) Yr. Mr. Brinner
(Formerly numbered 131A-131B.)
Classical Arabic grammar and reading.

30A-30B. Elementary Modern Persian. (4-4) Yr. Mr. Boyle
(Formerly numbered 140A-140B.)
Grammar and reading.

*35A-35B. Elementary Modern Turkish. (4-4) Yr.
(Formerly numbered 135A-135B.)
Introduction into the elements of the modern Turkish language; reading
of modern texts with grammatical exercises.

40A-40B. Elementary Spoken Hindi (Hindustani). (4-4) Yr.
(Formerly numbered 155A-155B.) Mr. Gumperz
Two lectures and 5 practice sessions per week.
An elementary course in the spoken idiom for students intending to
specialize in either Hindi or Urdu.

Upper Division Courses

100A-100B. Elementary Egyptian. (3-3) Yr. Mr. Baer
(Formerly numbered 161A-161B.)
Middle Egyptian grammar and texts.

102A-102B. Elementary Coptic. (3-3) Yr. Mr. Baer
(Formerly numbered 171A-171B.)
Prerequisite: 6 units of Greek.

103A-103B. Elementary Akkadian. (3-3) Yr. Mr. Finkelstein
(Formerly numbered 151A-151B.)
Elementary Akkadian (Assyro-Babylonian).

104A-104B. Akkadian Letters and Legal Documents. (2-2) Yr.
Prerequisite: course 100A-100B. Mr. Finkelstein
Reading of various groups of royal and private correspondence and legal
records, illustrating the diplomatic and political activity, as well as the social
and economic milieu in Mesopotamia and adjacent regions in the second
millenium B.C. May be repeated for credit.

105A-105B. Elementary Sumerian. (2-2) Yr. Mr. Finkelstein
(Formerly numbered 152A-152B.)
Prerequisite: course 100A-100B.

110A-110B. Intermediate Hebrew. (2-2) Yr. Mr. Schramm
(Formerly numbered 121A-121B.)
Prerequisite: course 10A-10B.
Reading and grammatical analysis of selections from the historical books
of the Old Testament, such as Joshua, Samuel, Kings or Ruth.

* Not to be given, 1959-1960.
111A-111B. Readings in Hebrew. (1-1) Yr. Mr. Schramm
Prerequisite: course 110A-110B.
Selected postbiblical Hebrew prose texts will be read to familiarize students with the various literary genres. May be repeated without duplication of credit.

*112A-112B. Modern Hebrew. (2-2) Yr.
(Formerly numbered 122A-122B.)
Prerequisite: course 10A-10B or the equivalent.
Reading and grammatical study of modern Hebrew literature.

*115A-115B. The Dead Sea Scrolls in Hebrew. (2-2) Yr. Mr. Fischel
(Formerly numbered 190A-190B.)
Prerequisite: course 110A-110B or the equivalent. 115A is not prerequisite to 115B.
Readings of the original texts (Book of Habakuk, Manual of Discipline, Damascus fragments, etc.) with interpretations and special assignments.

116A-116B. Elementary Syriac (Aramaic). (2-2) Yr. Mr. Schramm
(Formerly numbered 141A-141B.)
Prerequisite: course 10A-10B or the equivalent.
Elements of biblical Aramaic or classical Syriac designed to meet the needs of major students.

120A-120B. Intermediate Arabic. (2-2) Yr. Mr. Brinner
(Formerly numbered 132A-132B.)
Prerequisite: course 20A-20B.
Reading of selected materials from Arabic literature.

121A-121B. Readings in Arabic. (1-1) Yr. Mr. Brinner
Prerequisite: course 120A-120B or the equivalent.
Selected readings from important writers and various periods of Arabic literature. May be repeated without duplication of credit.

130A-130B. Intermediate Persian. (2-2) Yr. Mr. Boyle
Prerequisite: course 30A-30B.
Grammar and reading.

140A-140B. Readings in Hindi. (4-4) Yr. Mr. Gumperz
(Formerly numbered 160A-160B.)
Prerequisite: course 40A-40B or a knowledge of conversational Hindi or Urdu.
Selected readings drawn from modern short stories and magazines.

141A-141B. Advanced Readings in Hindi. (1-1) Yr. Mr. Gumperz
Prerequisite: course 140A-140B or the equivalent.
Selected readings from Hindi literature. May be repeated without duplication of credit.

142A-142B. Readings in Urdu. (4-4) Yr. Mr. Khan
(Formerly numbered 166A-166B.)
Prerequisite: course 40A-40B, or a knowledge of conversational Hindi or Urdu.
Selected readings drawn from modern short stories and magazines.

143A-143B. Advanced Readings in Urdu. (1-1) Yr. Mr. Khan
Prerequisite: course 142A-142B.
Selected readings from literature. May be repeated without duplication of credit.

* Not to be given, 1959-1960.
*161. Semitic Linguistic Structures. (2) II.  
(Formerly numbered 116.)  
Mr. Schramm  
Prerequisite: A working knowledge of at least one Semitic language or Linguistics 130 and 140 or 145.  
A structural analysis of the Semitic languages with emphasis on one or more of the classical idioms.

163A–163B. History of Persian Literature. (2-2) Yr.  
163A: Classical Persian literature from Firdawsi to the beginning of the Safavid era.  
163B: Modern Persian literature.  
163A is not prerequisite to 163B.

170A–170B. Religion and Cosmology of Ancient Egypt and Mesopotamia.  
(2-2) Yr.  
Mr. Finkelstein, Mr. Baer  
(Formerly numbered 102A–102B.)  
Original sources bearing on the religious beliefs and practices of the ancient Mesopotamians and Egyptians will be read in translation, with a view toward elucidating the world views current in the Ancient Near East.  
170A is not prerequisite to 170B.

171A–171B. The Ancient Near East. (3-3) Yr.  
Mr. Baer  
(Formerly numbered 113A and 113B.)  
The rise and spread of civilization in the Nile Valley, Mesopotamia and adjacent areas from the Paleolithic age to the middle of the second millennium B.C. The Near Eastern political and cultural development from the time of the new ethnic incursions in the middle of the second millennium B.C. to Alexander the Great.  
171A is not prerequisite to 171B.

180A–180B. Islamic Civilization. (2-2) Yr.  
Mr. Brinner  
(Formerly numbered 125.)  
180A. Rise and spread of Islam from the time of Muhammad to the height of the Ottoman Empire.  
180B. Islamic Institutions. The origin and development of distinctive aspects of Islamic society and institutions, including the Caliphate, jurisprudence, mysticism and philosophy.  
180A is not prerequisite to 180B.

190. Modern South Asian Literatures. (2) II.  
Mr. Khan  
A survey of modern literatures of India, Pakistan, and Ceylon in translation.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

*200A–200B. Bibliography and Historiography of Islamic Studies.  
(2-2) Yr.  
Mr. Fischel  
(Formerly numbered 180A–180B.)  
Prerequisite: course 180A–180B.  
A survey of the methods of research in Islamic studies, bibliographical tools and resources, recent literature, etc.

*224A–224B. Advanced Biblical Hebrew. (2-2) Yr.  
Mr. Fischel  
Prerequisite: course 110A–110B.  
Reading and grammatical analysis of prophetic or poetical books of the Bible, such as Amos, Isaiah, Jeremiah, or Psalms.

* Not to be given, 1959–1960.
Near Eastern Languages; Nursing

*227A–227B. Post-Biblical Hebrew. (1–1) Yr. Mr. Fischel
Prerequisite: course 110A–110B or 112A–112B.
Reading of unvocalized post-biblical texts such as the Mishnah, Midrash,
Piyyutim, or modern Hebrew literature.

*232A–232B. Advanced Arabic. (2–2) Yr. Mr. Fischel
Prerequisite: course 120A–120B.
Reading of the Koran, poetry, or modern literary works.

*241A–241B. Advanced Syriac (Aramaic). (2–2) Yr. Mr. Fischel

251A–251B. Advanced Akkadian. (2–2) Yr. Mr. Finkelstein
Attention will be paid primarily to the major literary compositions.

*252A–252B. Advanced Sumerian. (2–2) Yr. Mr. Finkelstein
Readings in early historical texts.

275. Seminar in Linguistic Structures of South Asia. (2) II. Mr. Gumperz
(Formerly numbered 175.)
Prerequisite: Linguistics 100 and 130.
A typological survey of the phonological and morphological systems of
selected Indo-Aryan and non-Indo-Aryan languages of South Asia.

290A–290B. Special Study. Yr. The Staff
Credit according to work accomplished.

NURSING

(Department Office, 210 Building T-8)

Helen Nahm, R.N., Ph.D., Professor of Nursing (Chairman of the Department).
Pearl Castile, R.N., Ed.D., Associate Professor of Nursing, Emeritus.
Amy A. MacOwan, R.N., Ed.D., Associate Professor of Nursing, Emeritus.
Margaret A. Tracy, R.N., M.S., Associate Professor of Nursing, Emeritus.
Jeanette S. Hiller, R.N., Ed.D., P.H.N., Associate Professor of Nursing.
Alice E. Ingrumire, R.N., Ed.D., Associate Professor of Nursing.
Margaret S. Taylor, R.N., M.A., Associate Professor of Nursing.
Hannah B. Binhammer, R.N., M.A., Assistant Professor of Nursing.
Dorothy G. Gunnell, R.N., M.S., Assistant Professor of Nursing.
Mary T. Harms, R.N., Ed.D., Assistant Professor of Nursing.
Ann E. Hill, J.D., P.H.N., M.P.H., Assistant Professor of Nursing.
Marion E. Kalkman, R.N., M.A., Assistant Professor of Nursing.
Dorothy K. Loveland, R.N., M.A., Assistant Professor of Nursing.
Patricia A. Rose, R.N., M.A., Assistant Professor of Nursing.
Kathryn M. Smith, R.N., M.A., Assistant Professor of Nursing.
Charlotte F. Bambino, R.N., M.A., Instructor in Nursing.
†Jeanne S. Berthold, R.N., M.S., Instructor in Nursing.
Velena Boyd, R.N., M.P.H., Instructor in Nursing.
Betty J. Broady, R.N., M.S., Instructor in Nursing.
Ruth Clark, B.S.N., M.A., Instructor in Nursing.
Doris J. Emmons, R.N., M.A., Instructor in Nursing.
Janet L. Erickson, R.N., M.A., Instructor in Nursing.
Margaret K. Evans, R.N., M.Ed., Instructor in Nursing.
Mildred McG. Fundis, R.N., M.A., Instructor in Nursing.

* Not to be given, 1959–1960.
Professional Courses for Graduate Nurses

416. Health Teaching. (3) I and II.
   Miss Taylor

418. The Nurse in Public Health. (3) I and II. Miss Taylor and the Staff

419. The Field of Public Health Nursing. (3) I and II.
   Miss Taylor and the Staff
   Prerequisite: course 418 or consent of the instructor.

Graduate Courses

As a condition of enrollment in a graduate course, the student must have been admitted to the Graduate Division, Northern Section, and have completed 15 units of advanced work basic to the proposed major subjects for a higher degree; be certified by the School of Nursing as to eligibility to complete the program; and satisfy professional requirements as established by the School of Nursing.

Specific prerequisite: completion of the undergraduate major in nursing at the University of California, Berkeley, or its equivalent.

Any graduate course may not be given if fewer than four students enroll.

200. Problems of Administration in Nursing. Seminar. (2) I and II.
   Miss Nahm
   Basic material of study will be school surveys, national surveys, and contributions to education in the field of administration.
202. Principles and Techniques of Supervision in Nursing. Seminar. (2) I and II. Miss Taylor
A consideration of the principles and techniques of supervision.

203. Nursing Staff Personnel Problems. (3) I and II. Mrs. Ingmire
A course designed for administrators and teachers in leadership positions and for those concerned with teacher welfare.

204. Curriculum Development in Nursing. (3) I and II. Miss Taylor
Problems of curriculum construction as they relate to the selection and organization of material into units of instruction.

205. Problems in Curriculum Development. (2) I and II. Miss Taylor
Prerequisite: course 204.
Designed especially for administrators, supervisors, and teachers who have problems in curriculum development.

207. Historical Foundations of Nursing. (3) I and II. Mrs. Ingmire
An evaluation of cultural, religious, secular, military, and educational influences upon nursing. Emphasis on international relationships.

208. Counseling. (3) I and II. Mrs. Ingmire
A comprehensive analysis of the problems and programs of counseling in nursing.

(GIVEN AT SAN FRANCISCO)

PROFESSIONAL COURSES FOR GRADUATE NURSES

410. Public Health Nursing Laboratory. (2–3) I and II. Miss Taylor, Miss Hill, Miss Bambino
Prerequisite: completion of requirements for the major in nursing.
Instruction and supervised practice (laboratory) in public health nursing. The student is introduced to the social and health problems of the community. This practice provides her with the opportunity to apply the basic principles and skills of nursing in actual situations in homes, schools, clinics, and health centers. Conferences, demonstrations, field observation trips, care studies, and home and school visits.

432. Principles of Nursing Education. (2) I and II. Miss Harms

433. Laboratory in Nursing. (2–3) I and II. Miss Nahm and the Staff
Prerequisite: completion of requirements for the major in nursing.
Instruction and supervised practice (laboratory) in nursing at the University of California Medical Center, conferences, demonstrations, seminars and care studies.

Prerequisite: Education 110 (may be taken concurrently). Mrs. Ingmire

GRADUATE COURSES

201. Surveys in Nursing. (3) I and II. Miss Harms
Lectures and laboratory.
Training in practical application of principles and techniques developed in school surveys, including additional field work equivalent to two hours per week.

206. Curriculum and Teaching Problems in Nursing. Practicum. (4–6) I and II. Miss Nahm and the Staff
Prerequisite: course 204.
An opportunity for qualified students to work on practical curriculum and teaching problems under guidance.
UNDERGRADUATE COURSES IN BASIC CURRICULUM

For more detailed description of the following courses, see the ANNOUNCEMENT OF THE SCHOOL OF NURSING.

418. The Nurse in Public Health. (3) I.
   Parallels course 418 given at Berkeley.
   Miss Bambino

418E. Community Nursing. (2) I and II.
   Mrs. Hiller, Miss Hill, Miss Bambino

421. History of Nursing. (2) I and II.
   Mrs. Evans

423. Professional Adjustments. (1) I and II.
   Mrs. Evans

425. Pathology. (1) I.
   Mr. Swift

427A–427B. Pharmacology and Therapeutics. (2–1) Yr. Beginning each semester.
   Miss Binhammer, Miss Laycock, Mrs. Adler

435. Nursing Arts. (5) I.
   Mrs. Gunnell, Miss Gaffney, Miss Jordan

440A. Introduction to Medicine. (2) II.
   Mr. Gotch, Miss Torrey

440E–440F. Medical Nursing. (2–3) Yr. Beginning each semester.
   Miss Binhammer, Miss Laycock, Miss Jordan,
   Miss Broady, Mrs. Wolford

441A–441B. Introduction to Psychiatry. (1–1½) I and II.
   Mr. Prestwood

441E. Psychiatric Nursing. (2) I and II.
   Miss Davis

442A. Introduction to Surgery. (2½) II.
   Mr. Spicer, Mr. Lucas, Mr. Sooy

442D–442E–442F. Surgical Nursing. (3–2–2) I and II.
   Miss Loveland, Miss Erickson, Mrs. Fundis,
   Miss Kurihara, Miss Oelwein, Mrs. Wolford

444A. Introduction to Pediatrics. (2) II.
   Mr. Hutchings

444E–444F. Pediatric and Communicable Disease Nursing. (2–2) Yr. Beginning each semester.
   Miss Smith, Miss Clark, Miss Emmons, Miss Purdy

446. Introduction to Communicable Diseases. (2) I and II.
   Mr. Hutchings

448A. Introduction to Obstetrics and Gynecology. (3) II.
   Mr. Orcutt, Mr. Brown

448E–448F. Obstetrical and Gynecological Nursing. (2–2) Yr. Beginning each semester.
   Miss Rose, Mrs. West

EDUCATION

110. Introduction to Educational Psychology. (3) I and II.
   Parallels Education 110 given at Berkeley.

HOME ECONOMICS

111. Elementary Nutrition. (3) I and II.
    Parallels Nutrition 111 given at Berkeley.
    Mrs. Newton
Nursing; Nutrition and Home Economics

112A-112B. Diet Therapy. (1 1/2) II.
Prerequisite: Home Economics 111.
Mrs. Newton

PSYCHOLOGY

111. Child Psychology. (2) I.
Parallels Psychology 111 given at Berkeley.
Mr. McKee

PUBLIC HEALTH

100A. Introduction to Health Administration. (3) I and II.
Parallels Public Health 100A given at Berkeley.
Mr. Stiles

SOCIAL WELFARE

100. The Field of Social Welfare. (3) I.
Parallels Social Welfare 100 given at Berkeley.
Mrs. Oswald

SOCIOLOGY AND SOCIAL INSTITUTIONS

160. The City. (3) I and II.
Parallels Sociology and Social Institutions 160 given at Berkeley.
Mrs. Kornhauser

NUTRITION AND HOME ECONOMICS
(Formerly Home Economics)
(Department Office, 117 Home Economics Building)

Jessie V. Coles, Ph.D., Professor of Home Economics.
Judson T. Landis, Ph.D., Professor of Family Sociology.
Catherine Landreth, Ph.D., Professor of Home Economics and Lecturer in
Psychology.
Ruth Okey, Ph.D., Professor of Nutrition (Chairman of the Department).
Helen L. Gillum, Ph.D., Professor of Nutrition, Emeritus.
Agnes Fay Morgan, Ph.D., Professor of Nutrition, Emeritus.
Bessie B. Cook, Ph.D., Associate Professor of Nutrition.
Barbara M. Kennedy (Barbara Kennedy Johnson), Ph.D., Assistant Profes-
sor of Nutrition.
Richard L. Lyman, Ph.D., Assistant Professor of Nutrition.
Mary Ann Morris, Ph.D., Assistant Professor of Home Economics.
Clark E. Vincent, Ph.D., Assistant Professor of Family Sociology.
Mary Ann Williams, Ph.D., Assistant Professor of Nutrition.
Kaye Funk, M.S., Associate in Institution Management.
Ruth E. Hawthorne, M.A., Associate in Home Economics.
Agnes C. McClelland, M.A., Associate in Home Economics.
Rosemarie Ostwald, Ph.D., Associate in Nutrition.
Willa H. Schmidt, M.S., Associate in Home Management.
Hannah S. Tyau, M.A., Associate in Home Economics.

Henrietta Henderson, B.S., Cert. Diet., Lecturer in Hospital Dietetics.
Helen V. Park, Lecturer in Home Economics for the spring semester.

Departmental Adviser: Miss Okey.
Curricula in Home Economics.—For details concerning these curricula
and requirements for the Bachelor of Science degree, see the College of
Agriculture section in the Circular of Information.
HOME ECONOMICS

LOWER DIVISION COURSES

6. Introduction to Textiles. (3) II. Miss Morris
Lectures and laboratory. Prerequisite: Chemistry 1A and 8.
Study of plant, animal, and synthetic fibers used in textiles and of the finished textile materials.

7. Elementary Clothing Study. (3) I and II. Miss McClelland, Miss Hawthorne
Lecture and laboratory. Prerequisite: Decorative Art 6A–6B.
Practical and cultural problems in modern garment design and construction.

*13. Youth and Marriage. (2) I and II. Mr. Landis
Not open to students who have taken course 137.
A functional course treating courtship, mate selection, marriage adjustment, and parenthood.

14. Consumer Problems. (2) II. Miss Coles
A nontechnical discussion of consumers' problems, including income apportionment, consumer credit, buying aids, and protection of consumers.

UPPER DIVISION COURSES

Child Development and Family Relationships

132. Child Psychology. (3) II. Miss Landreth
Prerequisite: Psychology 1A and 5. Not open to students who are taking or have taken Psychology 112.
A study of the factors concerned in the motor, sensory, language, mental, emotional, and social development of young children.

*133. Laboratory in Child Development. (1) II. Miss Landreth, Miss Tyau
One lecture per week and observation to be arranged three hours one day per week. Prerequisite: course 132 (may be taken concurrently).
Laboratory supplement to course 132 conducted at the nursery school.

135. Techniques with Young Children. (3) I. Miss Landreth, Miss Tyau
Two lectures per week, and laboratory in the nursery school two mornings or two afternoons per week. Prerequisite: course 132 and consent of the instructor.

137. Marriage and Family Relationships. (3) I and II. Mr. Landis
Not open to students who have taken course 13.
A survey of the most recent information on courtship, mate selection, husband-wife adjustments, and parent-child relationships.

138. The Contemporary American Family. (3) I. Mr. Landis
An examination of the results of the impact of modern culture upon the family, with emphasis upon family types, member relationships, family dynamics in relation to personality, social change, and social values.

139. Sociology of Child Development. (3) II. Mr. Landis
An analysis of various social factors, social groupings, and social contexts in relation to the social development of the child.

* Not to be given. 1959–1960.
Professional Course

*435. Nursery School Administration. (3) II. Miss Landreth
Two lectures per week, supervised practice in nursery schools and related
field work, six hours per week. Open only to selected graduate and senior
students completing the major in child development.

Family Economics

140. Home Management. (3) I. Mrs. Schmidt
Lectures and laboratory. Prerequisite: Physiology 1 and Psychology 1A.
Use of time, energy, and equipment in the home from the viewpoint of the
satisfaction of members of the family.

140L. Home Management Laboratory. (1-3) II. Miss Coles, Mrs. Schmidt
Prerequisite: course 140.
Laboratory includes home projects or living for six to eight weeks in the
home-management house under supervision of the instructor. A two-hour
weekly conference to be arranged.

141. Consumers and the Market. (3) I. Miss Coles
Prerequisite: Economics 1A. Not open to students who are taking or have
taken Agricultural Economics 130 or Business Administration 160.
A study of the functions and structure of the market from the standpoint
of consumers; evaluation of the guides available for consumers in buying;
agencies aiding and protecting consumers.

*142. Social Problems of Families. (3) II. Miss Coles
Prerequisite: Economics 1A-1B and either Economics 2 or Psychology 5.
Present-day problems of families as they are related to economic and social
conditions.

144. Family Finance. (3) I. Miss Coles
Prerequisite: Economics 1A.
Management of personal and family finances—money income, household
production, planning expenditures, credit, savings, investments, financing
home ownership.

Home Furnishing

152. Home Furnishing. (3) II. Miss Park
Lecture and laboratory. Prerequisite: Decorative Art 6A-6B, 130A-130B.
130B may be taken concurrently.
A nonprofessional course designed to develop discrimination in values. A
consideration of materials involved in furnishing the home, and their uses.
An analysis of current trends and available materials.

Clothing and Textiles

160. Textiles. (3) I. Miss Morris
Lecture and laboratory. Prerequisite: course 6.
The chemical and physical structure of textile fibers, and its relation to
fiber and fabric properties.

162. Textile Economics. (3) I. Miss Morris
Lecture and laboratory. Prerequisite: course 6; Economics 1A-1B.
Organization of the textile industry; production and consumption of tex­
tile products; and the principles involved in the maintenance of textile
products.

* Not to be given, 1959–1960.
175. Apparel Design and Construction. (3) I and II. Miss McClelland
Lecture and laboratory. Prerequisite: courses 6 and 7.
Wardrobe planning and problems in advanced clothing construction.

176. Dress Design and Fashion Analysis. (3) I and II. Miss Hawthorne
Lecture and laboratory. Prerequisite: course 7.
The design, draping, and construction of costumes based on the principles
of design and color theory; past and current fashion trends and fashion
merchandising methods.

**Special Study Course Applying to All Majors**

199. Special Study for Advanced Undergraduates. (1-5) I and II.
The Staff (Miss Okey in charge)

**Graduate Courses**

(Concerning conditions for admission to graduate courses, see page 18)

200A-200B. Research in Home Economics. (2-6; 2-6) Yr.
(Formerly numbered 238.) The Staff (Miss Okey in charge)

232. Seminar in Psychology of Early Childhood. (2) I. Miss Landreth
Prerequisite: graduate standing in child development or psychology.

237. Seminar in Family Sociology. (2) II. Mr. Landis

*239. Seminar in Sociological Aspects of Marriage and Family Counseling.
   (2) II. Mr. Vincent
Prerequisite: consent of the instructor.
A survey and critical analysis of the field of marriage and family counseling,
with primary emphasis upon social factors and sociological concepts,
as differentiated from psychiatric and clinical concepts and levels of analysis.

*242. Seminar in Family Economics. (2) II. Miss Coles

262. Seminar in Textiles. (2) II. Miss Morris
Prerequisite: graduate standing in textiles and clothing.

**Nutrition**

**Lower Division Courses**

†1A-1B. Experimental Food Study. (3-3) Yr. Miss Kennedy
Lecture and laboratory. Prerequisite: Chemistry 1A and 8. Recommended:
Bacteriology 1.
Production and composition of food and principles involved in food preparation
and preservation.

†10. Elementary Nutrition. (2) II. Mrs. Cook
A nontechnical study of the basic principles of nutrition including discussion
of the principal nutrients in foods, their utilization by the body; the
needs of individuals at different stages of the life span and during reproduction
and lactation.

*†11. Principles of Food Preparation. (2) II. Miss Kennedy
Designed for students not enrolled in one of the curricula of the Department
of Nutrition and Home Economics.
A discussion of food composition, preparation, and choice.

† Formerly listed as Home Economics course; no change in number.
* Not to be given, 1959-1960.
UPPER DIVISION COURSES

Food Economics and Technology

†100. Food Economics. (3) I. Miss Funk
Lectures and laboratory or field work. Prerequisite: course 1A–1B and Business Administration 160 or Agricultural Economics 130 or Home Economics 141 (may be taken concurrently.)
Food production and food distribution as they relate to food consumption and to nutrient values. Factors affecting price and quality. Food buying for the home and institution.

†101A. Food Analysis. (3) I. Miss Kennedy
Lecture and laboratory. Prerequisite: course 1A–1B, Chemistry 1B, 8; or Chemistry 1B and 8 with grades of at least B.
The principles of quantitative analysis applied to food materials; chemical analysis of typical carbohydrate, fat, and protein foods.

†101B. Advanced Food Analysis. (3) II. Miss Kennedy
Lecture and laboratory. Prerequisite: course 101A or Chemistry 5 with a grade of at least B.
Official analytical methods and legal standards used in the chemical analysis of sugars, grain products, dairy products, fats and oils, meats, etc. Examination of foods for deterioration and adulteration.

*†108. Introduction to Research in Food Preparation and Control. (2) II. Miss Kennedy
Two laboratory periods a week to be arranged. Prerequisite: course 109 (to be taken concurrently).

*†109. Recent Advances in Food Technology. (2) II. Miss Kennedy
Prerequisite: course 101A.
A proseminar on late research in the chemistry of food composition, preparation, and control.

Nutrition and Dietetics

†111. Nutrition. (3) I. Mrs. Cook
Prerequisite: Chemistry 1A or high school chemistry; Physiology 1. Not accepted as part of the major in Curriculum A of the Department of Nutrition and Home Economics, and not open to students who have credit for course 10.
A brief study of the essential nutrients and their functions in nutrition; how to determine and satisfy the food needs of the normal individual.

†112A–112B. Nutrition and Dietetics. (3–3) Yr. Mrs. Cook
Lectures and laboratory. Prerequisite: course 1A–1B; Chemistry 1A, 8; Physiology 1.
The food requirements of the normal individual and the special needs imposed by growth, pregnancy, lactation, and disease. The planning and computation of diets.

†114. Laboratory Methods in Metabolism. (4) II. Miss Williams
Lectures and laboratory. Prerequisite: course 101A or Chemistry 5; Biochemistry 102 (may be taken concurrently).
Study of qualitative and quantitative reactions and procedures used in the analysis of biological materials of importance in nutrition.

* Not to be given, 1959–1960.
† Formerly listed as Home Economics course; no change in number.
Nutrition and Home Economics

†115. Therapeutic Dietetics. (3) II.
Lectures and laboratory. Prerequisite: courses 118A–118B, 118C–118D, (118B, 118D may be taken concurrently).
Problems in the planning and computation of dietaries for normal and pathological conditions.

†118A–118B. Human Nutrition. (2–2) Yr. Miss Okey, Mr. Lyman
Prerequisite: courses 101A, 114, and Biochemistry 102; or Biochemistry 100A–100B and 101A–101B.
Experimental bases for present concepts in the science of nutrition. Applications of basic principles to practical feeding problems.

†118C–118D. Human Nutrition Laboratory. (2–2) Yr. Mr. Lyman
Prerequisite: course 118A–118B (may be taken concurrently) or the equivalent.
Quantitative laboratory techniques used in research in nutrition.

Institution Economics

121A–121B. Problems of Quantity Food Service. (4–4) Yr. Miss Funk,
(121A, formerly numbered Home Economics 121; 121B, formerly numbered Home Economics 122.)
Lectures and laboratory. Prerequisite: course 1A–1B. Recommended: Business Administration 1A or 10 and Business Administration 151 or Psychology 3 or 185.
121A. Problems imposed by quantity preparation of food: Acceptability, retention of nutrients, economy.
121B. Problems in the organization and management of quantity food service.

Special Study Course Applying to All Majors

199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Miss Okey in charge)

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 18)

201A–201B. Seminar in Recent Advances in Nutrition and Dietetics.
(2–2) Yr. Miss Okey

†202. Seminar in Foods and Nutrition. (2) I. Miss Okey, Miss Williams
†212. Seminar in Nutrition. (2) II. Miss Okey, Mr. Lyman
†215. Seminar in Disorders of Nutrition. (2) I.
Prerequisite: course 115 or consent of the instructor.

219. Vitamin Analysis. (3) II. Miss Williams
(Formerly numbered 119.)
Prerequisite: courses 118A–118B, 118C–118D; and consent of the instructor.
Chemical, physical, microbiological and biological assay methods for vitamins. Individual problems pertaining to animal tissue analysis; comparison of new methods with standard procedures.

† Formerly listed as Home Economics course; no change in number.
**Nutrition and Home Economics; Optometry**

*221. Seminar in Problems of Quantity Food Service. (2) II.*  
(Formerly numbered Home Economics 222.)  
Prerequisite: course 121A-121B, or consent of the instructor.  
Especially designed for the student in hospital dietetics.

*230. Seminar in Nutrition of Development. (2) II.*  
Prerequisite: graduate standing in nutrition.

299. Research in Food and Nutrition. (1-9) I and II.  
(Formerly numbered Home Economics 218.)

**PROFESSIONAL COURSES**

*426. Hospital Problems. (2-3) I and II.*  
Open only to selected graduate students.  
Supervised practice in administrative problems of the hospital dietetic service carried on during residence in Berkeley.

427. Hospital Dietetics. (6) I and II.  
Miss Henderson  
Open only to selected graduate students.  
Conferences and supervised practice in the dietary department of the University of California Hospital and clinics.

**OCEANOGRAPHY**

*Marine Sciences*

Courses in oceanography leading to the master's or doctor's degree in oceanography and certain of the marine sciences are offered for a limited number of qualified students at the Scripps Institution of Oceanography at La Jolla, California. Detailed information concerning the courses may be found in the General Catalogue, Departments at Los Angeles. For further information concerning the Institution, refer to the Registrar of the University of California, 405 Hilgard Avenue, Los Angeles 24, California, or write to the Director of the Institution.

**OPTOMETRY**

(Department Office, 101 Optometry Building)

Meredith W. Morgan, Jr., Ph.D., Professor of Physiological Optics and Optometry.  
Kenneth B. Stoddard, Ph.D., Professor of Physiological Optics and Optometry (Chairman of the Department).  
Gordon L. Walls, Sc.D., Professor of Physiological Optics and Optometry.  
Ralph S. Minor, Ph.D., Sc.D., Professor of Physics and Optometry, Emeritus.  
Elvin Marg, Ph.D., Associate Professor of Physiological Optics and Optometry.  
Henry B. Peters, M.A., Associate Clinical Professor of Optometry.  
Merton C. Flom, Ph.D., Assistant Professor of Physiological Optics and Optometry.  
Jack T. Hobson, B.S., Assistant Professor of Optometry.  
Marshall B. Atkinson, M.D., Assistant Clinical Professor of Ophthalmology.

* Not to be given, 1959-1960.  
† Formerly listed as Home Economics course: no change in number.
Roy H. Brandreth, B.S., *Clinical Instructor in Optometry.*
James T. Crosby, Jr., B.S., *Clinical Instructor in Optometry.*
Ferd T. Elvin, A.B., *Clinical Instructor in Optometry.*
Robert F. Harrigan, B.S., *Clinical Instructor in Optometry.*
Richard M. Hill, M.Opt., *Clinical Instructor in Optometry.*
Monroe J. Hirsch, Ph.D., *Clinical Instructor in Optometry.*
Frank V. Johnson, Jr., M.Opt., *Clinical Instructor in Optometry.*
Robert W. Lester, A.B., *Clinical Instructor in Optometry.*
Niles Roth, M.Opt., *Clinical Instructor in Optometry.*
Morton D. Sarver, B.S., *Clinical Instructor in Optometry.*

**Letters and Science List.**—Physiological Optics 105A–105B and 106A–106B are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

**Upper Division Courses**

*Prerequisite.*—Physics 2A–2B, 3A–3B, Chemistry 1A, 8, Mathematics 3A, Bacteriology 1, Zoology 1A†, Anatomy 102†, Psychology 1A, 33†, together with all prerequisite courses in the Department of Optometry.

101. **Advanced Geometrical Optics.** (3) II.
Mr. Hobson

Prerequisite: Physics 108A–108B.

The mathematical development of the paraxial laws of optical image formation, employing the methods of Gauss. Application to the optical devices used to evaluate and aid the functions of vision. Classroom computation of marginally corrected lenses, iseikonic lenses, and contact lenses.

102A–102B. **Elementary Theoretical Optometry.** (3–4) Yr.
Mr. Hobson, Mr. Johnson

One unit of laboratory will be given in the second semester.

A study of the states of refraction of the eye, and correlated visual sensations, effects upon visual functions, optical methods of correction, and instruments used to detect and measure anomalous states of refraction.

103A–103B. **Advanced Theoretical Optometry.** (3–3) Yr.
Mr. Morgan, Mr. Marg

Prerequisite: course 102A–102B.

Extension of the principles discussed in course 102A–102B to the functions of the eyes in binocular vision. Stereoscopic vision, physical and physiological aspects of the fusion movements, binocular accommodation and convergence, strabismus and other anomalies of binocular vision, and ocular paralyses.

**Professional Courses**

401A–401B. **Ophthalmic Optics.** (2–2) Yr.
Mr. Peters, Mr. Brandreth

Lectures and laboratory.

Lectures: history of the development of lenses and spectacles; the optical

† While Zoology 1A, or Physiology 1, 1L, and Anatomy 102 is the usual biological science sequence in the preoptometry program, this requirement may be satisfied for admission purposes by one of the following alternative sequences:

Zoology 1A—Zoology 1B
Zoology 1A—Comparative Anatomy
Zoology 1A—Human Anatomy
Physiology 1, 1L—Human Anatomy

Unless a course in human anatomy, which is the full equivalent of Anatomy 102 at the University of California, is offered in one of the above sequences, Anatomy 102 must be included in the junior year program of the School of Optometry.

† Psychology 1B may be substituted for Psychology 33
properties of different glasses; the theory of the design of spectacle lenses. Laboratory: lens surfacing, edging, beveling, mounting, neutralization, and frame fitting.

404A-404B. Practical Optometry. (3-3) Yr. Mr. Harrigan, Mr. Morgan
Prerequisite: courses 102A-102B and 401A-401B.
Lectures and problems dealing with physical eye examinations. A study of instruments and the techniques for their use, interpretation of examination data and prescribing of lenses, and orthoptic training.

406A-406B. Optometry Clinic. (2-2) Yr.
The Staff (Mr. Harrigan in charge)
Prerequisite: courses 102A-102B and 401A-401B, Physiology 115.
Complete physical eye examinations with clinic patients. The adaptation of lenses to the defective eye and the study of abnormal visual conditions.

407A-407B. Pathology of the Eye. (1-2) Yr. Mr. Atkinson, 
Prerequisite: Physiology 115.
Lectures and demonstrations dealing with the identification of pathological conditions in the eye, and the manifestation of systemic disease as indicated by the eye.

499. Special Study for Advanced Undergraduates. (1-4) I and II.
The Staff (Mr. Stoddard in charge)

GRADUATE PROFESSIONAL COURSES

(Concerning conditions for admission to graduate courses, see page 18)
The Bachelor of Science degree in the School of Optometry, or its equivalent, is a prerequisite to all optometry courses of the graduate year.

209A-209B. Clinical Practice. (6-6) Yr.
The Staff (Mr. Stoddard in charge)
The examination and treatment, with lenses or orthoptic training, of patients with visual anomalies.

212A-212B. Advanced Clinical Procedures. (3-3) Yr.
Mr. Morgan, Mr. Peters, Mr. Lester
Lectures and class assignments on the orthoptics of strabismus and other binocular anomalies, aniseikonia, subnormal vision, telescopic spectacles, contact lens fitting, and allied subjects.

214A-214B. Seminar in Clinical Problems. (2-2) Yr.
Mr. Flom, Mr. Harrigan
A discussion of the various phases of optometry associated with problems arising from clinical cases.

216A-216B. Advanced Pathology of the Eye. (2-2) Yr.
An advanced consideration of topics covered in course 407A-407B, with particular reference to the application of this knowledge to the determination of diseases of the visual system in clinic patients.

217. Optometric Law and Economics. (1) II.
Mr. Morgan, Mr. Hobson, Mr. Peters, Mr. Sarver
A consideration of the laws governing the practice of optometry, and the problems associated with the establishing of a professional optometric practice.
PHYSIOLOGICAL OPTICS

UPPER DIVISION COURSES

105A–105B. Physiological Optics. (3–3) Yr. Mr. Stoddard, Mr. Marg, Mr. Walls
Prerequisite: course 105A, Physics 108A–108B, Physiology 115; for course 105B, consent of the instructor.
Lectures on the physics, physiology, and psychology of vision.
105A: The visual pathways, the visual field, the pupil- and accommodative-mechanisms, the interaction between radiation and ocular tissue, the aberrations of the eye, illumination, and allied phenomena.
105B: The psychophysics and physiological psychology of light, form, and color senses, and the elements of visual perception.

106A–106B. Physiological Optics. (1–1) Yr. Mr. Marg, Mr. Walls
Laboratory experiments in physiological optics to accompany course 105A–105B.

109. Physiological Optics. (3) II. Mr. Walls
Lectures on the physics, physiology, and psychology of vision for students in electrical engineering whose option is illumination engineering.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

201A–201B. Seminar in Advanced Physiological Optics. (2–2) Yr. Mr. Walls, Mr. Marg
A discussion of selected topics and current research literature in the various fields associated with vision.

203. Binocular Vision and Space Perception. (2) I. Mr. Morgan
A consideration of the precise nature of binocular vision and monocular and binocular space perception.

205. The Evolution of the Visual System. (1) II. Mr. Walls
The structure and the functional properties of the human eye, its orbital accessories, and the central-nervous connections and adnexa, interpreted in the light of their evolutionary development.

299. Research. (2–8) I and II. The Staff (Mr. Stoddard in charge)

RELATED COURSES IN OTHER DEPARTMENTS

Morphology and Physiology of the Visual System (Physiology 115).
Mammalian Physiology (Physiology 110A–110B).

ORIENTAL LANGUAGES

(Department Office, 102 Durant Hall)

Peter A. Boodberg, Ph.D., Professor of Oriental Languages.
Denzel Carr, Ph.D., Professor of Oriental Languages.
Yuen Ren Chao, Ph.D., Litt.D., Agassiz Professor of Oriental Languages and Literature.

* In residence spring semester only, 1959–1960.
Letters and Science List.—All undergraduate courses in this department are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Boodberg (Chinese); Mr. Nakamura (Japanese).

Preparation for the Major.—
Required: (a) Emphasis on Chinese—courses 1, 2, 3 and 4; 9 and 19 (to be taken in the sophomore or junior year), Linguistics 35. (b) Emphasis on Japanese—courses 9, 19, 39; 1 and 2, or 3 and 4 (to be taken in the sophomore or junior year), Linguistics 35.

The Major.—
Required: (1) With emphasis on Chinese: (a) courses 100, 103 or 143, 117, 123, 134, 191A-191B, 198; (b) 5 units selected from courses 106, 113, 124, 133A-133B, 134A-134B, 154, 164, 173, 174A-174B, 191C-191D. (2) With emphasis on Japanese: (a) courses 100, 119; 4 units from 129A-129B and 129C-129D, 139, 198; (b) 7 units selected from courses 103 or 143, 107, 113, 117, 129A-129B and 129C-129D (not repeated), 149A-149B, 191A-191B, 191C-191D.

Recommended: (1) a reading knowledge of French, German, or Russian. (2) Courses in Indonesian, Korean, Mongolian, Thai, and Tibetan. (3) The attention of students is drawn to courses in other departments such as the following: Anthropology 103 (Culture Growth), 115 (People of the Philippines and Indonesia), 120 (Language and Culture), 186 (Ethnology of Japan); Art 1D (History of Oriental Art), 160A-160B (History of Early Chinese Art), 161 (History of Later Chinese Art), 162 (The Art of Japan); Classics 151 (Ancient Greek Religion), 178 (Mythology); Decorative Art 193A (Historic Costume); History 190C (Historical Problems in Asian Interrelationships), 191A-191B (Social History of Asia), 193C (Chinese Civilization of the Middle Dynasties), 194A-194B (History of China), 194C (Intellectual History of Modern China), 195A-195B (History of Japan), 195C (Problems of Japanese Intellectual History); Linguistics 130 (Phonetics and Phonemics), 140 (Linguistic Analysis), 145 (Types of Linguistic Structure); Near Eastern Languages 180A-180B (Islamic Civilization); Sociology and Social Institutions 166 (Oriental Societies), 167 (Nomadic Societies).

Undergraduate students expecting to proceed to the M.A. or the Ph.D. degree in Oriental languages must take courses 117, 133A-133B (required only of those students whose major emphasizes Chinese) in their senior year. Students who fail to maintain an average of at least 2.0 grade points for each unit of work undertaken in the upper division in the department will, upon approval of the Executive Committee of the College of Letters and Science, be excluded from the major.
LOWER DIVISION COURSES

1. Elementary Mandarin. (4) I. Mr. Chao, Mr. Chen

2. Elementary Mandarin (continued). (4) II. Mr. Chao, Mr. Chen
   Prerequisite: course 1.

3. Elementary Classical Chinese. (4) I and II. Mr. Boodberg

4. Elementary Classical Chinese (continued). (4) I and II Mr. Boodberg
   Prerequisite: course 3.

6. Mandarin Texts. (4) I and II. Mr. Irwin, ———
   Prerequisite: course 1 and 2, or consent of the instructor.
   Instruction in the reading of Modern Mandarin (National Language) at
   an intermediate level.

7A–7B. Elementary Korean. (3–3) Yr. Mr. Rogers

8. Indonesian. (3) I. Mr. Carr
   An introduction to the official language of Indonesia and Peninsular
   Malay, a foundation for the study of Malayo-Polynesian languages in general
   or Classical Malay and Indonesian literature.

9. Elementary Modern Japanese. (4) I. Mr. Shively, Mr. Nakamura

18. Readings in Indonesian. (2) II. Mr. Carr
   Prerequisite: course 8, or the equivalent.

   Prerequisite: course 9 or the equivalent. Mr. Shively, Mr. Nakamura

39. Intermediate Modern Japanese. (4) I. Mr. Nakamura
   Prerequisite: courses 9 and 19, or the equivalent.

COURSES IN WHICH NO KNOWLEDGE OF ORIENTAL
LANGUAGES IS REQUIRED

22. Indonesian Civilization. (2) I. Mr. Carr
   A survey of Indonesian civilization and the effects of contacts with Indian,
   Islamic, and Western cultures. Emphasis on Hinduism, Buddhism, and Islam.

32. Japanese Civilization. (2) II. Mr. Shively
   A broad survey of Japanese civilization dealing with cultural, literary,
   religious, and social developments, and giving attention to the influence of
   Chinese and Western cultures.

38A–38B. Great Books of Eastern Asia. (1–1) Yr. Mr. Boodberg
   Lectures and assigned readings on the great classics of Eastern Asia,
   in English translation. 38A is not prerequisite to 38B.

UPPER DIVISION COURSES

Courses 3 and 4 are prerequisite to all upper division courses in Chinese.
Course 103 or 143 is prerequisite to courses 113, 133A–133B, 173, 191A–191B,
191C–191D. Courses 9, 19, and 39, or the equivalent, are prerequisite to all
upper division courses in Japanese.

* Not to be given, 1959–1960.
Oriental Languages

100. Languages of Eastern Asia. (2) II. Mr. Carr
A survey course on the nature and distribution of the main languages of Eastern Asia.

*103. Chinese Narrative Prose. (3) I. Mr. Schafer

*106. Contemporary Chinese Writers. (3) II.
Prerequisite: course 1, 2, and 6.
Readings in all genres of Chinese literature since 1917.

*107. Intermediate Korean. (2) I and II. Mr. Rogers
Prerequisite: course 7A-7B or the equivalent.
May be repeated without duplication of credit.

113. Chinese Classics. (3) I. Mr. Schafer

*117. Logography and the Evolution of the Chinese Language and Script. (2) I. Mr. Boodberg

*118. Introduction to Malayo-Polynesian Linguistics. (2) II. Mr. Carr
Prerequisite: course 8, an equivalent knowledge of one Malayo-Polynesian language, or Linguistics 130 or 145.

119. Advanced Japanese. (4) II. Mr. Nakamura
Prerequisite: course 39 or the equivalent.

123. Chinese Grammar. (3) I. Mr. Chao

124A*-124B. Readings in Modern Chinese. (3-2) Yr. Mr. Chen
(Formerly numbered 124.)
Prerequisite: course 1, 2, and 6. Course 124A is not prerequisite to 124B.
*124A: Readings in Modern Chinese texts on social and political topics.
*124B: Readings in Modern Chinese texts of literary and philosophical interest. Mr. Chen.

*128. Classical Malay Literature. (2) II. Mr. Carr
Prerequisite: courses 8 and 18.
Reading of Segerah Me]ayu and other standard texts in Roman and Arabic characters.

129A-129B. Classical and Medieval Japanese Literary Texts. (3-3) Yr. Mr. Shively
Prerequisite: course 119.

*129C-129D. Japanese Historical Texts and Kambun. (3-3) Yr. Mr. Shively
Prerequisite: course 119; 129A-129B is not prerequisite to 129C-129D.

133A-133B. Chinese Bibliography. (2-2) Yr. Miss Huff
Open to seniors.

134A-134B. Cantonese. (2-2) Yr.
Not open to students with previous experience in standard Cantonese.

*135. Phonology of Ancient Chinese. (3) I. Mr. Chao

139. Japanese Grammar. (2) II. Mr. Carr
Prerequisite: course 119 or the equivalent.

143. Readings in Medieval Chinese. (3) II. Mr. Schafer
Prerequisite: course 3 and 4.

* Not to be given, 1959-1960.
149A–149B. Advanced Colloquial Japanese. (2–2) Yr. Mr. Nakamura
Three laboratory hours per week.
149A is not prerequisite to 149B.
An intensive course, open only to students specializing in Oriental languages, to provide training in the active use of colloquial Japanese.
In the second semester, one hour per week will be devoted to lectures in Japanese on elements of Japanese culture.

154. Mongolian. (2) I and II.
May be repeated without duplication of credit. Mr. Rogers

*164. Tibetan. (2) II.
May be repeated without duplication of credit. Mr. Nakamura

173. Chinese Philosophical Texts. (2) I. Mr. Boodberg

*174A–174B. Thai (Siamese). (3–3) Yr. Miss Haas

*175. Readings in Thai. (2) I and II.
(Formerly numbered 174C–174D.)
Prerequisite: course 174A–174B, or the equivalent.
May be repeated without duplication of credit with consent of the instructor. Miss Haas

*187. Philological Laboratory. (2) I. Mr. Carr

*191A–191B. Masterpieces of Chinese Literature and Literary Criticism. (2–2) Yr. Mr. Chen
191A: Verse; 191B: Belles-lettres.
191A is not prerequisite to 191B.

191C–191D. Masterpieces of Chinese Literature and Literary Criticism. (2–2) Yr. Mr. Chen
191C: the Short Story and Essay; 191D: The Novel.
191A–191B are not prerequisite to 191C. 191C is not prerequisite to 191D.

198. Special Study for Advanced Undergraduates and the Senior Essay. (1 or 2) I and II. Mr. Boodberg, Mr. Shively
Required of all majors in Oriental languages.

199. Special Individual Study. (1–5) I and II. Mr. Boodberg in charge

LECTURE COURSES
Prerequisite: junior standing. Knowledge of an Oriental language not required.

112. Survey of Chinese Classical Literature and Literary Criticism. (2) I. Mr. Chen
The general characteristics, main currents, and representative authors of Chinese literature in the classical tradition. Texts and references in English translation critically analyzed.

122. Semasiological Problems in the Translation of Oriental Texts. (2) II. Mr. Boodberg

132. History of Japanese Literature. (3) I. Mr. Shively
From the beginning to modern times, emphasizing Chinese, Buddhist, and Western influences.

* Not to be given, 1959–1960.
*142C. Civilizations of Eastern Asia: China. (3) II.  Mr. Schafer
   Emphasis on material culture, technology and science.

142K. Civilizations of Eastern Asia: Korea. (2) II.  Mr. Rogers
   The development of Korean civilization; emphasis on Chinese influence.

163. Readings in Pacific Literature in English Translation. (2) II.  Mr. Carr
   A survey of literature in non-European and non-Asiatic languages (with
   the exception of Malay), with selections to be read in English translation.
   Areas: Philippines, Malaya, Indonesia, other Pacific islands.

*172. Survey of Chinese Vernacular Literature. (2) I.
   Development of the novel and drama from early times to the present,
   with assigned readings in English translation.

*182. Life and Times of Confucius. (2) II.  Mr. Boodberg

*188. Philological Method: Languages and Literatures of Eastern Asia.
   (3) I.  Mr. Boodberg
   May be repeated without duplication of credit.

GRADUATE COURSES

A reading knowledge of either French or German is prerequisite to the first
year of graduate work; a reading knowledge of both French and German is
prerequisite to the second year.

*206. Seminar in Chinese Fiction. (2) II.  Mr. Carr
   Detailed study of a text with its literary and historical background.

*208. Malayo-Polynesian Linguistics. (2) II.  Mr. Carr

212. Seminar in Chinese Literary History. (2) I and II.  Mr. Chen
   Textual and aesthetic criticism.
   May be repeated without duplication of credit with consent of the in­
   structor.

213. Seminar in Philological Analysis of Chinese Sources of the Post-Han
   Period. (2) I and II.  Mr. Boodberg
   May be repeated without duplication of credit with consent of the in­
   structor.

216A–216B. Texts on the Civilization of Medieval China. (2–2) Yr.
   Mr. Schafer
   Textual studies in the history of science and technology, with related
   materials from archaeology and folklore.
   May be repeated without duplication of credit with consent of the in­
   structor.

217A–217B. Seminar in Philological Analysis of Koryŏ and Yi Dynasty
   Sources. (2–2) Yr.  Mr. Rogers
   May be repeated without duplication of credit with consent of the in­
   structor.

219. Proseminar in Bibliography and Methods in Japanese Studies. (2) II.
   Mr. Shively

* Not to be given, 1959–1960.
Oriental Languages; Paleontology

229. Seminar in Japanese Literature. (2) I. Mr. Shively

235. Seminar in Chinese Dialectology. (2) II. Mr. Chao

May be repeated without duplication of credit.

236A-236B. Seminar in Contemporary Chinese Writings on Linguistics. (2-2) Yr. Mr. Chao

239. Seminar in Japanese Linguistics. (2) II. Mr. Carr

250. Research. (1-4) I and II. The Staff (Mr. Schafer in charge)

Related Courses in Other Departments

Linguistics Laboratory (Linguistics 220A-220B).
Seminar in Descriptive Linguistics (Linguistics 230).
Seminar in Historical Linguistics (Linguistics 250).

PALEONTOLOGY

(Departmental Office, 410B Hearst Memorial Mining Building)

Charles L. Camp, Ph.D., Professor of Paleontology and Curator of Amphibians and Reptiles in the Museum of Paleontology.
J. Wyatt Durham, Ph.D., Professor of Paleontology and Curator of Invertebrate Collections in the Museum of Paleontology.
Robert M. Kleinpell, Ph.D., Professor of Paleontology and Curator of Micropaleontological Collections in the Museum of Paleontology.
Ruben A. Stirton, Ph.D., Professor of Paleontology, Curator of Mammals, and Director of the Museum of Paleontology.
Ralph W. Chaney, Ph.D., Professor of Paleontology, Emeritus, and Curator of Paleobotanical Collection in the Museum of Paleontology, Emeritus.
Donald E. Savage, Ph.D., Associate Professor of Paleontology and Curator in the Museum of Paleontology.
Zach M. Arnold, Ph.D., Assistant Professor of Paleontology and Curator in the Museum of Paleontology.
Wayne L. Fry, Ph.D., Assistant Professor of Paleontology and Curator of the Paleobotanical Collections in the Museum of Paleontology.

William B. N. Berry, Ph.D., Visiting Assistant Professor of Paleontology.
Hans E. Thalmann, Ph.D., Visiting Professor of Paleontology for the fall semester.

Letters and Science List.—All undergraduate courses in paleontology are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Savage.
Graduate Adviser: Mr. Savage.

Major Program.—Two types of major programs are organized on the basis of relationships to geological sciences and to biological sciences.

Required of all majors: Paleontology 1 (3), 3 (3), 111 (4), 170 (2); Geology 1 or 5 (4); Botany 1 (5) or Zoology 1A (4); and completion of one of the following programs.

I. Paleontology and Geological Sciences.

Required: Mineralogy 6 (4); Geology 101 (4), 103 (3); Engineering 21 (3); and one of the following options.

(a) Emphasis on invertebrate paleontology: Paleontology 102 (3), 112


Paleontology

(4); Paleontology 114 (5) or 116 (4) or 117 (4); Paleontology 136 (5) or 137 (5) or 139 (5).

(b) Emphasis on vertebrate paleontology: Paleontology 102 (3) or 112 (4), 125 (3), 126 (4), 127 (4); Zoology 1B (4).

(c) Emphasis on paleobotany: Paleontology 112 (4), 120 (3), 121 (3); Botany 108 (4).

II. Paleontology and Biological Sciences.

(a) Emphasis on invertebrate paleontology: Paleontology 112 (4); Paleontology 114 (5) or 116 (4) or 117 (4); Paleontology 136 (5) or 137 (5) or 139 (5); Zoology 108 (4) or 110 (5) or 112 (6); Zoology 114 (3) or Genetics 100 (3).

(b) Emphasis on vertebrate paleontology: Paleontology 125 (3), 126 (4), 127 (4); Zoology 106 (4), 113 (4); Zoology 114 (3) or Genetics 100 (3).

(c) Emphasis on paleobotany: Paleontology 112 (4), 120 (3), 121 (3); Botany 108 (4), 110A (3), 110B (3), 151 (3).

Recommended: Chemistry 1A (5), 1B (5); French and German; Anthropology 1 (4), 152 (3) and Genetics 103A-103B (2–2) for Ib and IIb (see above); Botany 16 (3) and Forestry 114 (3) for IIc (see above).

A reading knowledge of French and German is essential for efficient advanced work and is required of candidates for the Ph.D. degree.

Honor Students.—See College of Letters and Science regulations, page 74, Circular of Information.

LOWER DIVISION COURSES

1. General Paleontology. (3) I and II. Mr. Arnold, Mr. Stirton
Two lectures and one two-hour laboratory period per week; field trip.
A survey of the history and classification of plants and animals.
Methods of interpretation of the fossil record; fossils as evidence of the history of life; evolution of form and structure in plants and animals; sequence of floras and faunas in the rocks.

3. Vertebrate Paleontology. (3) II. Mr. Savage
Two lectures and one three-hour laboratory period per week; field trips.
Prerequisite: course 1 or Zoology 1A or Geology 3 or Anthropology 1.
Cranial, dental, and postcranial morphology; evolution, classification, and distribution in time and space of mammals, reptiles, and amphibians.

10. Principles of Paleontology. (2) II. Mr. Camp
Two lectures per week; one or more field excursions half day Saturday.
Enrollment limited to the size of classroom available. Not open to students who have credit in course 1.
General principles of the history of life.

UPPER DIVISION COURSES

102. Stratigraphy. (3) II. Mr. Berry
Two lectures and one three-hour laboratory period per week. Prerequisite: course 1 or Geology 3, and Geology 103.
Principles involved in the origin, composition, and relationships of stratified rocks.

111. Invertebrate Paleontology. (4) I. Mr. Durham, Mr. Berry
Two lectures and two three-hour laboratory periods per week. Prerequisite: course 1, or Geology 1 and 3, or Zoology 1A.
Paleobiology, morphology, and systematics of the invertebrates.
112. Stratigraphic Paleontology. (4) II. Mr. Kleinpell
Two lectures and two three-hour laboratory periods per week. Prerequisite: course 1 or Geology 3, and Zoology 1A or course 111.
Principles of biostratigraphy and correlation.

114. Micropaleontology. (5) I. Mr. Thalmann
Three lectures and two three-hour laboratory periods per week. Prerequisite: course 112.
Paleobiology, taxonomy, and biostratigraphy of the microfossils, with emphasis on the foraminifera.

†116. Paleozoic Invertebrates. (4) II. Mr. Berry
Two lectures and two three-hour laboratory periods per week. Prerequisite: course 111 or Zoology 112 and course 1 or Geology 3.
Advanced studies in trilobites, brachiopods, graptolites, and pelmatozoans.

†117. Mesozoic and Cenozoic Invertebrates. (4) II. Mr. Durham, Mr. Arnold
Two lectures and two three-hour laboratory periods per week. Prerequisite: course 111 or Zoology 108.
Advanced studies in mollusks, echinoids, corals and other invertebrates.

120. Paleobotany. (3) I. Mr. Fry
Two lectures and one three-hour laboratory period per week. Prerequisite: consent of the instructor; recommended a course in botany and one in geology.
Detailed consideration of the structure and form of plants represented in the geologic record.

121. Floras of the Past. (3) II. Mr. Fry
One lecture and two three-hour laboratory periods per week.
Composition, distribution, and stratigraphic occurrence of past floras.

125. History of the Lower Vertebrates. (3) I. Mr. Camp
Two lectures, proseminar, and two three-hour laboratory periods per week. Prerequisite: course 3 or Zoology 106.

126. Evolution and Classification of the Mammals. (4) I. Mr. Savage
Two lectures, proseminar, and two three-hour laboratory periods per week. Prerequisite: course 3 or Zoology 106.

127. History and Paleoecology of Higher Vertebrates. (4) II. Mr. Stirton
Two lectures, proseminar, and two three-hour laboratory periods per week. Prerequisite: course 126.

*136. Paleozoic and Early Mesozoic of Western North America. (5) I.
Three lectures and one laboratory period per week, field trips. Prerequisite: course 111.
Invertebrate paleontology and stratigraphy of the marine Paleozoic and Early Mesozoic.

†137. Late Mesozoic and Cenozoic of the Pacific Coast. (5) I. Mr. Durham
Three lectures and two three-hour laboratory periods per week; field trips. Prerequisite: course 111.
Invertebrate paleontology and stratigraphy of the marine Late Mesozoic and Cenozoic of the Pacific Coast.

* Not to be given, 1959–1960.
† To be given if a sufficient number of students enroll.
139. Cenozoic History of the West Coast of North America. (5) II. Mr. Kleinpell

Three lectures and two three-hour laboratory periods per week. Assigned readings. Prerequisite: course 114. Emphasis on correlation, sequence, and relationships of West Coast foraminiferal faunas.

170. History of Paleontology. (2) II. Mr. Camp

Two lectures per week. Prerequisite: consent of the instructor. Review of discoveries and development of ideas, principles, and methods, with emphasis on modern trends and theories.

199. Special Study for Advanced Undergraduates. (1-5) I and II. The Staff (Mr. Savage in charge)

Restricted to senior honor students in paleontology. Special problems or reading assignments.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

252. Seminar in Stratigraphy. (2) I. Mr. Berry

Current literature and general problems.

253. Seminar in Micropaleontology. (2) I and II. Mr. Kleinpell, Mr. Thalmann, Mr. Arnold

Current literature and general problems.

254. Seminar in Mammalian Paleontology. (2) I and II. Mr. Savage, Mr. Stirton

255. Seminar in Vertebrate Paleontology. (2) II. Mr. Camp

256. Seminar in Invertebrate Paleontology. (2) I and II. Mr. Durham

Current literature and general problems.

257. Seminar in Paleobotany. (2) I and II. Mr. Fry

Current literature and general problems.

299. Research in Paleontology. (1-6) I and II. The Staff (Mr. Savage in charge)

Graduate Seminar. (No credit) I and II. The Staff (Mr. Arnold, Mr. Fry in charge) Prerequisite: consent of the instructor for nonmajors. Required of all graduate students in the department. Review of recent literature and current research in the department.

MUSEUM OF PALEONTOLOGY

The Museum of Paleontology, situated in the Hearst Memorial Mining Building on the Berkeley campus, was organized in 1921, and is supported chiefly by funds donated by the late Miss Annie M. Alexander. The Museum maintains the largest fossil collections on the Pacific Coast, and makes use of these in teaching and research. Anyone wishing to make use of the facilities of the Museum should address the Director, Museum of Paleontology.

MATTHEW MEMORIAL LIBRARY

A branch of the General Library containing an outstanding collection of books and pamphlets on paleontology, provides service to both faculty and students.
PHILOSOPHY

(Department Office, 4401 Dwinelle Hall)

Karl Aschenbrenner, Ph.D., Professor of Philosophy.
William R. Dennes, D.Phil., LL.D., Mills Professor of Intellectual and Moral Philosophy and Civil Polity (Chairman of the Department).
Lewis S. Feuer, Ph.D., Professor of Philosophy.
Benson Mates, Ph.D., Professor of Philosophy.
1 Edward W. Strong, Ph.D., Professor of Philosophy.
George P. Adams, Ph.D., LL.D., Mills Professor of Intellectual and Moral Philosophy and Civil Polity, Emeritus.
Jacob Loewenberg, Ph.D., Professor of Philosophy, Emeritus.
Stephen C. Pepper, Ph.D., L.H.D., Mills Professor of Intellectual and Moral Philosophy and Civil Polity, Emeritus.
1 Paul K. Feyerabend, Ph.D., Associate Professor of Philosophy.
Thomas S. Kuhn, Ph.D., Associate Professor of the History of Science.
Wallace I. Matson, Ph.D., Associate Professor of Philosophy.
John R. Myhill, Ph.D., Associate Professor of Philosophy.
Celestine J. Sullivan, Ph.D., Associate Professor of Philosophy.
1 Ernest W. Adams, Ph.D., Assistant Professor of Philosophy.
† Stanley L. Cavell, A.B., Assistant Professor of Philosophy.
John R. Searle, M.A. (Oxon.), Assistant Professor of Philosophy.
David S. Shwayder, D.Phil., Assistant Professor of Philosophy.

Price Charlson, M.A., Visiting Assistant Professor of Philosophy.
Kurt R. Fischer, M.A., Lecturer in Philosophy.
Robert L. Vaught, Ph.D., Assistant Professor of Mathematics.

Letters and Science List.—All undergraduate courses in this department are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Matson.

Major Program.—A total of 33 units is required in the major program. The following courses are required for a major program in the department: 20A–20B, 12A, 104, 114, and 18 additional units selected by the student from other upper division courses in accordance with the rule that at least two courses in each of the Groups A, B, and C, must be completed. The two required upper division courses 104 and 114 in Groups A and B, respectively, will satisfy the A and B requirements in part but may not be counted toward satisfaction of the 18-unit requirement.

For students in residence prior to September, 1958, the requirements of the major are similar, with the exception of the requirement of courses 104 and 114. The following will in this case be required: 20A–20B, and 12A as preparation for the major, 6 units in each of the Groups A, B, and C, and 6 additional units chosen from any group. With the approval of the departmental adviser 3 of the latter units may be taken in another department, provided the course selected is regarded as relevant to the major.

1 In residence fall semester only, 1959–1960.
2 In residence spring semester only, 1959–1960.
LOWER DIVISION COURSES

6A–6B. Introduction to Philosophy. (3–3) Yr. Beginning each semester.
Mr. Aschenbrenner, Mr. Charlson, Mr. Feyerabend, Mr. Fischer,
Mr. Matson, Mr. Searle, Mr. Shwayder, Mr. Sullivan
Course 6A is prerequisite to 6B.
Weekly section meetings for discussion and written work.

SOPHOMORE COURSES

12A–12B. Introduction to Logic. (3–3) Yr. Beginning each semester.
Mr. E. W. Adams, Mr. Mates, Mr. Myhill, Mr. Vaught
Weekly section meetings for discussion and written work.

20A–20B. History of Philosophy. (3–3) Yr. Mr. Dennes, Mr. Sullivan
Weekly section meetings for discussion and written work.
20A is not prerequisite to 20B.
20A. From the Pre-Socratics to Plotinus: Mr. Dennes.
20B. From the Scholastics to Kant: Mr. Sullivan.

UPPER DIVISION COURSES

General Prerequisites.—Students enrolling in any restricted upper division
course must have completed 6 units in courses 6A-6B or 20A-20B. Additional
prerequisites are indicated in certain courses. The unrestricted course 101 is
intended for juniors and seniors who are not majors in philosophy and who
have not taken any of the freshman or sophomore courses in the department
or their equivalents. Upon successful completion of course 101 all other upper
division courses are open to such students unless additional prerequisites are
indicated. Prerequisites in philosophy are waived also for course 127A–127B
and other upper division courses in the history of science.

Unrestricted Course

101. Philosophical Theories. (3) I and II.
Mr. Charlson, Mr. Aschenbrenner
A study of fundamental problems in metaphysics and the theory of knowl­
edge. Careful reading and discussion of selected texts of Plato, Hume, Kant,
Russell, and recent authors.
Course 101 is open to juniors and seniors who are not majors in philosophy
and will be accepted as prerequisite for other upper division courses in the
department in lieu of courses 6A–6B or 20A–20B.

Restricted Courses

GROUP A

Courses concerned with a critical analysis and appraisal of specific human
interests such as art, literature, morality, religion, science, and society.

104. Ethics. (3) I.
Mr. Dennes
Moral Values: A study and analysis of the concepts of good and right and
of the criteria of conduct.

*108. Social Philosophy. (3) I.
Mr. Dennes
An examination of the fundamental notions involved in the explanation
and evaluation of social structures and processes. Basic problems of human
personality and values in relation to their social matrix.

* Not to be given, 1959–1960.
*112. Philosophy of Religion. (3) II.
The nature and the validity of religious ideas.
Mr. Matson

*125. Theory of Value. (3) II.
A study of the principles of evaluation in relation to both individual and social problems.
Mr. Shwayder

128. Political Philosophy. (3) I.
Analysis of political obligation and related problems.
Mr. Feuer

136A–136B. Aesthetics. (3-3) Yr.
Mr. Charlson
A study of the nature of the aesthetic experience and of the work of art with detailed applications to the visual arts, music, and literature.
At the discretion of the instructor, the general prerequisite may be waived for major students in literature or in the fine arts.

*137. Aesthetic Theories. (3) II.
A study of aesthetic theories based on historical and recent materials.
Mr. Aschenbrenner

*140. Philosophy of Law. (3) I.
A study of philosophical problems arising in the legal context.

*146A–146B. Philosophy in Literature. (3-3) Yr.
At the discretion of the instructor, the general prerequisite may be waived for major students in literature or in the fine arts.
A study of certain basic philosophical issues as expressed in poetry, drama, and the novel.

*147. Theory of Historical Inquiry. (3) I.
Mr. Strong

GROUP B

Courses dealing with the methods of reflective thinking and the more general features of experience.

*111. Metaphysics. (3) I.
Mr. Matson

113A–113B. Logic. (3-3) Yr.
Mr. E. W. Adams, Mr. Myhill
Prerequisite: course 12A or the equivalent. 113A is prerequisite to 113B.

114. Theory of Knowledge. (3) II.
Mr. Matson

120A–120B. Scientific Method. (3-3) Yr.
Mr. E. W. Adams, Mr. Feyerabend
Methodology of the mathematical, the natural, and the social sciences.

*124. Philosophy of Science. (3) II.
Mr. E. W. Adams
Prerequisite: course 12A–12B.
Central topic: Axiomatic analysis of concepts of geometry (theoretical and applied), physics, and unobservables in behavioral science.

133A–133B. Philosophy of Language. (3-3) Yr. Mr. Searle, Mr. Shwayder
Prerequisite: course 12A.

135A–*135B. Contemporary Philosophy. (3-3) Yr. Mr. Searle
135A: II.

*142. Semantics of Formal Systems. (3) II.
Mr. Myhill
Prerequisite: course 12A and one upper division course in logic, or consent of the instructor.
Application of logical techniques to the analysis of such key semantical concepts as meaning, validity, and truth.

* Not to be given, 1959–1960.
*144. Historical Development of the Theory of Knowledge. (3) I.
   Mr. Feyerabend
   Historical treatment of the theory of knowledge in connection with the development of science.

GROUP C

Courses dealing with individual thinkers and epochs in the history of ideas. Course 20A–20B or its equivalent is prerequisite to courses in this group.

*103. Philosophy of the Nineteenth Century. (3) I.

105. Kant. (3) I.  Mr. Aschenbrenner

*115. Medieval and Early-Modern Thought. (3) I.  Mr. Strong

116. Plato. (3) I.  Mr. Sullivan

*117. Aristotle. (3) II.

118. Spinoza. (3) II.  Mr. Sullivan

121. Hobbes. (3) I.  Mr. Matson

History of Scientific Thought and Technique (History 105A–105B).  
(3–3) Yr.  Mr. Kuhn

127A–127B. Problems in the Development of Physical Science. (3–3) Yr.  Mr. Kuhn

No philosophy prerequisite, but high school or college physics will normally be required. 127A is not prerequisite to 127B.

127A. Scientific Cosmology: Aristotle to Newton.

127B. Matter and Energy: Lavoisier to Einstein.

Intensive study, using primary sources where possible, of a closely related series of episodes in the development of scientific thought.

*129. Leibniz. (3) II.  Mr. Aschenbrenner

*130. Materialism and Naturalism. (3) II.  Mr. Matson

Historical and critical studies of the chief philosophical materialists from Democritus to Dewey.

*132. Descartes and Cartesianism. (3) II.

*145. American Philosophy. (3) I.

171. Greek Philosophy from Thales to Democritus. (3) II.  Mr. Matson

Prerequisite: course 20A.

A study of the emergence, from a mythological background, of Greek philosophical thought in the sixth century B.C. The philosophies of the Milesians, Heraclitus, the Pythagoreans, Parmenides, the Pluralists, and the Atomists.

183. Locke. (3) I.  Mr. Shwayder

184. Berkeley. (3) II.  Mr. Mates

185. Hume. (3) II.  Mr. Dennes

*188. Post-Kantian Idealism. (3) II.

The Philosophy of Fichte, Hegel, and Schelling.

199. Special Study for Advanced Undergraduates. (1–4) I and II.

The Staff (Mr. Aschenbrenner in charge)

* Not to be given, 1959–1960.
GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

204. Seminar in Ethics. (3) I. Mr. Shwayder

210A–210B. Seminar in the History of Philosophy. (3-3) Yr. Mr. Aschenbrenner, Mr. Sullivan

*211. Seminar in Metaphysics. (3) I. Mr. Sullivan

213A–213B. Seminar in Logic. (3-3) Yr. Mr. Myhill

214. Seminar in the Theory of Knowledge. (3) I. Mr. Searle

*216A–216B. Seminar in Plato. (3-3) Yr. Mr. Mates

218A–218B. Seminar in Semantics. (3-3) Yr. Mr. Mates

Seminar in the History of Science (History 204). (3) II. Mr. Kuhn

220. Seminar in the Relations of Science and Philosophy. (3) I. Mr. Kuhn

221. Metaphysics and Philosophical Analysis. (3) I. Mr. Matson

222. Seminar in the Philosophy of Mind. (3) I. Mr. Cavell

*224A–224B. Axiomatic Method in Science. (3-3) Yr. Mr. E. W. Adams
Prerequisite: course 12A–12B; elementary calculus.
Axiomatic systems and interpretations in social and physical science.

225. Seminar in Theory of Value. (3) II. Mr. Cavell

*228. Seminar in Political Philosophy. (3) II. Mr. Matson

229. Philosophy of the Social Sciences. (3) II. Mr. Feuer

231. The Philosophy of Santayana. (3) I. Mr. Sullivan

*232. Philosophical Naturalism. (3) II. Mr. Dennes

233. Seminar in the Philosophy of Language. (3) II. Mr. Searle

235. Seminar in Contemporary Philosophy. (3) II. Mr. Shwayder

236. Seminar in Aesthetics. (3) II. Mr. Charlson

247. Theories of History. (3) I. Mr. Strong

248A–248B. Seminar in the Philosophy of Science. (3-3) Yr. 248A: II. Mr. Feyerabend

250. Special Studies. (1-6) I and II. The Staff (Mr. Aschenbrenner in charge)

Enrollment is ordinarily restricted to students who have been admitted to candidacy for the doctor's degree.

* Not to be given, 1959–1960.
PHYSICAL EDUCATION

(Department Office, 103 Harmon Gymnasium)

Anna S. Espenschade, Ph.D., Professor of Physical Education (Vice-Chairman of the Division for Women).
Franklin M. Henry, Ph.D., Professor of Physical Education.
Pauline Hodgson, Ph.D., Professor of Physical Education.
Carl L. Nordly, Ph.D., Professor of Physical Education (Chairman of the Department).
Sarah R. Davis, A.B., Assistant Professor of Physical Education, Emeritus.
Louise S. Cobb, Ph.D., Supervisor of Physical Education, Emeritus.
Eleanor E. Bartlett, A.B., Associate Supervisor of Physical Education, Emeritus.
Caroline W. Coleman, M.A., Associate Supervisor of Physical Education, Emeritus.
Joseph Royce, Ph.D., Assistant Professor of Physical Education.
David H. Clarke, Ph.D., Instructor in Physical Education.
Lucile K. Czarnowski, M.S., Supervisor of Physical Education.
Marie H. Glass, A.B., Supervisor of Physical Education.
¹ Charles J. Keeney, A.B., Supervisor of Physical Education.
Ralph D. Miller, M.A., Supervisor of Physical Education.
Heber A. Newsom, M.A., Supervisor of Physical Education for Men and Supervisor of Teaching of Physical Education for Boys.
Charles A. Pease, A.B., Supervisor of Physical Education.
Frederica Bernhard, M.S., Associate Supervisor of Physical Education.
M. June Brasted, M.S., Associate Supervisor of Physical Education.
Lance Flanagan, M.A., Associate Supervisor of Physical Education.
Kooman Boycheff, Ph.D., Associate Supervisor of Physical Education.
Edgar Nemir, A.B., LL.B., Associate Supervisor of Physical Education.
Harold J. Frey, M.S., Assistant Supervisor of Physical Education.
Rose Marie Meyer, M.S., Assistant Supervisor of Physical Education.
Chester W. Murphy, M.S., Assistant Supervisor of Physical Education.
Roberta J. Park, M.A., Assistant Supervisor of Physical Education.
Everett D. Ryan, Ed.D., Assistant Supervisor of Physical Education.
Dorothy M. Wendt, M.S., Assistant Supervisor of Physical Education.
Thomas S. Yukie, Ed.D., Assistant Supervisor of Physical Education.
June Day, M.S., Junior Supervisor of Physical Education.
Mary E. Day, M.S., Junior Supervisor of Physical Education.
Joanna R. Gewertz, M.A., Junior Supervisor of Physical Education.
Alfred Mathews, Jr., A.B., Junior Supervisor of Physical Education.
William H. Phillips, Jr., M.A., Junior Supervisor of Physical Education.
Doris White, A.B., Junior Supervisor of Physical Education.

Peter R. Elliott, A.B., Lecturer in Physical Education.
George Wolfman, A.B., Lecturer in Physical Education.

Letters and Science List.—Course 105 is included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

The incidental fee payable by all students at the time of registration entitles students to the use of gymnasiums, swimming pools, showers, towels, lockers, tennis courts, and the athletic fields; also to the use of costumes for certain physical education activities, including swimming.

Recreational opportunities.—At Hearst Gymnasium and at Harmon Gymnasium, rooms, courts, swimming pools, sports fields, and equipment for

¹ In residence fall semester only, 1959–1960.
games and sports are available to students of the University who wish an opportunity for exercise and recreation, either with or without instruction. Courses may be elected with or without academic credit. The Women's Athletic Association, A.S.U.C., and the Department of Physical Education cooperate in furthering opportunities for participation in a wide variety of activities.

The Lucie Stern pool, the Elise and Walter Haas Clubhouse, courts and fields located in Strawberry Canyon, are available to men and women students, their spouses and families. Further information may be obtained from the Coordinator of Recreation, Room 143 Harmon Gymnasium.

Fees.—The fee for ice skating is $5.50.

Fines.—Fines are imposed for each formal transaction necessitated by failure of the student to comply with the regulations of the department: (a) failure to return equipment or clothing on or before the date posted for such return at the end of each semester, or at the end of each special session of the University, or failure to return athletic supplies (balls, bats, etc.) on the date of issue, $1 for each twenty-four hours until the full purchase price of the article has been reached; (b) failure to meet the appointment for the physical education orientation meetings, $5; (c) overnight use of dressing locker, $2; (d) failure to empty locker within designated time, $5.

LOWER DIVISION COURSE FOR MEN

1. Physical Education Activities. (½) I and II.

The Staff (Mr. Nordly in charge)

Sections meet twice weekly at various hours, M Tu W Th.

The following activities are open to those found properly qualified: archery‡, baseball, basketball, boxing, wrestling, judo, fencing, crew, American football, rugby football, golf‡, gymnastics, body building, tumbling, handball, sailing‡, squash, figure skating‡, badminton, soccer, swimming, diving, tennis, track, modern dance‡, folk dance‡, social dance‡, elementary school activities: games and dance‡, trampoline, volleyball, and weightlifting. Special guidance and facilities are provided for men who wish to accomplish specific bodily development.

A physical examination is required of all men entering the University, and a special medical examination is demanded of all athletes prior to training for, or participation in, intercollegiate competition.

LOWER DIVISION COURSE FOR WOMEN

26. Physical Education Activities. (½) I and II.

The Staff (Miss Espenschade in charge)

Sections meet twice weekly at various hours.

The following activities are offered in elementary, intermediate, and advanced grades for women who are in good physical condition.

Sports: archery‡, badminton, basketball, diving, fencing, golf‡, field hockey, figure skating‡, lifesaving, sailing‡, swimming, tennis, field sports.

Dancing: modern dance‡, folk dance‡, and social dance‡.

General Exercise: gymnastics, tumbling, trampoline and conditioning exercises.

Individual Exercise: group exercises adapted to individual needs.

Elementary School Activities: games and dance‡.

LOWER DIVISION COURSES FOR MEN AND WOMEN

5A. First Aid. (1) I and II.

Mr. Royce, ———

(Formerly numbered 85A.)

Standard and advanced course. Sections meet two hours per week.

‡ See Lower Division Courses for Men and Women.
Upon successful completion of the course, a Red Cross certificate is awarded.

20. Introduction to Physical Education. (1) I and II. Miss Hodgson, Mr. Nordly
   An interpretation of the field designated to give the prospective major student an understanding of its scope.

26. Physical Education Activities. ( ½ ) I and II.
   The Staff (Miss Espenschade in charge)
   Sections meet twice weekly at various hours.
   Archery, folk dance, figure skating, golf, modern dance, sailing, social dance.

35. Rhythmic Basis of Dance and Allied Arts. (2) I. Miss Czarnowski
   (Formerly numbered 54.)
   Prerequisite: 2 semesters of experience in dance, or consent of the instructor.
   This course is planned for students interested in dance, music, and art. Consideration given to nature and function of rhythm, rhythmic analysis and notation, rhythmic form in the temporal and spatial arts.

**Upper Division Course for Men**

171. Conditioning of Athletes and Care of Injuries. (2) II. Mr. Royce
   (Formerly numbered 318.)
   Lectures and a three-hour laboratory period per week. Prerequisite: course 5A, Physiology 1 or Anatomy 102.
   Modern principles and practice in conditioning and care of athletes; individual variation and needs as to sleep, diet, health, and activity habits; care of injuries, with special emphasis on therapy, taping, and protective equipment.

**Upper Division Courses for Women**

160A—160B. Theory of Dance. (3–3) Yr. Miss Czarnowski
   160A, II; 160B, I.
   Lectures and laboratory. Prerequisite: course 35 and Psychology 1A.

165A. Theory of Group Athletics. (3) I. Miss Brasted, Miss Park
   Lectures and laboratory. Recommended: course 101; Prerequisite: experience in the activities included.

165B. Theory of Gymnastics. (2) I. Miss Meyer
   Lectures and laboratory. Recommended: course 101. 165A is not prerequisite to 165B.

166. Theory of Individual Athletics. (2) II. Mrs. Glass
   Prerequisite: a working knowledge of the activities included.

**Upper Division Courses for Men and Women**

101. Kinesiology and Body Mechanics. (3) I. Mr. Royce
   Lectures and laboratory. Prerequisite: Physiology 1, 1L; Anatomy 102.
   The study and application of physical structure and muscular movements in various physical education activities. Description and application of certain anatomical concepts and physical laws to joint and muscular action.

† To be given if a sufficient number of students enroll.
102. Corrective Physical Education. (3) II.
Prerequisite: course 101.
Development of programs for those individuals whom the physician has diagnosed as functionally deficient; particular attention to poor circulation, spinal deviations, etc. Analysis of causes underlying these conditions and direction of students into activities suitable to their needs.

105. Physiological Hygiene. (4) II. Mr. Henry
Lectures and laboratory. Prerequisite: high school chemistry; Home Economics 10; Physiology 1, 1L; Public Health 5A.
The physiology of exercise; diet, ventilation, training, fatigue, and health in relation to physical activity. Individual differences in cardiovascular and respiratory function.

110. Psychologic Bases of Physical Activity. (2) I. Miss Espenschade
Prerequisite: Psychology 1A.
Perception, motivation, learning, and emotion in relation to physical activity; reaction time and coordination. Personal adjustment and social behavior as observed in play. The psychology of competition.

120. Sports in American Society. (2) I. Mr. Flanagan
Open to all upper division students.
An examination of the interrelationships of sports and physical recreation with other aspects of American culture: industrialization and urbanization, communication and transportation, war and peace. Sports and American education. The influence of ideas, ideals, traditions, and democratic concepts.

130. History and Theories of Physical Education. (3) II. Miss Hodgson
Prerequisite: course 20; Psychology 1A.
History of American and foreign physical education. Its cultural background: political, social, educational. Comparative physical education. Designed to develop critical judgment regarding the purposes and significance of physical education in modern life and education on the basis of pertinent cultural and scientific factors.

131. Organization and Administration of Physical Education. (2) I.
(Formerly numbered 131A.) Mr. Clarke
Prerequisite: course 130.
Principles, policies, and administrative procedures pertaining to departmental organization, personnel, facilities, equipment and supplies, finance, health and safety, public relations and legal aspects.

132. Curriculum in Physical Education. (2) II.
(Formerly numbered 131B.) Mr. Clarke, Miss Hodgson
Prerequisite: course 130.
Principles of curriculum development applied to physical education including the instructional program, intramural sports and interscholastic athletics.

135A–135B. Measurement and Evaluation in Physical Education. (2–2) Yr.
135A. II. Miss Espenschade
Historical background of measurement in physical education; statistical techniques used in scoring tests; construction and use of tests and other forms of appraisal of individuals; evaluative criteria and procedures for facilities, personnel, and program; interpretation of results; analysis of selected research studies.

140. Community Recreation. (2) I. Mr. Miller
Prerequisite: upper division standing. Course 140 is not open to students who have taken course 143A or 143B; and the latter are open for 2 units of credit to students who have taken course 140.

† To be given if a sufficient number of students enroll.
Nature, scope, and significance of recreation in the social and economic life of the American people. Meaning and nature of play. History, purpose, function, organizational patterns, and interrelationships of groups, agencies, and institutions which serve the recreational needs of the community.

143A. Theory and Principles of Recreation. (3) I. Mr. Miller
Prerequisite: upper division standing.
The meaning and significance of leisure in modern society; essential characteristics and uses of recreation; theories of play; the recreation movement in the United States.

143B. The Organization and Administration of Recreation. (3) II.
Prerequisite: course 143A. Miss Brasted
Community interrelationships affecting recreation; the recreation program; areas and facilities and their operation, recreation organization; financial support, records, personnel administration, publicity, and public relations.

144A. Field Laboratory Course. (No credit) I and II.
Prerequisite: completion of the lower division requirements of the group major in recreation.
A minimum of six weeks' full-time field experience, or its equivalent, in a variety of recreational assignments based on the needs and experience of the student.

144B. Field Laboratory Course. (No credit) I and II.
Prerequisite: course 144A. Mrs. Glass, Mr. Miller
A continuation of course 144A, including additional field experience in recreational activities.

199. Special Study for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. Nordly in charge)
Prerequisite: senior standing and consent of the department. Only specially qualified students will be admitted.

METHODS COURSES FOR MEN

340. The Theory and Teaching of Aquatics. (1) I and II. Mr. Flanagan
Prerequisite: successful completion of course 1. Students desiring Water Safety Instructor Certificate must complete senior lifesaving in addition to course 1.
Swimming, diving, water polo, lifesaving and water safety.

341. The Theory and Teaching of Gymnastics and Individual Adapted Activities (1) I.
Mr. Frey, Mr. Keeney, Mr. Pease
Prerequisite: course 1 (gymnastics).
Stunts, tumbling, apparatus, calisthenics, weightlifting, bodybuilding.

342. The Theory and Teaching of Combative Activities. (1) II.
Mr. Clarke, Mr. Nemir, Mr. Ryan
Prerequisite: course 1 (combative skills).
Boxing, wrestling, combative games.

344. The Theory and Teaching of Field Sports. (2) II.
Mr. Elliott, Mr. Keeney, Mr. Mathews, Mr. Newsom, Mr. Wolfman
Prerequisite: course 1 (fields sports).
Baseball, American football, soccer, softball, touch football, track and field.

† To be given if a sufficient number of students enroll.
345. The Theory and Teaching of Court Sports. (2) I.
Mr. Flanagan, Mr. Miller, Mr. Murphy, Mr. Newsom
Prerequisite: course 1 (court sports).
Badminton, basketball, handball, tennis, volleyball.

METHODS COURSE FOR MEN AND WOMEN

343. The Theory and Teaching of Social Recreational Activities. (1) II.
Miss J. Day, Mr. Pease
Folk and social dance, games and relays including social recreational activities.

GRADUATE COURSES FOR MEN AND WOMEN

200. Seminar in Physical Education. (2) I and II.
Mr. Henry, Miss Hodgson
The meaning, methods, and techniques of research procedure as applied to physical education; a critical review of selected studies, literature, practices, and procedures in the field; application of this training to a particular problem in the field.

201. Seminar in Movement and Body Mechanics. (2) I.
Mr. Royce
Application of neurophysiological concepts, physical laws, and kinesiology to analysis of human movement.

205. Seminar in Physiological Hygiene. (2) I.
Mr. Henry
Immediate and long-range adaptations of the body to exercise. Physiological limits and work capacities in relation to age, sex, diet, environmental factors, and nature of activity.

210. Seminar in Psychologic Bases of Physical Activity. (2) II.
Miss Espenschade
Critical review of current literature on motor learning, coordination, kinesthesia, and reaction time. Consideration of sensory-motor perception, motivation and personality factors in relation to physical activities.

*230. Seminar in Cultural and Historical Foundations of Physical Education. (2) II.
Miss Hodgson
A critical analysis of the interrelations of physical education and culture within the historical perspective of school and society.

†231. Administration of Physical Education. (2) II.
Mr. Nordly

290. Research. (1-6) I and II.
Miss Espenschade, Mr. Henry, Miss Hodgson, Mr. Nordly, Mr. Royce

PROFESSIONAL COURSE

†400A–400B. Recreational Leadership. (2–2) Yr. Mrs. Glass, Mr. Miller
Prerequisite: course 143A.
Observation, conferences, and supervised field work in community agencies.

* Not to be given, 1959–1960.
† To be given if a sufficient number of students enroll.
†Luis W. Alvarez, Ph.D., Professor of Physics.
Robert B. Brode, Ph.D., Sc.D., Professor of Physics.
* Owen Chamberlain, Ph.D., Professor of Physics.
Geoffrey F. Chew, Ph.D., Professor of Physics.
William B. Fretter, Ph.D., Professor of Physics.
August C. Helmholtz, Ph.D., Professor of Physics (Chairman of the Department).
Francis A. Jenkins, Ph.D., Professor of Physics.
Robert Karplus, Ph.D., Professor of Physics.
Arthur F. Kip, Ph.D., Professor of Physics.
Charles Kittel, Ph.D., Professor of Physics and Research Professor in the Institute for Basic Research in Science.
Edwin M. McMillan, Ph.D., Professor of Physics and Director of the Lawrence Radiation Laboratory.
Burton J. Moyer, Ph.D., Professor of Physics.
† William A. Nierenberg, Ph.D., Professor of Physics and Research Professor in the Institute for Basic Research in Science.
Wilson M. Powell, Ph.D., Professor of Physics.
Malvin A. Ruderman, Ph.D., Professor of Physics.
Emilio G. Segrè, Ph.D., Professor of Physics.
*Edward Teller, Ph.D., Sc.D., Professor of Physics and Director of the Lawrence Radiation Laboratory at Livermore.
Robert L. Thornton, Ph.D., Professor of Physics.
Kenneth M. Watson, Ph.D., Professor of Physics.
Harvey E. White, Ph.D., Professor of Physics (Vice-Chairman of the Department).
*Herbert F. York, Jr., Ph.D., Professor of Physics.
Raymond T. Birge, Ph.D., LL.D., Professor of Physics, Emeritus.
Victor F. Lenzen, Ph.D., Professor of Physics, Emeritus.
Leonard B. Loeb, Ph.D., Professor of Physics, Emeritus.
Ralph S. Minor, Ph.D., Professor of Physics and Optometry, Emeritus.
William H. Williams, Graduate, United States Military Academy, Professor of Physics, Emeritus.
Hiram W. Edwards, Ph.D., Associate Professor of Physics, Emeritus.
Gerson Goldhaber, Ph.D., Associate Professor of Physics.
Erwin L. Hahn, Ph.D., Associate Professor of Physics.
Carson D. Jeffries, Ph.D., Associate Professor of Physics.
Walter D. Knight, Ph.D., Associate Professor of Physics.
John H. Reynolds, Ph.D., Associate Professor of Physics and Associate Research Professor in the Institute for Basic Research in Science.
Michael Tinkham, Ph.D., Associate Professor of Physics.
Robert R. Brown, Ph.D., Assistant Professor of Physics.
Frank S. Crawford, Ph.D., Assistant Professor of Physics.
Kenneth M. Crowe, Ph.D., Assistant Professor of Physics.
Alan M. Portis, Ph.D., Assistant Professor of Physics.
Arthur H. Rosenfeld, Ph.D., Assistant Professor of Physics.
Howard A. Shugart, Ph.D., Assistant Professor of Physics.
M. Lynn Stevenson, Ph.D., Assistant Professor of Physics.
Eyvind H. Wichmann, Ph.D., Assistant Professor of Physics.

* In residence spring semester only, 1959–1960.
*Thomas J. Ypsilantis, Ph.D., Assistant Professor of Physics.
*Charles Zemach, Ph.D., Assistant Professor of Physics.

Norris E. Bradbury, Ph.D., Professor of Physics, Los Alamos Laboratory.
Sumner P. Davis, Ph.D., Lecturer in Physics.
Donald A. Glaser, Ph.D., Visiting Professor of Physics.
David L. Judd, Ph.D., Lecturer in Physics.
Frederic Keffer, Ph.D., Visiting Professor of Physics.
Wulf B. Kunkel, Ph.D., Lecturer in Physics.
Joseph V. Lepore, Ph.D., Lecturer in Physics.
Samuel Silver, Ph.D., Professor of Engineering Science.
John M. Stone, Ph.D., Lecturer in Physics.

**MEDICAL PHYSICS**

John W. Gofman, M.D., Ph.D., Professor of Medical Physics.
Hardin B. Jones, Ph.D., Professor of Medical Physics and Physiology and Assistant Director of the Donner Laboratory.
John H. Lawrence, M.D., Professor of Medical Physics and Director of the Donner Laboratory.
Cornelius A. Tobias, Ph.D., Professor of Medical Physics.
John H. Northrup, Ph.D., Sc.D., LL.D., Professor of Bacteriology and Professor of Biophysics, Emeritus.
Howard C. Mel, Ph.D., Acting Assistant Professor of Medical Physics and Biophysics.
Robert K. Mortimer, Ph.D., Assistant Professor of Medical Physics.
Alexander V. Nichols, Ph.D., Acting Assistant Professor of Medical Physics and Biophysics.
Kwan Hsu, M.S., Associate in Biophysics.

*R. Lowry Dobson, M.D., Ph.D., Lecturer in Medical Physics.
Thomas L. Hayes, Ph.D., Lecturer in Medical Physics and Biophysics.
Lola S. Kelley, Ph.D., Lecturer in Medical Physics and Biophysics.
Donald J. Rosenthal, M.D., Lecturer in Medical Physics.

*Letters and Science List.*—All undergraduate courses in physics except 131 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

*Departmental Major Advisers:* Mr. Chamberlain, Mr. Hahn, Mr. Jeffries, Mr. Kip, Mr. Rosenfeld.

*Preparation for the Major.*—Required: Courses 4A, 4B, 4C, or the equivalent (under special circumstances, courses 2A–2B and 3A–3B may be accepted); Chemistry 1A–1B, Mathematics C, 3A–3B, 4A–4B, or their equivalents. Recommended: Mathematics 8, and a reading knowledge of French and German.

*The Major.*—The major must include courses 105A–105B, 108B, 110A–110B, 110C, or 110D, 112, 115 and 121. The department will certify to the completion of the major program for graduation only on the basis of at least a C average in the upper division courses taken in the department. Students who cannot maintain such an average may be required at any time to withdraw from the major in physics.

*Engineering Physics.*—The College of Engineering with the cooperation of the Department of Physics offers a curriculum in engineering physics leading to

* In residence spring semester only, 1959–1960.
the degree of Bachelor of Science. Major Adviser: Mr. Portis. (See section on Program of Study in Engineering Physics in the CIRCULAR OF INFORMATION.)

Physic AND Biology.—A group major may be arranged for students who wish to obtain a broad introduction to the physical sciences and to their application to biology. Adviser: Mr. Tobias and Mr. Lawrence.

Honors.—Honor students in physics may do special work in course H197 or 199. Honor students in medical physics may do special work in course 198.

Lower Division Courses

Courses 4A, 4B, 4C, are fundamental and are designed to meet the needs of students whose major is physics and of students preparing for applications of physics in the colleges of Engineering and Chemistry.

Prerequisite for all lower division courses except course 10: (1) either high school physics or chemistry or physics 10; (2) trigonometry (may be taken concurrently). Prerequisite for course 10: elementary algebra and plane geometry.

2A-2B. General Physics Lectures. (3-3) Yr. Beginning each semester.  
Mr. White, Mr. Kunkel

Three lectures and one discussion section per week. Elective in the College of Letters and Science. Required for premedical students and students in architecture.

Mechanics, properties of matter, heat, sound, light, electricity and magnetism, atomic and nuclear physics.

3A-3B. General Physics Laboratory. (1-1) Yr. Beginning each semester.  
Mr. Shugart

Required for premedical students. Recommended for all students who elect course 2A-2B.

Mechanics, properties of matter, heat, sound, light, electricity and magnetism, atomic and nuclear physics. Experimental work planned to accompany the lectures in course 2A-2B.

4A. General Physics. (4) I and II.  
Mr. Brown, Mr. Rosenfeld, Mr. Shugart, Mr. Stevenson

Three lectures and one three-hour laboratory period per week. Prerequisite: Mathematics 3A-3B or the equivalent. Mathematics 3B may be taken concurrently. Open to students in all colleges. Together with course 4B-4C, required for students in the College of Letters and Science whose major subject is physics, and for students in engineering and chemistry.

Mechanics, properties of matter, wave motion, sound.

4B. General Physics. (4) I and II.  
Mr. Brown, Mr. Kip, Mr. Portis, Mr. Shugart, ———

Three lectures and one three-hour laboratory period per week. Prerequisite: course 4A. Open to students in all colleges. Required for students in the College of Letters and Science whose major subject is physics, and for students in engineering and chemistry.

Electricity and magnetism.

4C. General Physics. (4) I and II.  
Mr. Davis, Mr. Moyer, Mr. Jenkins, ———

Three lectures and one three-hour laboratory period per week. Prerequisite: courses 4A and 4B. Open to students in all colleges. Required for students in the College of Letters and Science whose major subject is physics, and for students in engineering and chemistry.

Heat, light, modern physics.
10. Descriptive Introduction to Physics. (3) I and II.  
Mr. Knight, Mr. Teller

Open to students with or without high school physics, but not open to those who have credit for any of 2A, 2B, 4A, 4B, 4C, or the equivalent.

A brief presentation of some of the more important phenomena in physics, with experimental illustrations. (No experimental illustrations to be given in the spring semester.)

24. Supplementary Laboratory Courses in General Physics. (1)

Lower Division Staff

These courses are intended primarily for students entering the University with partial credit in general physics and are part of the regular work of courses 4A, 4B, 4C in the semester indicated for each. Students should enroll under one or more of the following numbers:

24A. Mechanics and Properties of Matter. (1) I and II.
24B. Electricity and Magnetism. (1) I and II.
24C. Heat and Light. (1) I and II.

31-34. Supplementary Lecture Courses in General Physics. (1–3)

Lower Division Staff

These courses are intended primarily for students entering the University with partial credit in general physics. Courses 32A, 32B cover part of the lecture work in 2A–2B, and 31D covers part of the lecture work in 4C, whereas courses 34A, 34B, 34C cover the lecture work only of 4A, 4B, 4C, respectively. Students should enroll under one or more of the following numbers:

31D. Light and Modern Physics. (2) I and II.
32B. Light, Electricity, and Magnetism. (1–3) I and II.
34A. Mechanics and Properties of Matter. (3) I and II.
34B. Electricity and Magnetism. (3) I and II.
34C. Heat, Light, and Modern Physics. (3) I and II.

41A. Properties of Matter. (1) I and II.

Mr. Brown, Mr. Rosenfeld, Mr. Shugart, Mr. Stevenson

Equivalent to part of 4A. Students enrolled under 41A will attend the lectures and laboratory of 4A, but will be held only for the portion of that course covering properties of matter (formerly included in course 1B).

41B. Heat. (1) I and II.  
Mr. Davis, Mr. Moyer, Mr. Jenkins, ——

Equivalent to part of 4C. Students enrolled under 41B will attend the lectures and laboratory of 4C, but will be held only for the portion of that course covering heat (formerly included in course 1B).

41D. Light and Modern Physics. (3) I and II.

Mr. Davis, Mr. Moyer, Mr. Jenkins, ——

Equivalent to part of 4C. Students enrolled under 41D will attend the lectures and laboratory of 4C, but will be held only for the portion of that course covering light and modern physics (formerly included in course 1D).

**Upper Division Courses**

Courses 4A, 4B, 4C, and differential and integral calculus are prerequisite to all upper division courses except course 108A, I, and 108B, section I, II.

104. Vector Analysis. (3) I and II.  
Mr. Ruderman, Mr. Judd

Elements of vector analysis and its application to physics. Importance of an invariant formulation of physical laws. Elements of tensor analysis only in regard to general applications.
Physics

105A-105B. Analytic Mechanics. (3-2) Yr. Beginning each semester.
Mr. Crawford, Mr. Crowe, Mr. Goldhaber, Mr. Moyer, ———
105A. I: Mr. Crawford, Mr. Crowe; II: Mr. Moyer, ———
105B. I: Mr. Goldhaber, ———; II: Mr. Crawford, Mr. Crowe.
Prerequisite: Mathematics 110B or 119 (either may be taken concurrently).
Fundamental principles of Newtonian mechanics. Brief introduction to
Lagrangian's and Hamilton's equations.

108A. Geometrical Optics. (3) I.
Mr. Powell
Two lectures and one three-hour laboratory period per week. Prerequisite:
courses 2A-2B and 3A-3B.
Geometrical methods applied to the optics of mirrors, prisms, and lenses.

108B. Physical Optics. (3) I and II.
Mr. Jenkins, Mr. Powell, Mr. Stone, ———
I: Mr. Jenkins; II: Mr. Powell, Mr. Stone, ———.
Two lectures and one three-hour laboratory period per week. Section I
(spring semester) not open to physics majors. Course 108A is not prerequisite
to 108B.
The phenomena of diffraction, interference, and polarization of light, and
their applications.

110A-110B. Electricity and Magnetism. (3-3) Yr. Beginning each semester.
Mr. Brode, Mr. Hahn, Mr. Jeffries, Mr. Thornton, ———
110A. I: Mr. Brode, Mr. Thornton; II: Mr. Hahn, Mr. Jeffries.
110B. I: Mr. Jeffries; II: Mr. Brode, Mr. Thornton, ———.
Prerequisite: Mathematics 110B or 119.
Elementary and mathematical theory of electrostatics, magnetostatics,
magnetism, steady and varying currents, electron theory, and electromagnetic
waves.

110C. Advanced Electrical Laboratory. (2) I and II.
Mr. Jeffries, Mr. Knight
The use and calibration of precision electrical instruments and electronic
devices.

110D. Modern Physics Laboratory. (2) I and II.
Mr. Jeffries, Mr. Knight
The experimental foundation for the theory of atomic structure.

112. Thermodynamics and Kinetic Theory. (3) I and II.
Mr. Fretter, Mr. Tinkham
Thermodynamics and the kinetic theory of gases, with an introduction to
statistical mechanics.

115. Introduction to Quantum Mechanics. (3) I and II.
Mr. Tinkham, Mr. Rosenfeld, ———
Prerequisite: courses 105A, 121; Mathematics 110B or 119.
The classical background, basic ideas, and methods of quantum mechanics,
with applications to atomic physics.

121. Introduction to Atomic Structure. (3) I and II.
Mr. Brown, Mr. Keffer, Mr. Stevenson, Mr. Moyer, ———
An 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.

124. Radioactivity and Nuclear Structure. (3) I and II.
I: ———; II: Mr. Fretter.
Mr. Fretter, ———
Prerequisite: course 121.
Discovery of radioactivity, nature of radioactivity, α, β, and γ rays, theory
of successive transformation, artificial transmutations, nuclear structure.
129A-129B. Nuclear Physics. (3-3) Yr. Beginning each semester.  
Mr. Segre
Designed to cover more thoroughly the material of course 124.
Prerequisite: course 121.
Nuclear and artificial radioactivity, nuclear transformations, nuclear structure, magnetic moments, nuclear radiations, mesons, high energy physics.

132. Modern Physics. (3) I.  
Prerequisite: Physics 2A-2B, 3A-3B, or the equivalent, or consent of the instructor.
Not open for credit to students who have had Physics 121.
A general course in modern physics. Elements of atomic and nuclear physics. The periodic table, spectra, X rays, electron optics, solid state, nuclear physics, and nuclear energy, instrumentation, cosmic rays and fundamental particles.

*140. Introduction to Solid State Physics. (3) I and II.  
Mr. Kip
Prerequisite: course 121.
An elementary survey of the properties of solids, not intended for students planning graduate work in solid-state or resonance physics. Simple crystal structures; dielectric, thermal, and magnetic properties; metals and semiconductors; superconductivity; mechanical properties.

H197. Physics Honors Course. (2) I and II.  
Mr. Chamberlain, Mr. Fretter, Mr. Helmholz, Mr. Knight
A proseminar which includes study of a standard book on theoretical physics and reports on current theoretical and experimental problems. May be repeated for credit.

199. Special Study for Advanced Undergraduates. (1-2) I and II.  
The Staff (Mr. Helmholz in charge)
All special work of upper division grade not included in courses announced above. Designed to introduce students to advanced topics and to the technique and methods of research. Credit value to be fixed in each case.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

205A. Advanced Dynamics. (3) I and II.  
Mr. Judd, Mr. Wichmann
I. Mr. Judd; II: Mr. Wichmann.
Prerequisite: course 105A-105B.
The generalized methods of Lagrange, Hamilton, and Jacobi.

*205B. Advanced Dynamics. (3) II.  
Prerequisite: course 105A-105B or the equivalent. 205A not prerequisite to 205B.
Theory of elasticity and hydrodynamics.

208. Interactions of Light with Matter. (3) I and II.  
Mr. Ruderman
Prerequisite: Physics 108B and Physics 121.
Emission, absorption, and propagation of light treated classically. Limits of classical theory. Transition to quantum theory through the correspondence principle.

* Not to be given, 1959-1960.
2 To be given spring semester only, 1959-1960.
210A. I: Mr. Karplus; II: Mr. Karplus.
210B. I: Mr. Karplus; II: Mr. Karplus.
Prerequisite: course 110A–110B and a working knowledge of differential equations.
Classical description of the electromagnetic field, including special relativity and electron theory.

219. Thermodynamics and Statistical Mechanics. (3) I and II.
Mr. Keffer, Mr. Watson
Prerequisite: Physics 112 or equivalent, Physics 115 or equivalent.

220. Advanced Statistical Mechanics. (3) II.
Mr. Watson
Prerequisite: Physics 219 or consent of the instructor.
Phase transitions, including condensation. Description of imperfect gases. Transport theory and other nonequilibrium phenomena.

221A–221B. Quantum Mechanics. (3–3) Yr. Beginning each semester.
Prerequisite: course 115. Mr. Lepore, Mr. Nierenberg

222. Mathematical Methods of Theoretical Physics. (3) II. Mr. Silver
The setting up and solution of differential and integro-differential equations; statistical and algebraic methods for the treatment of problems of physics.

Mr. Tinkham, Mr. Tinkham,
The first semester treats the quantum mechanics of atoms and molecules, using group theoretical methods. The second semester, which may be taken independently, treats solid state theory.

224A–224B. Nuclear Physics. (3–3) Yr. Mr. Chew
Prerequisites: the equivalent of course 221A, and also either course 124 or 129.
224A: Elements of nuclear structure, including the two-nucleon system and simple models of complex nuclei; basic theory of nuclear reactions; symmetry principles.
224B: Relativistic phenomena; introduction to field theory; weak and electromagnetic interactions; properties of pions.

227. Nuclear and Electron Resonance. (3) II.
Prerequisite: a knowledge of the elements of quantum mechanics.
Experimental methods; theory of relaxation mechanisms; paramagnetic salts; coupling of electronic and nuclear systems; cyclotron resonance.

230A–230B. Quantum Theory of Fields. (3–3) Yr. Mr. Wichmann
Quantization of the electromagnetic field; formal and phenomenological meson theories with applications; general relativity.
The Staff (Mr. Fretter in charge)
Open to graduate students contemplating research in contemporary physics, chemistry, or engineering who have, in the instructor's opinion, the necessary background knowledge.
An introduction to modern experimental developments in the techniques of physical measurements. Lectures on the various measuring techniques developed in recent years will be given by a number of experts in the different fields of experimentation.

240A–240B. Solid State Physics. (3–3) Yr. Mr. Portis
Prerequisite: course 115 or equivalent. Open to advanced undergraduates.
Crystal symmetry; electromagnetic, elastic, and particle waves in periodic lattices; crystal binding; thermal properties; dielectric and magnetic susceptibilities; ferroelectricity; ferromagnetism; theory of metals and alloys; semiconductors; excitons; superconductivity; imperfections in solids. Selected topics, including electron and nuclear spin resonance.

290. Seminar. (2) I and II. The Staff (Mr. Helmholzin charge)
Advanced study in various fields of modern physics. Topics will vary from year to year. The program for 1959–1960 will probably include seminars in: (a) Magnetohydrodynamics (Watson); (b) Cosmic Rays (Brode, Brown and Fretter); (d) Spectroscopy (Jenkins, ______); (e) Nuclear Physics (to be arranged); (f) Molecular Beams (Nierenberg and Shugart); (k) Solid State Theory (Kip, Kittel, Portis, Tinkham); (s) Nuclear Resonance (Hahn, Jeffries, Knight).

295. Research. (1–6) I and II. The Staff (Mr. Helmholz in charge)

MEDICAL PHYSICS

LOWER DIVISION COURSE

25. Atomic Radiation and Life. (2) I and II. The Staff (Mr. Mel in charge)
Basic aspects of atomic radiations illustrated by examples from various biological and physical fields. To provide a framework for evaluating the complex changes associated with the atomic age in biomedical and physical sciences and society as a whole. Designed for liberal arts as well as for science students.

UPPER DIVISION COURSES

126. Artificial Radioactivity in the Biological Sciences. (2) II. Mr. Gofman, Mr. Nichols
Prerequisite: course 2A–2B, Chemistry 1A–1B, and one of the following: Zoology 1A–1B, Physiology 1, 1L, or Botany 1.
The theory, methods, and interpretation of the use of artificial radioactive elements for research in the biological sciences. Special emphasis is placed upon the role of radioactive tracers for the interpretation of the dynamic aspects of metabolic phenomena in biological systems.

126L. Artificial Radioactivity in the Biological Sciences. (1) II.
Laboratory work to accompany course 126. Mr. Gofman, Mr. Hayes

128. Nuclear Physics in Biology. (3) I. Mr. Mortimer, Miss Hsu
Two lectures and one three-hour laboratory per week. Prerequisite: course 2A–2B, 3A–3B, or the equivalent.

* Not to be given, 1959–1960.
An introduction to the properties and interactions of electromagnetic and ionizing radiations and aspects of nuclear physics of interest in biology. The laboratory is designed to illustrate the basic physical laws and principles of measurements covered in the lecture.

131. Biological Effects of Radiation. (3) II. Mr. Mortimer
Two four-hour laboratory sections per week. Prerequisite: course 128, or 124, or the equivalent, and one of the following: Physiology 108, Zoology 1A-1B, bacteriology laboratory, or the equivalent, and consent of the instructor.
Actions of ionizing radiations and ultraviolet light on microorganisms, plants, and higher animals. Designed to introduce students to the experimental approach to problems and radiobiologic mechanisms.

133. Physics of Biological Systems. (3) II. Mr. Tobias
Prerequisite: courses 4A, 4B, 4C, or the equivalent; Mathematics 110A, 110B or the equivalent.
Aspects of physics important for the understanding of living phenomena: portions of dynamics, electricity, kinetics, and quantum physics, as physical framework for biological phenomena.

198. Special Study in Medical Physics for Undergraduates. (1-3) I and II.
The Staff (Mr. Jones and Mr. Lawrence in charge)
Advanced upper division work in medical physics and biophysics. Designed to introduce students to advanced topics and to the technique and methods of research. Credit value to be fixed in each case.

GRADUATE COURSES

225A-225B. Isotopes in Experimental Medicine. (2-2) Yr.
Mr. Rosenthal, Mr. Lawrence
One lecture and one three-hour demonstration per week. Prerequisite: graduate standing in one of the biological or medical sciences.

290. Seminar. (1-3) I and II.
The Staff (Mr. Lawrence in charge)
Advanced study in various fields of biophysics and medical physics.
Topics will vary from year to year. The program for 1959-1960 will probably include seminars in (g) Effects of Radiation in Mammals (I, Kelly and Dobson); (j) Aging (II, Jones); (p) Progress in Biophysics (I, ---; II, ---); (q) Physiology of Circulation (I, Jones and Dobson); (v) Radiation Genetics in Microorganisms (II, Mortimer).

299. Research: Medical Physics and Biophysics. (1-6) I and II.
The Staff (Mr. Jones in charge)

RELATED COURSES IN OTHER DEPARTMENTS

Elastic Waves. (Geology 204A-204B.)
Advanced Seismometry. (Geology 217.)
Radiation Physiology. (Physiology 108.)
Physical Biochemistry. (Biochemistry 206.)
Principles of Geophysics. (Geology 122A-122B.)
History of Scientific Thought and Technique. (History 105A-105B.)
Problems in the Development of Physical Science. (Philosophy 127A-127B.)
Seminar in the History of Science. (History 204.)
Seminar in the Relations of Science and Philosophy. (Philosophy 220.)
PHYSIOLOGY

(Office, 2549 Life Sciences Building)

I. Lyon Chaikoff, M.D., Ph.D., Professor of Physiology.
Sherburne F. Cook, Ph.D., Professor of Physiology (Co-Chairman for Physiology).
Hardin B. Jones, Ph.D., Professor of Physiology and Medical Physics.
Nello Pace, Ph.D., Professor of Physiology.
Paola S. Timiras, M.D., Ph.D., Assistant Professor of Physiology.

Ernest L. Dobson, Ph.D., Lecturer in Physiology.
Gilbert S. Gordan, Jr., Ph.D., M.D., Associate Professor of Medicine, and
Lecturer in Psychiatry.
Gordon L. Walls, Sc.D., Professor of Physiological Optics and Optometry.

Letters and Science List.—All undergraduate courses in physiology are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Pace.
Preparation for the Major.—Required: course 1-1L (5) or Zoology 1A-1B (8) or Biology 11A-11B (6); Physics 2A-2B (6), 3A-3B (2); Chemistry 1A-1B (10), 5 (3), 8 (3); Mathematics 3A-3B or 16A-16B. Recommended: Anatomy 102; Chemistry 109; and a reading knowledge of French and German.

The Major.—The major must include courses 100A-100B (6), 100L (2), 110A-110B (6), 112 (3); the remaining 7 units necessary to complete the required 24 must be selected from other upper division courses in physiology.

Lower Division Courses

1. Introductory Physiology. Lectures. (3) I and II. Mr. Cook
   Prerequisite: either high school chemistry or at least 3 units of college physics or biology. Not open to entering freshmen.

1L. Introductory Physiology. Laboratory. (2) I and II. Mr. Cook
   Prerequisite: course 1 (may be taken concurrently). In the first semester, two laboratory sections will be limited to ninety students, the other two to sixty students each.

Upper Division Courses

100A-100B. General Physiology. (3-3) Yr. Mr. Pace
   Prerequisite: Chemistry 1A-1B, 8; Physics 2A-2B; course 1-1L, or Zoology 1A-1B, or Botany 1. Recommended: Mathematics 3A-3B or 16A-16B.
   Lectures on the chemical, mathematical, and physical characteristics of the life process, with particular reference to the cell.

100L. General Physiology Laboratory. (2) I. Mr. Pace
   Prerequisite: course 100A (may be taken concurrently).
   Experiments illustrating the physical and chemical principles underlying the life processes.
102. Physiology of Human Development. (2) I
Prerequisite: course 1, or Zoology 1A–1B, or the equivalent.
Lectures on the physiological changes occurring from conception to old age, and the role of the different organic systems in development and the aging process.

104. Physiology of the Endocrines. (2) I
Prerequisite: course 1–1L, or Zoology 1A–1B, or consent of the instructor.
Lectures and demonstrations designed to acquaint the nonmedical student with the principles of the physiology and chemistry of the endocrine glands.

107. Environmental Physiology. (3) II
Prerequisite: course 1, or Zoology 1A–1B, or consent of the instructor.
Lectures on the physical, chemical, and biotic influences of the environment on man, and the adaptive changes in response to environment.

108. Radiation Physiology. (3) II
Prerequisite: Chemistry 1A–1B, Physics 2A–2B, and course 1–1L, or Zoology 1A–1B.
Lectures on the physiological effects of radiation.

110A–110B. Mammalian Physiology. (3–3) Yr.
Prerequisite: course 1–1L or Zoology 1A–1B, Physics 2A–2B, Chemistry 1A, 8.
A comprehensive survey of mammalian physiology.

112. Mammalian Physiology. Laboratory. (3) II
Prerequisite: course 110A–110B (may be taken concurrently).

115. Morphology and Physiology of the Visual System. (4) I
Prerequisite: course 1–1L or Zoology 1A. Open to students in the School of Optometry and to others with consent of the instructor.

*120A. Comparative Physiology. (3) II
Prerequisite: Chemistry 1A–1B, Physics 2A–2B, and course 1–1L or Zoology 1A–1B.
A survey of the muscular, nervous, and sensory systems of animals in general from the comparative point of view.

120B. Comparative Physiology. (3) I
Prerequisite: the same as for 120A.
Circulation, respiration, and blood.

120C. Comparative Physiology. (3) II
Prerequisite: the same as for 120A.
Digestion, metabolism, the endocrines, and excretion.

199. Special Study for Advanced Undergraduates. (1–4) I and II
Prerequisite: at least 6 units of upper division courses in physiology.

* Not to be given, 1959–1960.
GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

200. Seminar in Cell Physiology. (1) II. Mr. Pace
Prerequisite: courses 100A–100B and Chemistry 109.
Topics will vary from year to year, and emphasis will be placed on the current literature.

201A–201B. Research. (2–8; 2–8) Yr.
Mr. Cook (in charge), Mr. Chaikoff, Mr. Pace, Mrs. Timiras

203A–203B. Seminar in Physiology. (1–1) Yr. Mr. Chaikoff
Designed to give students an acquaintance with recent physiological literature, and practice in making reports.

204. Seminar in the Endocrines. (1–3) I. Mr. Chaikoff

207A–207B. Seminar in Environmental Physiology. (1–1) Yr. Mr. Cook, Mr. Pace, Mrs. Timiras
I: Mr. Pace, Mrs. Timiras; II: Mr. Cook.
Prerequisite: courses 107 and 110A–110B.
Topics will vary from year to year.

220. Seminar in Comparative Physiology. (1) I. Mr. Cook
Prerequisite: course 110A–110B and consent of the instructor.
The topic for 1959–1960 will be announced.

PLANT BIOCHEMISTRY

(For courses in Plant Biochemistry, See Biochemistry, page 52.)

PLANT NEMATOLOGY

(For courses in Plant Nematology, see Entomology and Parasitology, page 191.)

PLANT NUTRITION

(See Soils and Plant Nutrition, page 390.)

PLANT PATHOLOGY

(Department Office, 133 Giannini Hall)

Peter A. Ark, Ph.D., Professor of Plant Pathology.
Hans N. Hansen, Ph.D., Professor of Plant Pathology
James B. Kendrick, Sr., Ph.D., Professor of Plant Pathology (Chairman of the Department), Davis.
John W. Oswald, Ph.D., Professor of Plant Pathology.
Thomas E. Rawlins, Ph.D., Professor of Plant Pathology.
William C. Snyder, Ph.D., Professor of Plant Pathology (Vice-Chairman of the Department).
William N. Takahashi, Ph.D., Professor of Plant Pathology.
Cecil E. Yarwood, Ph.D., Professor of Plant Pathology.
**Departmental Major Adviser:** Mr. Rawlins.

**Preparation for the Major.—** See plant science curriculum, College of Agriculture, page 83, in the Circular of Information. Bacteriology 1, Chemistry 1A, 1B, 8, and 5 or Biochemistry 102; Physics 2A, 2B; Soil Science 100 or 110; and Zoology 1A or 10 must be included.

**The Major.—** Required: 12 units of plant pathology in addition to Plant Pathology 120. In satisfaction of part of this 12-unit requirement, related courses approved by the adviser may be accepted.

### Upper Division Courses

100. **Forest Pathology.** (3) II. Mr. Parmeter
Lectures and laboratory. Prerequisite: Botany 1. Restricted to forestry students.
Diseases of forest plants.

120. **Plant Diseases.** (4) I. Mr. Oswald, Mr. Raabe
Lectures and laboratory. Prerequisite: Botany 1. Recommended: Bacteriology 1.
A general course on the nature, cause, and control of plant diseases.

122. **Plant Pathology Methods.** (3) II. Mr. Schlegel
Lectures and laboratory. Prerequisite: course 120.
The laboratory methods and techniques used in the study of plant diseases.

123. **Principles of Plant Pathology.** (3) II. Mr. Wilhelm
Prerequisite: course 120.
A consideration of some of the principles broadly applicable to fungus, bacterial, virus, and nutritional diseases of plants.

126. **Principles and Techniques of Plant Virology.** (3) II. Mr. Gold
Lecture and laboratory. Prerequisite: course 120 or consent of the instructor.
Viruses as causal agents of plant diseases; laboratory study of techniques used in research in plant virology, such as inoculation, staining methods, virus assay, electron microscopy, serology.

127. **Principles of Plant Disease Control.** (3) I. Mr. Yarwood
Lectures and laboratory. Prerequisite: course 120.
The fundamentals of plant disease control and their application; exclusion, eradication, immunization, therapy and protection; laboratory study of nature of fungicidal action, dosage relations, mechanics of application, chemotherapy, graphic methods.

199. **Special Study for Advanced Undergraduates.** (1-5) I and II.
Mr. Rawlins (in charge), Mr. Ark, Mr. Gold, Mr. Oswald, Mr. Parmeter, Mr. Raabe, Mr. Schlegel, Mr. Snyder, Mr. Takahashi, Mr. Wilhelm, Mr. Yarwood
GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

201. Seminar in Plant Pathology. (1) I and II. Mr. Raabe, Mr. Wilhelm
(Formerly numbered 201A–201B.)

212. The Diagnosis and Dynamics of Plant Disease. (3) I. Mr. Snyder
(Formerly numbered 125A.)
Lecture and laboratory. Prerequisite: consent of the instructor.
The pathology of selected field, vegetable, ornamental, and other crops.
Experience in field and laboratory diagnosis; consideration of factors influencing disease dynamics, inception, epidemiology, and disease avoidance.

299. Research in Plant Pathology. (1–9) I and II.
(Formerly numbered 230A–230B.)
Mr. Snyder (in charge), Mr. Ark, Mr. Gold, Mr. Oswald,
Mr. Parmeter, Mr. Raabe, Mr. Rawlins, Mr. Schlegel,
Mr. Takahashi, Mr. Wilhelm, Mr. Yarwood

(GIVEN AT RIVERSIDE)

GRADUATE COURSES

201. Seminar in Plant Pathology. (1) I and II.
(Formerly numbered 201A–201B.) The Staff (Mr. Middleton in charge)

299. Research in Plant Pathology. (1–6) I and II.
(Formerly numbered 230A–230B.) The Staff (Mr. Middleton in charge)

POLITICAL SCIENCE

(Department Office, 202 South Hall)

Charles Aikin, LL.B., Ph.D., Professor of Political Science (Chairman of the Department).
Eric C. Bellquist, Ph.D., Professor of Political Science.
Thomas C. Blaisdell, Jr., Ph.D., Professor of Political Science and Director of the Bureau of International Relations in the Institute of International Studies.
Joseph P. Harris, Ph.D., Professor of Political Science.
*Victor Jones, Ph.D., Professor of Political Science.
*Albert Lepawsky, Ph.D., Professor of Political Science.
'Leslie Lipson, Ph.D., Professor of Political Science.
'Austin F. Macdonald, Ph.D., Professor of Political Science.
Frederick C. Mosher, Ph.D., Professor of Political Science.
Peter H. Odegard, Ph.D., Professor of Political Science.
'Robert A. Scalapino, Ph.D., Professor of Political Science.
Julian Towster, J.D., Ph.D., Professor of Political Science.
C. Dwight Waldo, Ph.D., Professor of Political Science.
Hans Kelsen, Ph.D., Professor of Political Science, Emeritus.
Frank M. Russell, Ph.D., Professor of Political Science, Emeritus.
Eugene L. Burdick, Ph.D., Associate Professor of Political Science.
Ernst B. Haas, Ph.D., Associate Professor of Political Science.
Norman Jacobson, Ph.D., Associate Professor of Political Science (Vice-Chairman of the Department to December 30, 1959).
George Lenczowski, LL.M., J.S.D., Associate Professor of Political Science.
N. Wing Mah, Ph.D., Associate Professor of Political Science.

' In residence fall semester only, 1959–1960.
* In residence spring semester only, 1959–1960.
Political Science

Guy J. Pauker, Ph.D., Associate Professor of Political Science.
Paul Seabury, Ph.D., Associate Professor of Political Science.
Sheldon S. Wolin, Ph.D., Associate Professor of Political Science.
George M. Belknap, Ph.D., Assistant Professor of Political Science.
Richard H. Cox, Ph.D., Assistant Professor of Political Science.
Eugene C. Lee, Ph.D., Assistant Professor of Political Science.
Yosal Rogat, Ph.D., Assistant Professor of Political Science.
Carl G. Rosberg, Jr., Ph.D., Assistant Professor of Political Science.
John H. Schaar, Ph.D., Assistant Professor of Political Science.

Joan Bondurant, Ph.D., Lecturer in Political Science.
*Conrad Brandt, Ph.D., Lecturer in Political Science.
William Buchanan, Ph.D., Visiting Research Professor of Political Science.
Frederic N. Cleaveland, Ph.D., Visiting Professor of Political Science.
Hugh M. Clokie, Ph.D., Lecturer in Political Science.
James C. Davies, Ph.D., Visiting Associate Professor of Political Science.
Jay Doubleday, Ph.D., Lecturer in Political Science.
Milorad M. Drachkovitch, Ph.D., Visiting Associate Professor of Political Science.
Margaret Fisher, Ph.D., Lecturer in Political Science.
Walter Galenson, Ph.D., Professor of Industrial Relations and Lecturer in Political Science.
William H. Gardner, M.A., Lecturer in Political Science.
Boynton S. Kaiser, A.B., Lecturer in Political Science.
Leo Rosten, Ph.D., Visiting Research Professor of Governmental Affairs.
Leonard C. Rowe, Ph.D., Lecturer in Political Science.
Richard S. Wheeler, Ph.D., Lecturer in Political Science.

Letters and Science List.—All undergraduate courses in political science except course 183 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

The American Institutions Requirement.—This requirement may no longer be satisfied by completing an approved course, but must be met by passing an examination. See page 35 of the Circular of Information.

Departmental Major Advisers: Mr. Akin, Mr. Bellquist, Mr. Cox, Mr. Harris, Mr. Lipson, Mr. Macdonald, Mr. Mosher, Mr. Odegard, Mr. Seabury, Mr. Towster.

Preparation for the Major.—Students majoring in Political Science will be required to complete with at least a grade C average the following courses or their equivalents: Political Science 1 and 2, Economics 1A–1B, and one of the following History courses: 4A–4B, 17A–17B. Students whose major field of undergraduate concentration will be in Group VI (Parties, Pressure Groups, and Public Opinion) or Group VII (Public Administration and Public Policy), or who wish to take a graduate degree, will be required to take a course in statistics approved by their departmental adviser. (For Group VI, it is also recommended that students take Sociology and Social Institutions 106.) In addition, it is strongly recommended that those who major in Political Science study allied subjects in the social sciences, and to that end are advised to include in the program of their freshman and sophomore years some of the following lower division courses: Anthropology 2A–2B; Geography 5A–5B; History 8A–8B; Philosophy 6A–6B; Psychology 1A; Social Science 1A–1B; Sociology and Social Institutions 1, 2.

Major Programs
I. The major program consists of 30 units of Political Science, including Political Science 1 and 2. Beginning in September, 1958, students accepted

into the major will be required to complete satisfactorily Political Science 1, 2, and 110A, and to complete two of the following courses: 120A, 163, 181. The additional 15 units of upper division work will be distributed among courses in political science or related courses in the other social sciences as determined in consultation with a departmental adviser. Each student is expected to concentrate on a group by taking from 6 to 9 units in one of the following seven groups: I. American Government; II. Political Theory; III. International Relations; IV. Comparative Government; V. Public Law and Jurisprudence; VI. Public Opinion, Parties, and Pressure Groups; VII. Public Administration and Public Policy.

II. Students already enrolled as majors will be certified for graduation upon fulfillment of the requirements in effect at the time they were accepted into the major. These requirements are:

1. Completion of at least 24 units of upper division courses in the major, of which 18 units must be in political science. Six (6) upper division units taken in other departments may be accepted as a part of the major, provided they are related to the candidate's field of emphasis and have been approved by his departmental adviser.

2. Majors in the department will include in their programs, normally in the junior year, four courses, one each from any four groups in the following list, including the group emphasized:

   I. 101A, 102
   II. 110A, 118A, 118B
   III. 120A
   IV. 141A, 141B, 144A
   V. 150A, 157A, 157B
   VI. 162A, 163
   VII. 175, 181

3. Students who were accepted as majors under the plan in force until the year 1952-1953 will be permitted to continue with their programs as then approved. Students in political science must maintain a grade C average in the major.

   In the senior year, students who are on the honors list may pursue a systematic scheme of reading under the direction of some member of the department. The maximum credit for this course (199) will usually not exceed 4 units in any semester.

   Program in Public Administration.—Undergraduate students interested in government service with local, state, national, or international agencies are advised to consider the courses listed for the field of undergraduate concentration in Public Administration and Public Policy (Group VII).

   Qualified graduate students who wish to enter the public service may follow a program of studies leading to the M.A. degree under Plan II. Under this plan the department will arrange for an internship in a local, state, or federal agency. Candidates will take a comprehensive examination. For further information, see the Graduate Adviser.

   LOWER DIVISION COURSES

1. Introduction to Government. (3) I and II. Mr. Schaar, Mr. Odegard
   Two lectures and two section meetings per week.
   An introduction to the principles and problems of government, with particular emphasis on national government in the United States.

2. Introduction to Government (Comparative Government). (3) I and II. Mr. Drachkovitch, Mr. Lipson
   Two lectures and two section meetings per week.
   A comparative study of constitutional principles, governmental institutions, and political problems of selected national governments.
33A–33B. American Studies. (3–3) Yr. Mr. Schaar
Open to sophomores with the consent of the instructor. Limited to fifteen students. Not open to students taking English 33A–33B or History 33A–33B.

An honors course in the study of American culture. The class will study significant ideas and issues, drawing on material from history, literature, political science, philosophy, and other fields. The course will emphasize discussion and the writing of essays and will include occasional joint meetings with the staff and students of the two equivalent courses (English 33A–33B and History 33A–33B).

**Upper Division Courses**

Nonmajors who plan to take upper division courses in political science are strongly advised to take courses 1 and 2. Lacking these, students with satisfactory equivalents may be admitted to upper division courses other than those listed on page 13 only with consent of the instructor.

Courses which are given the same number followed by letters “A,” “B,” “C,” etc., may be taken independently unless otherwise indicated.

198A–198B. Honors Program. (3–3) Yr. Mr. Cox, Mr. Rogat, Mr. Seabury
A special program of study extending through the junior and senior years for political science majors who are on the honors list. Under some circumstances, students may be admitted to the program in the second semester of the junior year. Instruction by weekly seminar meetings and tutorials.

199. Special Study for Advanced Undergraduates. (1–4) I and II.
The Staff (Mr. Bellquist in charge)

**Group I—American Government**

(The following courses listed in other Groups may also be regarded as belonging to Group I to meet the requirements of concentration: 113, 128A, 128B, 157A, 157B, 158, 159, 175.)

100A. Government in the United States. (3) I. Mr. Doubleday
Not open to students who have taken course 1 or 151 (as formerly numbered).
A survey of the powers, structure, and operations of government at national, state, and local levels.

101A. Basic Factors in American Politics. (3) I. Mr. Rowe
The constitutional-legal background of American political action; historical, social, and ideological factors affecting American politics; the politics of economic interests and geographical areas; emergent political patterns in the two-party system.

102. State Government and Administration. (3) II.
Organization of state government; federal-state relations; elections and politics; the courts; county government; current administrative problems, such as state finance, the merit system, regulation of business, the state and labor, conservation of natural resources, health, welfare, correction.

103A. Municipal Government and Administration. (3) I. Mr. Macdonald
How cities are organized and what they are doing; municipal politics; relations of city and state; problems and activities of modern cities; traffic regulation, city and regional planning, zoning, police and fire protection, budget making; the war against crime.
104A. State and Local Government in California. (3) I. Mr. Lee
An examination of the constitution; legislative, administrative, judicial and electoral system of California; parties and interest groups; city and county government; California in national politics.

105A. The Legislative Process. (3) II. Mr. Doubleday
A study of the organization and functioning of the legislative bodies, with particular attention to Congress and state legislatures, functions; membership; committee system; executive-legislative relations; pressure groups; lobbying; movement for reform.

Group II—Political Theory

110A. Contemporary Issues and Political Theory. (3) I and II.
Mr. Burdick, Mr. Cox
Introductory inquiry into some of the main concepts of political philosophy and their relevance to modern society. Emphasis on such concepts as: nature and purpose of the political community; justice, freedom, equality, political obligation, power. Alternative solutions offered by communism, liberalism, utopianism.

111A. Principles of Political Theory. (3) I. Mr. Wolin
An analytical approach to problems of citizenship and authority from the standpoint of the individual, the group, and the state.

113. American Political Theory. (3) I. Mr. Jacobson
Basic problems of political theory as viewed within the context of American history and institutions.

*115A. Development of Political Thought in Asia. (3) II. Mr. Scalapino
Analysis of the political thought of South and Southeast Asia and the Far East, with particular attention to China, Japan, and India; a historical survey of traditional and modern thought in Asia, leading to a discussion of contemporary issues. Emphasis: the Western impact, nationalist movements, current ideological trends.

116A. Soviet Political Theory. (3) I. Mr. Towster

118A–118B. History of Political Theory. (3–3) Yr. Mr. Wolin
Major political theories from the Greeks to the modern period
118A: Classical and Medieval theories; Machiavelli and the beginnings of modern political theory.
118B: Political thought during the Reformation; the emergence of liberalism, conservatism, and revolutionary theories.

Group III—International Relations

120A–*120B. Elements of International Relations. (3–3) Yr.
120A: The International Society. I and II. Mr. Cox, Mr. Seabury
Analysis of ideological, legal, military, and economic factors creating harmony and hostility among nations. Development of international institutions reflecting and molding such factors. Not open to students who have had course 123 or 124.
*120B: National Foreign Policies. II. Mr. Seabury
Factors—political, economic, cultural, and geographic—shaping the foreign policies of nation-states, with emphasis on the Great Powers.

* Not to be given, 1959–1960.
121. International Organization. (3) II.  Mr. Haas
(Formerly numbered 124.)
Conditioning factors; development of nineteenth-century unions and commissions; survey and evaluation of the experience of the League of Nations and the United Nations, especially with respect to security and peaceful change; specialized agencies.

122A-122B. Principles of International Law. (3-3) Yr.
(Formerly numbered 133A-133B.)
122A: Nature and sources of international law; international legal personality; nationality; territory; jurisdiction.
122B: Diplomatic and consular agents; treaties and executive agreements; pacific settlement; war; neutrality.

128A. Concepts in American Foreign Policy. (3) I.  Mr. Seabury
Analysis of competing concepts of the American “national interest” operative since World War I: Wilsonianism, isolationism, the Open Door, the Monroe Doctrine, and the Good Neighbor Policy; continentalism; national security, containment and liberation; their relation to substantive policies, and the character of American democracy.

128B. The Conduct of American Foreign Relations. (3) II.  Mr. Bellquist
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.

131A. Soviet Foreign Policy. (3) II.  Mr. Towster

134. The American Role in the Far East. (3) I.  Mr. Scalapino
(Formerly numbered 138F.)
A survey of the role which the United States has played in the Far East through the examination of such topics as America’s role in Asiatic Westernization, United States–Far Eastern foreign policy. Oriental attitudes toward America. Evaluation of present-day problems.

135. South Asia in World Affairs. (3) I.  Mr. Wheeler
(Formerly numbered 138C.)
Politics of the South Asian countries in relation to each other and to other countries in Asia; as members of the Commonwealth, and of the United Nations. Their relations with the United States and with other powers.

*136A. Latin America in World Affairs (3) II.  Mr. Macdonald
Relations of Latin America with the United States and other world powers. Pan-Americanism and its relation to world organization. The future of Latin America in the community of nations.

137A-137B. International Relations in the Middle East. (3-3) Yr.
137A: National Policies.  Mr. Lenczowski
Policies and diplomacy of eleven independent states in the Middle East. Emphasis is laid on the interrelation of foreign and domestic policies.

* Not to be given, 1959–1960.
137B: Regional Problems.
The Middle East in world strategy; policies of major powers; suprana­tional political movements; regional security arrangements; role of inter­national agencies.

138A–138B. International Relations in the Far East. (3–3) Yr. Mr. Mah
(Formerly numbered 138 and 136.)
138A: A general survey to provide an essential background for the under­standing of contemporary political events and developments in the area.
138B: An analysis of political issues of world significance and ramifications posed by the competition and conflict of interests of the powers in the area.

139A. International Relations of Western Europe and the Atlantic Region.
(3) I. Mr. Haas
Analysis of the foreign policy aims of significant Western European groups and parties, and their impact on the emergence of a United Europe. Influence of American and Soviet policy on European events and the integration of the Atlantic Area.

Group IV—Comparative Government

141A–141B. Government in the Soviet Union. (3–3) Yr. Mr. Towster
Demographic, historical, and ideological bases of Soviet rule. The social and governmental structure. Nationalities and federalism. The Party, Trade unions and cooperatives. The church; army; courts, prosecutors and organs of police. Statics and dynamics of power in the U. S. S. R.

141C. Government and Politics of Eastern Europe. (3) I and II.
(Formerly numbered 130.) Mr. Drachkovitch
The origins and nature of the present social and ethnic structures, governmental systems, and international position of the East European satellites. Primary emphasis upon the political evolution and status of the Soviet satellites.

142A–142B. Government and Politics in the Middle East. (3–3) Yr.
Mr. Lenczowski
142A: A study of political institutions, traditions, and mores of the peoples of the Middle East in their geographical and cultural setting.
142B: (Formerly numbered 142F.) Evolution and revolution in the Middle East: transformation of the traditional Moslem state into a modern state; impact of foreign ideologies on political institutions; current trends in Islam; reformist and revolutionary experiments.

143A–143B. Government and Politics in East Asia. (3–3) Yr.
Mr. Scalapino
This course will present an integral study of the political institutions and ideas of the major East Asian societies. It will also emphasize the cultural context in which modern political institutions have developed.
The first semester will deal with the political societies of Northeast Asia, and the second semester, with Southeast Asia.

144A–144B. Government in Great Britain and the British Commonwealth.
(3–3) Yr. Mr. Lipson, Mr. Clokie
144A. II: A study of the democratic process in Britain, as it operates through party politics and the machinery of government; the nature of the cabinet system; the functions undertaken by the state; and the gradualist blending of tradition and change.
144B. II: The evolution of the British Commonwealth and changing status of its members; the internal politics of Australia, Canada, South Africa, and New Zealand: their similarities and differences.
(Formerly numbered 142B and 142C.)  
Mr. Wheeler  
145A: The development of political ideas and institutions in India and Pakistan, with some attention to Ceylon and Nepal. Emphasis will be given to traditional political thought, the growth of nationalism, and to selected problems.  
145B: Recent political development in India, Pakistan, Ceylon, and Nepal. Constitutional development, political parties, legislation, administration, economic planning.  

146A-146B. Political Institutions in Africa South of the Sahara. (3–3) Yr.  
(Formerly numbered 142D–142E.)  
Mr. Rosberg  
146A: Survey and analysis of indigenous African political institutions and of the problems of the Africans in tribes, villages, towns, and cities. European influence on African ways of life examined.  
146B: British statecraft in Africa: nation-building, economic development, social progress, Dominion-colony relations, and international questions. Comparison with French, Portuguese, and South African colonial statecraft.  

147A*—147B. Government and Politics in Western Europe. (3–3) Yr.  
Mr. Seabury,  

*147A: Germany and Italy. An analysis of the evolution and contemporary nature of German and Italian political institutions, with special emphasis on conditions of constitutional stability, parliamentary responsibility, and party systems.  
147B: France and Switzerland. A comparative treatment of the politics of two western communities; the problem of attaining national unity through uniformity or diversity, through a unitary or federal state; the nature of party groupings; the problem of achieving a stable constitutional regime.  

148. Governments of Latin America. (3) I.  
Mr. Macdonald  
Latin-American parties and politics; governmental activities and problems; the structure of government. Emphasis is placed on political realities rather than formal constitutional provisions.  

Group V—Public Law and Jurisprudence  

*150A. The Foundations of Legal Institutions. (2) I.  
Mr. Rogat  
The development and agencies of legal growth since primitive times and the interrelations between law and government. The early legal institutions of Europe and their influence on the modern juridical systems.  

150B. Elements of Jurisprudence. (3) I.  
Mr. Rogat  
Fundamental legal principles, especially from the analytical, historical, philosophical, and sociological points of view. Particular attention will be given to modern theories of the function of law.  

*151A–151B. Legal Order of a Communist State. (3–2) Yr.  

* Not to be given, 1959–1960.
156. Administrative Law. (3) II. Mr. Rogat
A study of the position of the executive branch of government in the American constitutional system, of the foundation of administrative power, of the area of judicial supervision of administration, and of the liability of public offices and of the state based on misuse of administrative power.

157A–157B. Constitutional Law of the United States. (3–3) Yr. Mr. Aikin
An examination of the structure of public power in American national, state, and local government.
157A: The federal system: expansion of national authority; interstate barriers; separation of powers; admission of states to the Union; interstate compacts; constitutional amendments; treaties.
157B: Rights of individuals; citizenship; suffrage; education; civil liberty; rights of accused; rights in war; slavery.

*158. Government and Business. (3) I. Mr. Aikin
A study of the basis of national and state control of industry and agriculture, and the extent to which government may control competition, maintain prices, protect home industries, prevent waste, establish quality standards, regulate conditions of labor, etc.

*159. American Judicial Administration. (3) I.
The organization and operation of American courts. Problems of jurisdiction, staffing, civil and criminal procedure.

Group VI—Parties/Pressure Groups, and Public Opinion

160A–160B. Pressure Groups and Political Power. (3–3) Yr. Mr. Schaar
An examination of the internal government and politics of the private association. Materials will be drawn from trade unions, the church, agricultural, business, professional, and other organizations. Special attention will be paid to the concepts of majoritarianism, constitutionalism, oligarchy, and constituency.

160B: Private Power and Public Policy.
The nature and sources, strategy and tactics of group power within the context of the American institutional setting. Business, agriculture, labor, religion, the professions as organized power. Ramifications for a democratic society.

161A–161B. Political Behavior. (3–3) Yr. Mr. Davies
The individual and group determinants of political belief and action. Political institutions considered in relation to individual values and behavior.

162A. Public Opinion. (3) I. Mr. Bellquist
An analysis of the nature of public opinion and propaganda in modern society. Major attention given to basic principles of communication and group behavior, with emphasis on their political implications at home and abroad.

163. Political Parties. (3) I and II. Mr. Odegard, Mr. Belknap
Nature and functions of political parties; their origin, development, structure, economic and social composition, internal management and control; relation of parties and pressure groups to legislation and administration; analysis of pressure politics as distinguished from party politics.

* Not to be given, 1959–1960.
164A–164B. Problems in Analysis of Political Behavior. (3–3) Yr.  Mr. Belknap
Analyses of voting behavior and other manifestations of public participation in politics. The conceptual tools and the techniques of research used in political studies. Problems in design and execution of research projects including instruction in the use of punched-card equipment.

*165. Soviet Propaganda. (3) II.  Mr. Towster
A critical analysis of the content and role of Soviet propaganda. Government control of the press, radio, and other media of communication. The nature of public opinion in the U.S.S.R. The main themes and stereotypes of internal and external propaganda.

Group VII—Public Administration and Public Policy

175. National Administration of the United States. (3) II. Mr. Cleaveland
Not open to students who have completed formerly given course 176.
The processes of policy formulation and administrative management in relation to economic, resource, welfare, strategic, and other governmental affairs, emphasizing long-range and current trends in the national administration of the United States.

*180. Administrative Theory: Bureaucracy and Democracy. (3) II.  Mr. Waldo
The nature and role of public administration in modern society; the executive and its relations with other organs of government at all levels; problems of organization, management, communication, stimulus and control; citizen participation. The treatment will be comparative.

181. Elements of Public Administration. (3) I and II.  Mr. Harris, Mr. Mosher
The role of public administration in modern society; principles of organization, budgeting, management techniques, the public service, and the control of administration.

183. Public Personnel Administration. (3) II.  Mr. Harris
A survey of public personnel administration, including the history of civil service, the personnel agency, classification, recruitment, examination techniques, promotion, service ratings, training, discipline, employee organizations, and retirement.

185A. Public Policy and Administration of Natural Resources. (3) I  Mr. Cleaveland
Programs and policies for the conservation, development, and administration of natural resources.

185B. Economic and Social Planning and Development. (3) II.  Mr. Blaisdell
An analysis of governmental agencies which conduct research and disseminate information concerning our physical, economic, and human resources, and stimulate, regulate, or control their use through orderly program of national, regional, local, and international development directed toward optimum utilization and social stability in peace and mobilization for defense.

186. Government Organization and Management. (3) I.  Mr. Mosher
An analytical examination through case studies of public administration organization, and the techniques and processes of public management; the growth and significance of the management movement; the organization of administrative authority; the relation of organization to operational processes.

* Not to be given, 1959–1960.
GRADUATE INSTRUCTION

Admission to graduate courses or seminars is at the discretion of the instructor. Admission to graduate work is limited to graduate students who have adequate undergraduate course preparation to participate in and benefit from such work.

Properly qualified undergraduates may be admitted to graduate courses or seminars with special permission of the instructor.

Unless otherwise stated, the first half (A) of any course or seminar is not prerequisite to the second half (B).

201. Concepts of Political Philosophy. (3) II. Mr. Burdick
A review of philosophical method as it bears on the study of politics. Scientific method in the social sciences, nature of proof, value systems will be studied.

202A-*202B. Comparative Politics. (3-3) Yr. Mr. Lipson, Mr. Clokie
202A. II: The Comparative Study of Government. (Formerly numbered 243.)
An inquiry at an advanced level into the comparative study of politics and institutions, with emphasis upon the economic, geographic, cultural, and historical context within which the state operates.
*202B. II: Comparative Party Systems. (Formerly numbered 226.)
The origin of political parties, with special reference to Britain; significance of party for constitutional and democratic government; experience with single-party dictatorship and coalitions; the peculiarities of the two-party system, past and present; trends in political thought about party government.

*203A. International Relations. (3) II. Mr. Seabury
The bases of international relations in conflicting ideologies and philosophies. Special problems; imperialism, demogogy, economic relations, regionalism, military, and geographic factors.

204A—204B. Public Administration. (3-3) Yr. Mr. Harris, Mr. Mosher
An advanced study of the theory and practice of public administration.

209A—209B. European Political Thought in the Nineteenth Century. (3-3) Yr. Mr. Wolin
An examination of the principal themes of political thought in England and on the Continent from the French Revolution to World War I. Special emphasis will be placed on the development of modern conservative thought.

210. Recent Indian Political Thought. (3) II. Miss Bondurant
A study of contemporary trends in Indian political thought, with reference to traditional and European influences, and to the contributions of Indian leaders. Attention will be given to nationalism, Marxist theory, Hindu polity, indigenous “socialism,” liberal and humanist elements.

215A—215B. Government and Politics in China. (3-3) Yr. Mr. Mah
215A: China as a nation in the Oriental world; impact of the Occident and its repercussions; internal and external aspects of the struggle for the creation of a modern democratic state; China in world politics.
215B: China from Monarchy to Republic. China’s republican experiment, its problems, failures, and successes. China’s internal politics and external relations under Communist rule.

*216. Government and Politics in Japan. (3) II. Mr. Scalapino
How Japan is governed, with consideration of major changes in her basic political structure and policies under Allied military occupation.

* Not to be given, 1959–1960.
218. Government and Politics of the Northern European Countries. (3) II. Mr. Bellquist
Constitutionalism and parliamentarianism in the countries of Northern Europe—Denmark, Finland, Iceland, Norway, and Sweden. Their constitutional history and present governmental systems. Social legislation in Scandinavia; foreign policies; inter-Scandinavian cooperation.

220. Theories of International Relations. (3) II. Mr. Cox
Historical development and present range of political thought on relations between nations; origins and implications of the idea of sovereignty; the theory of an international community; theories of imperialism; Christian, Communist, and Fascist ideas; geopolitical theories.

221. Nationalism and Imperialism. (3) II. Mr. Haas, Mr. Pauker
The growth of national consciousness in selected European countries. Ideological content of various national belief systems and their development into imperialism. Colonial rule and the growth of new nationalisms as the older doctrines diminish in intensity.

228. National Security and Foreign Policy. (3) I. Mr. Blaisdell
Development of strategic concepts; utilization of manpower resources; impact of major weapons, i.e., tank, battleship, airplane, electronic and nuclear weapons; economic potential in relation to national power; international trade and autarchy; place of propaganda and diplomacy.

229. International Relations of the Southeast Asian Region. (3) I. Mr. Pauker
A study of the regional and international relations of the Southeast Asian societies; emphasis will be placed on twentieth-century developments with such topics as neutralism, policy toward other Asian communities, and relations with the United States receiving special attention.

235A–235B. Municipal Administration. (3–3) Yr. Mr. Gardner, Mr. Lee
Techniques of municipal administration, with emphasis on the function, tools, and skills of management. Consideration of factors influencing the administrative process. Synthesis of theory and practice.

GRADUATE SEMINARS

240A–240B. Comparative Government. (2–2) Yr. Mr. Bellquist

240C. Research in Comparative Government. (2) II. Mr. Drachkovitch


242A–242B. Major Problems of the Middle East. (2–2) Yr. Mr. Lenczowski
A study of selected problems in politics, international relations, political theory and institutions of Moslem and non-Moslem states in the area.

243A–243B. Contemporary Problems of Far Eastern Politics. (2–2) Yr. Mr. Scalapino
A study of basic social, economic, and cultural problems of the contemporary Far East area.

243C–243D. Political Problems of Southeast Asia. (2–2) Yr. Mr. Pauker
An advanced study of special socio-political problems of the key Southeast Asia countries, with emphasis upon the institutional structures, ideological patterns, and shifting socio-economic conditions of these societies.

* Not to be given, 1959–1960.
245A–245B. Problems of South Asia. (2–2) Yr.  
Miss Bondurant, Mr. Wheeler

245A. Problems of methodology, value, and interpretation in the study of government and politics in India. Research on selected topics.  
245B. A study of Indian Islam and the background to the founding of Pakistan; the government and politics of Pakistan. Research on selected topics.

246. African Political Institutions. (2) I and II.  
Mr. Rosberg

248A-*248B. Governments and International Relations of Latin America. (2–2) Yr.  
Mr. Macdonald

*250. Bibliography and Research Methods. (2) I.  
Governmental research as a focal point in the formulation of public policy and the utilization of existing information through the various social science disciplines.

251. Research in American Government. (2) II.  
Mr. Odegard

252. Legislative Process. (2) II.  
Mr. Buchanan

A comparative study of selected problems of the legislative process in Congress, American state legislatures, and abroad.

253A–253B. Public Opinion. (2–2) Yr.  
Mr. Davies

Advanced problems in political behavior research. Construction and evaluation of research designs in voting studies and other areas of political behavior. Study of specialized problems of research methodology and technique including instruction in the use of punched-card equipment.

*Labor Politics in Industrial Societies. (Business Administration 254.) (2) II.  
Mr. Lipson, Mr. Galenson

This course given in the Department of Business Administration.

256. Jurisprudence. (3) I and II.  
Mr. Rogat

The emphasis will be mainly on the analysis of legal concepts such as rights, duties, and other fundamental legal conceptions, personality, ownership, possession, and the various types of obligation.

257A–257B. Constitutional and Administrative Law. (2–2) Yr.  
Mr. Aikin

Fundamental principles of constitutional law; leading cases; judicial decisions affecting the liabilities, rights, duties, and procedures of governmental officers and agencies.

258. Private Power and Public Policy. (2) I.  
Mr. Schaar

Research into the nature and sources, strategy and tactics of group power in the United States. Economic, religious, and professional associations as organized power and its relationship to public policy.

259A-*259B. American Politics. (2–2) Yr.  
Mr. Odegard

260. International Relations. (2) II.  
Mr. Seabury

Research seminar on selected topics, with emphasis chiefly upon contemporary approaches to the study of international relations.

261. International Organization. (2) II.  
Mr. Haas

Analytical studies of the ideologies and attitudes of political parties, pressure groups, and elites with respect to the evolution of a consensus toward organization above the state level. The impact of organization on consensus is considered. Emphasis is placed on regional rather than universal trends.

* Not to be given, 1959–1960.
262A–262B. Seminar in International Law. (2–2) Yr.
262A: Development of modern international law and international tribunals; United States contributions; theories of nature and sanctions of international law, its relation to the state.

263A–263B. American Foreign Policy. (2–2) Yr. Mr. Blaisdell
American military, economic, social, and political policies toward various parts of the world. Normally, North Atlantic and South American countries are considered during the first semester and Asian and African countries during the second semester.

264A–264B. International Relations of the Far East and Pacific Area. (2–2) Yr. Mr. Mah

*265A–265B. Dependent Peoples and Trusteeships. (2–2) Yr. Mr. Haas, Mr. Clokie
Colonial societies, their political, economic, and social problems, and their relationship to international organization. Comparisons between colonial administration with and without international supervision. The future status of dependent areas.

*270A–270B. Federal Administration. (2–2) Yr.
Special studies in problems of federal administration.

*270C. Federal and Intergovernmental Administration. (2) I. Mr. Jones
Seminar in American federalism and intergovernmental relations, including fiscal relations, administrative relations in field offices, and relations in the course of legislative or executive decision-making, and of quasi-governmentally sponsored inquiries.

*271. Comparative National Administration. (2) II. Mr. Mosher
Comparative studies of national administration in relation to constitutional structures, economic systems, historical traditions, and cultural patterns.

*272. State Administration. (2) I. Mr. Jones

273. Public Personnel Administration. (2) II. Mr. Kaiser, Mr. Mosher
Techniques and problems in the field of public personnel administration, with special reference to federal, state, and local agencies.

274. Financial Administration and Budgeting. (2) I. Mr. Mosher
Role of the budget system in the determination of public policy, in administrative planning and management, in control of government operations, in intergovernmental relation, and in relation to the private economy. Emphasis upon the administrative aspects of budgeting.

*275. Social Security Administration. (2) II.
Unemployment, disability, old-age and survivors insurance, workmen’s compensation, public assistance. Coordination of interrelated programs; administrative relations at three levels of government; interest group representation; jurisdictional disputes; intergovernmental relations; influence of administrative structure and procedure upon policy; comparative administrative evolution.

* Not to be given, 1959–1960.
280A–280B. Administrative Theory. (2–2) Yr.  
Mr. Waldo

*282. Governmental Problems of Metropolitan Areas. (2) II.  
(Formerly numbered 263.)  
A consideration of the governmental, economic, social and physical organization of metropolitan areas, with special attention to the San Francisco Bay region; and an evaluation of their governmental structure and problems, and techniques used to solve or lessen area-wide difficulties.

285A–285B. Regional Planning and Resources Management. (2–2) Yr.  
Mr. Cleaveland

*286. Public Enterprise: Its Forms, Methods, and Directions. (2) II.  

290A–*290B. Scope and Method of Political Science. (2–2) Yr.  
Mr. Jacobson

290A. Science as an ideology: the contributions of philosophies and theories, methods, and results in the natural and social sciences to a science of politics.  
290B. Individual research in selected topics in scope and methods.

*291. American Political Theory. (2) II.  
Basic problems of political theory will be examined within the context of American political development.

*292A–292B. European Political Theory. (2–2) Yr.  
292A: Examination of the elements of socialist thought; theories of “mass society”; rise of modern totalitarian thought.  
292B: Study of emergent political thought; relevant aspects of psychoanalysis, the political novel, sociology; the theory of totalitarianism.

293. Problems in Political Theory: Politics and Ethics. (2) I.  Mr. Cox  
Critical examination of basic value patterns in the Western political tradition, preliminary to contemporary interpretations of power and morals. Ethical relativity and “neutrality,” means and ends, and obligations and rights will be explored in relation to the valuational base of contemporary democracy.

400A–400B. Field Work in the Legislative Process. (4–4) Yr.  
Mr. Harris, Mr. Doubleday

Prerequisite: enrollment limited to persons appointed as Legislative Interns.  
Supervised full-time research and other work with the California Legislature. Course includes a seminar on the legislative process, under the direction of faculty supervisor.

COURSES COMMON TO ALL GROUPS

298. Individual Study. (1–4) I and II.  
The Staff (Mr. Burdick and Mr. Pauker in charge)

RELATED COURSES IN OTHER DEPARTMENTS

Introduction to Social Science. (Social Science 1A–1B).  
Freedom of Speech. (Speech 123).

* Not to be given, 1959–1960.
BUREAU OF PUBLIC ADMINISTRATION

The Bureau of Public Administration, located in the library, maintains library and research facilities for study in the field of public affairs. The library contains an extensive collection of documents, periodicals, and pamphlets which are indexed in a detailed subject catalog, facilitating the use of the collection for advanced study and research.

A staff of public administration analysts who are specialists in political science, public administration, economics, planning, legal studies, and bibliography conduct a research program and provide informational services for public officials and civic organizations. State commissions, legislative committees, municipal offices, and many other public and private organizations call upon the bureau for assistance.

The California Public Survey, a monthly digest of public developments throughout the United States, is issued by the bureau and distributed free upon request.

The bureau also serves as headquarters for two organizations active in research and public administration: (1) the San Francisco Bay Area Chapter of the American Society for Public Administration, and (2) the Western Governmental Research Association, a regional clearinghouse for public affairs research in the eleven western states. The Western Governmental Research Association publishes a monthly checklist of administrative and governmental research positions available in the western states.

For further information concerning the activities of the Bureau of Public Administration, write to the Director, 346 Library.

POULTRY HUSBANDRY

(Department Office, 100 Poultry Husbandry Laboratory)

Samuel Lepkovsky, Ph.D., Professor of Poultry Husbandry.
I. Michael Lerner, Ph.D., Professor of Poultry Husbandry and Genetics.
George F. Stewart, Ph.D., Professor of Poultry Husbandry (Chairman of the Department), Davis.
Lewis W. Taylor, Ph.D., Professor of Poultry Husbandry.

The Major.—For details, see the animal science curriculum, College of Agriculture on page 79, of the CIRCULAR OF INFORMATION.

Major Adviser: Mr. Taylor.

UPPER DIVISION COURSES

*102. Experimental Incubation. (3) II. Mr. Taylor
Lectures and laboratory. Prerequisite: Zoology 100 or the equivalent, Chemistry 8.
Problems of embryonic development, causes of embryonic mortality in poultry, and principles of artificial incubation.

*198. Directed Group Study. (1-2) II. Mr. Taylor
Prerequisite: senior standing and consent of the instructor.
Group study of methods employed in poultry production and management.

* Not to be given, 1959-1960.
199. Special Study for Advanced Undergraduates. (1-5) I and II.

The Staff (Mr. Taylor in charge)

Prerequisite: course 1§, courses basic to the problems elected, and consent of the instructor.

Problems may be elected relating to the nutrition, breeding, incubation, physiology, or egg and meat quality of chickens.

Graduate Course

(Concerning conditions for admission to graduate courses, see page 18)

200A–200B. Research in Poultry Husbandry. (1–6; 1–6) Yr.

Mr. Lepkovsky, Mr. Lerner, Mr. Taylor

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PSYCHOLOGY

(Department Office, 1023 Life Sciences Building)

Frank A. Beach, Jr., Ph.D., Professor of Psychology.
Clarence W. Brown, Ph.D., Professor of Psychology.
Richard S. Crutchfield, Ph.D., Professor of Psychology.
Edwin E. Ghiselli, Ph.D., Professor of Psychology.
Mason Haire, Ph.D., Professor of Psychology.
Harold E. Jones, Ph.D., Professor of Psychology.
David Krech, Ph.D., Professor of Psychology.
Jean Walker Macfarlane, Ph.D., Professor of Psychology.
Donald W. MacKinnon, Ph.D., Professor of Psychology.
Leo J. Postman, Ph.D., Professor of Psychology (Chairman of the Department).

R. Nevitt Sanford, Ph.D., Professor of Psychology.
Theodore R. Sarbin, Ph.D., Professor of Psychology.
M. Brewster Smith, Ph.D., Professor of Psychology.
Read D. Tuddenham, Ph.D., Professor of Psychology.
Robert Choate Tyrion, Ph.D., Professor of Psychology.
Olga L. Bridgman, M.D., Ph.D., Sc.D., Professor of Psychology, Emeritus.
Edward C. Tolman, Ph.D., Sc.D., LL.D., Professor of Psychology, Emeritus.

Egerton L. Ballachey, Ph.D., Associate Professor of Psychology.
Jack Block, Ph.D., Associate Professor of Psychology.
Harrison G. Gough, Ph.D., Associate Professor of Psychology.
Rheem F. Jarrett, Ph.D., Associate Professor of Psychology.
Richard S. Lazarus, Ph.D., Associate Professor of Psychology.
Paul H. Mussen, Ph.D., Associate Professor of Psychology.
Donald A. Riley, Ph.D., Associate Professor of Psychology.
Benbow F. Ritchie, Ph.D., Associate Professor of Psychology.

Mark R. Rosenzweig, Ph.D., Associate Professor of Psychology (Vice-Chairman of the Department).

Alex C. Sherriffs, Ph.D., Associate Professor of Psychology.
Tom N. Cornsweet, Ph.D., Assistant Professor of Psychology.
Gilbert M. French, Ph.D., Assistant Professor of Psychology.
Gerald E. McClearn, Ph.D., Assistant Professor of Psychology.
John P. McKee, Ph.D., Assistant Professor of Psychology.

Lyman W. Porter, Ph.D., Assistant Professor of Psychology.

§ Poultry Husbandry 1 is offered only on the Davis campus. See the Bulletin of the College of Agriculture, also known as the Prospectus of the College of Agriculture.

1 In residence fall semester only, 1959–1960.
2 In residence spring semester only, 1959–1960.
Psychology

David A. Rodgers, Ph.D., Assistant Professor of Psychology.
Joseph C. Speisman, Ph.D., Assistant Professor of Psychology.

Edward N. Barnhart, Ph.D., Lecturer in Psychology and Associate Professor of Speech.
Vaughn J. Crandall, Ph.D., Visiting Associate Professor of Psychology.
David A. Grant, Ph.D., Visiting Professor of Psychology.
Robert E. Harris, Ph.D., Lecturer in Psychology and Professor of Medical Psychology.
Marjorie P. Honzik, Ph.D., Lecturer in Psychology.
Albert Kostlan, Ph.D., Visiting Associate Professor of Psychology.
Catherine Landreth, Ph.D., Lecturer in Psychology and Professor of Home Economics.
Philburn Ratoosh, Ph.D., Visiting Associate Professor of Psychology and Business Administration.

Letters and Science List.—All undergraduate courses in this department except 3, 104, 114, 116, 117, 180, 185, and 186 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Ballachey, Mr. Block, Mr. Brown, Mr. French, Mr. Haire, Mr. Rodgers, Mr. Tryon, Mr. Tuddenham.

The major program is designed to provide the student with a survey of the principles and findings of the various areas of psychology and to introduce him to its methods of controlled observation and measurement of behavior. Completion of the major does not prepare the student for professional work in psychology.

Preparation for the Major.—Required: courses 1A, 1B, 5, Physiology 1, 1L, and Zoology 10. (Zoology 1A-1B may be substituted for Physiology 1, 1L, and Zoology 10.) Second-year high school algebra or Mathematics D is prerequisite to course 5. Courses 1A, 1B, 5, Physiology 1 and 1L are not open to entering freshmen. The required courses should be completed before the beginning of the junior year and must be completed before the beginning of the senior year. Lower division work in English composition, mathematics, and statistics is especially recommended in preparation for the major. If the student anticipates proposing certain upper division courses from other departments as part of his major program (see The Major, below), he should attempt to complete the prerequisites to such courses.

The Major.—The major consists of not less than 24 units of upper division courses to include the following: (1) 100A–100B, an advanced survey of general psychology, to be taken when possible in the junior year; (2) 6 units in one area of concentration (see below) and 3 units in each of two other areas of concentration; (3) at least two courses in which controlled observation or the analysis of the actual results of such observations comprise the principal activity (see below); (4) at least 3 units in an upper division course that stresses the measurement methods of psychology (see below). Courses selected to satisfy requirements (3) or (4) may also be used to satisfy requirement (2). Except for the completion of the requirements listed above, substitutions up to 6 of the 24 units may be made, with the approval of the undergraduate adviser, from upper division courses in anthropology, education, genetics, mathematics, philosophy, physiology, speech, sociology and social institutions, or other related departments. In requesting approval for such substitutions, the student must clearly establish the relationship of the substituted courses to his major program.

Requirement (2): Required Courses in Areas of Concentration.
Animal Psychology: courses 150A, and 150B* or 151*
Abnormal Psychology: courses 160, 168
Clinical Psychology: courses 162, and 165A* or 165B*
Developmental Psychology: courses 112 and 113 or 114*
Differential Psychology: courses 146A, and 146B or 165A* or 165B* or 140*
Experimental Psychology: courses 106A*, and 130 or 131
Industrial Psychology: courses 185, and 187 or 188*
Personality: courses 148A, and 148B or 136 or 141, or 140*
Physiological Psychology: courses 108A*-108B*
Social Psychology: courses 145, and 142A* or 142B*

List of courses satisfying requirement (3) are: any of the courses above followed by an asterisk and 115, 117.

List of courses satisfying requirement (4): 104, 107, 146B, 186.
The department will certify to the completion of the major program for graduation only on the basis of at least a C average in the upper division courses included in the major. Students who do not maintain such an average may be required at any time to withdraw from the major in psychology.

Honor Students.—Honors are granted on the basis of the whole record of the student. It is recommended that honor students majoring in psychology enroll in course 199 in their senior year

LOWER DIVISION COURSES

1A. General Psychology. (3) I and II. Mr. Tryon, Mr. Krech
Three lectures and one section meeting per week. Not open to entering freshmen.

1B. General Psychology. (3) I and II. Mr. Brown
Two lectures and one three-hour laboratory per week. Prerequisite: course 1A.
A continuation of course 1A with a detailed treatment of the application of the scientific method in the study of behavior. Basic assumptions, limitations, and advantages of the method of experiment. Intended primarily for prospective major students.

†3. Introduction to Applied Psychology. (3) I.
Prerequisite: sophomore standing.
A survey of psychological problems occurring in the setting of daily life, particularly vocational choice; personal adjustment and efficiency; employee selection, training, motivation, and labor relations; advertising, selling, and market research; public opinion measurement; safety; mental hygiene; law; and medicine.

5. Introduction to Psychological Measurements. (3) I and II. Mr. Brown, Mr. Rodgers
Three lectures and one section meeting per week. Prerequisite: second-year high school algebra or Mathematics D, and course 1A (may be taken concurrently). Open only to students whose major subject is psychology. Not open to students who are taking, or have taken, another course in statistics.
Arrays of experimental measurements, central tendencies, variability, correlation, significance of measures; elementary reliability and validity of tests.

33. Personal and Social Adjustment. (3) I and II. Mr. Sherriffs
Three lectures and one section meeting per week. Prerequisite: course 1A.
A continuation of course 1A intended primarily for students who will not major in psychology.
The dynamics of normal personality development. Family relationships, social adjustment, and factors modifying self-evaluation are emphasized.

† Not to be given, 1959–1960.
Psychology

**Upper Division Courses**

Unless otherwise stated, courses 1A, 1B, and junior standing are prerequisite to all upper division courses.

**100A-100B. Survey of General Psychology.** (3-3) Yr.

Mr. Postman (in charge, fall semester), Mr. Ritchie! (in charge, spring semester), Mr. Cornsweet, Mr. French, Mr. Jarrett, Mr. Grant

Two lectures and one two-hour laboratory section per week. Prerequisite: courses 1A, 1B, 5.

A comprehensive survey of the fundamentals of general psychology at an advanced level. Consideration of the facts and principles of behavior which form a common basis for the various special fields of psychology.

**H101. Honors Seminar.** (3) I and II. Mr. Krech, Mr. Brown

Restricted to students who are (1) either honors students in psychology or have a similar status in some other University department, and who, in addition, (2) have been accepted by the course instructor.

An honors seminar devoted to the theoretical and experimental analysis of problems arising in current studies of perception, motivation, learning, and problem-solving.

**H102. Honors Seminar.** (3) I and II. Mr. Crutchfield, Mr. Block

Restricted to students who are (1) either honors students in psychology or have a similar status in some other University department, and who, in addition, (2) have been accepted by the course instructor.

An honors seminar devoted to the theoretical and experimental analysis of problems arising in current studies of mental abilities, mental development, personality, social attitudes, group behavior, and mental disorders.

**104. The Psychological Test.** (3) II.

Lectures and laboratory. Prerequisite: courses 1A, 1B, 5.

Psychological and logical aspects of measurements of behavior domains; concepts of behavior sampling and representativeness of the domains of proficiency, aptitude, and conceptualized abilities; theory of attitude measurement; theory underlying measurement by units and item sampling; psychological interpretation of measured performance.

**105. Psychology of Speech and Communication.** (3) II.

Prerequisite: courses 1A, 1B, 5.

A broad examination of research and theories of communication including the physical nature of speech sounds, psychophysics of perception, physiological mechanisms of speech and audition, communication, development of speech in children, and individual differences in speech.

**106A. Experimental Psychology.** (3) I. Mr. Riley

Lectures and laboratory. Prerequisite: courses 1A, 1B, and 5 or an equivalent course in statistics.

A survey with performance of typical experiments on reaction tendencies, perception, learning, and problem-solving. Emphasis on methods of experimentation.

**107. Advanced Statistical Methods in Psychology.** (3) I. Mr. Jarrett

Lectures and laboratory. Prerequisite: course 5 or an equivalent course in statistics.

The nature of the probabilistic considerations involved in the interpretation of psychological data derived from controlled observation; large-sample

* Not to be given, 1959–1960.
and small-sample sampling theory frequently employed in psychological research; analysis of variance and linear regression problems in experimental psychology.

108A–108B. Physiological Psychology. (3–3) Yr. Mr. Rosenzweig
Lectures and laboratory. Prerequisite: courses 1A, 1B, 5, and Physiology 1 and 1L or consent of the instructor.
A survey of relations between behavior and biological processes. Coordination of behavior; anatomy and physiology of the nervous system; sensory processes; perceptual dynamics; neural and hormonal processes in motivation; changes in the organization of the nervous system in maturation and learning.

111. Child Psychology. (2) II. Mr. McKee
Prerequisite: course 1A, and either 1B, 5, or 33 (1B, 5, or 33 may be taken concurrently).
Behavior of normal children. Prenatal development; the period of infancy; mental, social, and personality development in childhood.

112. Developmental Psychology. (3) I. Mr. Crandall
Prerequisite: courses 1A, 1B, 5. Primarily for majors in psychology; majors in closely related departments will be admitted by consent of the instructor. Not open to students who have taken course 111 or Home Economics 132.
The development of motor functions, social and emotional traits, language, and mental abilities. Individual differences in development and performance, as related to physical, social, and psychological factors.

113. Adolescence. (2) I. Mr. Crandall
Prerequisite: courses 1A, 1B, 5. Primarily for majors in psychology.
A survey of current research, with particular reference to the analysis and interpretation of data from growth studies.

*113N. Adolescent Psychology. (2) II. Mr. Mussen
Prerequisite: course 1A and one other course in psychology. This course is for nonmajors; it is not open to students who have taken course 113.
A survey of adolescent development and the problems of adolescents.

114. Laboratory in Child Psychology. (2) II. Mr. Mussen
One hour of lecture and three hours of laboratory per week to be arranged. Prerequisite: courses 1A, 1B, 5 (with grade of A or B) and either 111, 112, Education 111, or Home Economics 132.
A survey of empirical methods of investigation used in child psychology: observation, time sampling, rating scales, standardized tests, and experimental procedures. Students will conduct investigations typical of the field and will execute an original investigation.

*115. Laboratory in Adolescent Development. (1) II. Mr. Jones
Three hours per week to be arranged. Prerequisite: consent of the instructor. Offered to a limited number of students also enrolled in course 113.
Individual projects and reports.

116. Tests and Measurements of Infants and Preschool Children. (1) I. Mrs. Honzik
Prerequisite: courses 5 and 112 or Home Economics 132.
A survey of the standardized tests and techniques of measurement of mental, physical, motor and personality development of infants and young children. There will be class demonstrations of individual tests. Theory and empirical research, using these testing methods, will be reviewed.

* Not to be given, 1959–1960.
Psychology

117. Laboratory Tests and Measurements of Infants and Preschool Children. (2) I. Mrs. Honzik
   Prerequisite: consent of the instructor.
   Laboratory work at the Institute of Child Welfare, accompanying course 116.

120. Introduction to History and Systems of Psychology. (3) I.
   Mr. Krech
   Prerequisite: course 1A and at least 12 upper division units in psychology, or graduate standing in philosophy, biology, or sociology and social institutions.
   Major stages in the emergence of psychology as an independent science from its beginnings in ancient philosophy and medicine to the present. Classical nineteenth-century structuralism will be compared with such modern schools as functionalism, behaviorism, Gestalt psychology, and psychoanalysis.

126. Contemporary Psychology. (3) I.
   Prerequisite: courses 1A, 1B, and at least 6 upper division units in psychology. Primarily for seniors.
   Reading and discussion of current books and monographs, affording a survey of contemporary aims, methods, and achievements.

130. Learning. (3) I.
   Mr. Grant
   Survey of experimental and theoretical work in the psychology of memory and learning.

131. Perception. (3) I.
   Mr. Cornsweet
   Lectures and demonstrations on the perception of form (Gestalt) and of objects in three-dimensional space, and on first impressions from photographs and from other reduced social contact; interaction of cognition and motivation.

134. Motivation. (3) I.
   Mr. MacKinnon
   Prerequisite: courses 1A, 1B, and at least 6 upper division units in psychology. Primarily for seniors and graduates.
   The nature of primary and secondary drives; the theories concerning drives found in animal, child, experimental, social, and abnormal psychology, and in philosophy.

135. Thinking. (3) I.
   Mr. Ritchie
   Prerequisite: courses 1A, and 1B or 33.
   Survey of experimental and theoretical work on concept formation and thought processes.

136. Psychology of the Unconscious. (3) II.
   Mr. MacKinnon
   Prerequisite: course 1A.
   A consideration of the evidence for, and the nature and role of, unconscious psychological processes in behavior.

140. Personality Assessment. (3) I.
   Mr. Ballachey
   Lectures and laboratory. Prerequisite: courses 1A, 1B, 5.
   A systematic consideration of concepts, methods, and procedures for the diagnosis and assessment of personality.

141. Personality in Society and Culture. (3) I.
   Mr. Smith
   Prerequisite: courses 1A, 1B, and senior standing.
   A consideration of the social and cultural determinants of personality.

* Not to be given, 1959–1960.
142A–142B. Experimental Social Psychology. (3–3) Yr.  
Lectures and laboratory. Prerequisite: courses 1A, 5, and 145, or the equivalent. 142A is not prerequisite to 142B.  
142A: Typical experiments on social factors in such phenomena as perception, motivation, suggestion, attitudes and prejudice, rumor; studies of group influences upon the behavior of the individual.  
142B: Individual investigations of social behavior, utilizing laboratory or field methods.

144. Social Psychology of the Interview. (3) I.  
Lectures and laboratory. Prerequisite: courses 1A and 145 or consent of the instructor.  
Processes of communication in interview techniques used in the social sciences, with special reference to distortions arising from differences in psychosociological frames of reference of the participants.

145. Social Psychology. (3) I and II.  
Sections to be arranged. Prerequisite: course 1A.  
Psychological nature of: society, its functions and instruments; social groups, their ways, sanctions, symbols, social controls; social status, prestige, and mobility; social interaction, including conflict; social change. The person's adjustment to these phenomena.

146A–146B. Differential Psychology. (3–3) Yr.  
Prerequisite: courses 1A, 5 or the equivalent, and one other course in psychology, or consent of the instructor. (Course 146A may be omitted as prerequisite to 146B with consent of the instructor.)  
146A: Hereditary and environmental bases of individual differences in intelligence and personality. Family, sex, class, and race differences.  
146B: Continuation of 146A. An introduction to factor and cluster analysis of individual and group differences.

148A–148B. Personality. (3–3) Yr.  
Prerequisite: course 1A and either 1B or 33; 162 or 134 or 136 and senior or graduate standing.  
A survey of recent thought and research in the field of personality, with emphasis on dynamic and genetic problems.

150A. Comparative Psychology. (3) II.  
Prerequisite: consent of the instructor.  
A survey of the determinants of animal behavior at the various phyletic levels including an analysis of: the role of stimulation and neural integration, instincts and habits, and drives and incentives.

150B. Animal Learning and Problem-Solving. (3) I.  
Prerequisite: course 100B or the consent of the instructor.  
A survey in the higher animals of the conditions under which habits are acquired or lost, as well as an analysis of the ways in which old habits are integrated in the solution of new problems.

151. Experiments in Animal Psychology. (3) I.  
Lectures and laboratory. Prerequisite: course 150A and consent of the instructor.

*160. Mental Deficiency. (3) I.  
Prerequisite: course 1A and upper division standing.  
Mental deficiency and abnormality in children, including a consideration of tests used in clinical examinations.

* Not to be given, 1959–1960.
161. Personality Development. (3) I and II. Mr. Speisman,  
Prerequisite: upper division standing; either course 111, 112, 113, 160, or 
Home Economics 132. Limited to nonpsychology majors. Students may not 
receive credit for both 161 and 162. 
A survey of biosocial factors in the dynamics of normal personality de­
development.

162. Clinical Psychology. (3) I. Mr. Lazarus  
Prerequisite: courses 1A, 1B, 5 or the equivalent, and either course 112, 
113, 160, or 168. Limited to psychology majors. Students may not receive 
credit for both 161 and 162. 
Dynamics of personality development, with special reference to clinical 
methods and problems.

165A*–165B. Introduction to Clinical Methods. (3–3) Yr. Mr. Tuddenham  
Lectures and laboratory. Prerequisite: courses 1A, 1B, 5. 
Theory and evaluation of the principal tests of ability and personality. A 
consideration of psychological test methods, with special reference to clinical 
diagnosis. Historical development of psychometrics. 165A is concerned with 
abilities and aptitudes; 165B, with personality.

168. Abnormal Psychology. (3) II. Mr. Kostlan  
Prerequisite: course 1A and at least 6 units of upper division psychology 
or, with consent of the instructor, premedical status. 
The relations of psychology to the psychoneuroses and psychoses; the ap­
pearance of abnormal traits in incipient stages of mental disturbance.

*180. Psychological Aspects of Advertising and Marketing. (3) I.  
Prerequisite: course 1A or 3. 
A consideration of the application of psychological techniques and prin­
ciples derived from controlled observation to the study of problems in ad­
vertising, selling, and market research. Field work.

185. Personnel and Industrial Psychology. (3) I and II. Mr. Ghiselli  
Prerequisite: course 1A. 
A discussion of techniques for the selection and classification of employees, 
the psychological aspects of study of work methods, conditions of work, 
training, employee motivation, and morale.

186. Theory of Mental Measurement. (3) I. Mr. Ghiselli  
Lectures and laboratory. Prerequisite: courses 1A, 1B, 5. 
Scaling of psychological measurement, determination of the reliability and 
validity of tests, concepts of dimensions of psychological traits.

187. Human Relations in Industry. (3) I. Mr. Haire  
Prerequisite: course 185. 
The motivation of workers, psychological aspects of worker-management 
relationships, factors in employee morale, the maladjusted worker, leader­
ship.

188. Attitudes and Perception in the Industrial Society. (3) I.  
Prerequisite: courses 1A, 1B, 5. Mr. Ratoosh  
Theoretical problems of perceptual and attitudinal organization in indus­
trial situations, role perceptions in labor and management relations, genesis 
of attitudes, morale surveys, and similar problems.

H195. Special Study for Honors Candidates. (1–5) I and II. The Staff  
* Not to be given, 1959–1960.
199. Special Study for Advanced Undergraduates. (1-5) I and II.

The Staff

GRADUATE COURSES AND SEMINARS

The consent of the instructor is prerequisite to all graduate offerings. Graduate students in neighboring fields may participate in certain courses or seminars with consent of the instructor.

There will be a general colloquium of staff and graduate students which will be scheduled as the situation warrants. There will be no credit offered for these meetings.

201A-201B. Proseminar in Psychology. (3-3) Yr.
Prerequisite: graduate standing. Mr. Riley, Mr. McKee, Mr. Sarbin
An intensive consideration of major areas and problems in psychology.
Recommended for graduate students in their first year.

204E. Seminar in Principles of Measurement. (2) I.
Mr. Grant

206E. Seminar in Experimental Psychology. (2) I and II.
Mr. Postman, Mr. Riley

207. Quantitative Methods in Psychology. (3) II.
Mr. Grant
A discussion of quantitative research methods in psychology. Principles necessary to the understanding and use of rational and empirical equations in psychology, together with problems arising in connection with some of the more common statistical hypotheses encountered in psychological research.

208E. Seminar in Physiological Psychology. (2) I and II.
Mr. Rosenzweig, Mr. French

209E. Seminar in Individual Differences. (2) II.
Mr. Tryon

*210E. Seminar in Constitutional Psychology. (2) II. Mr. Tuddenham

212E. Seminar in Developmental Psychology. (2) I.
Mr. McKee, Mr. Mussen

*228. The Conceptual Framework of Psychology. (3) II.
Prerequisite: course 120 or any acceptable course in history or systems of psychology. Graduate students in philosophy, sociology and social institutions, biology, or physics may be admitted by consent of the instructor.
Further discussion of history and systems of psychology, with special emphasis on the philosophy of science as applied to psychology. Introspective and objective, molecular and molar, peripheral and central-distal point of view. The status of theory in modern psychology; description versus explanation, idiographic versus statistical versus nomothetic approach.

231E. Seminar in Perception. (2) II.
Mr. Comsweet

*235E. The Nature of Psychological Change. (2) II.
Mr. Sherriffs

239E. Social Perception. (2) II.
Mr. Ratoosh

240E. Seminar in Personality Tests and Assessment Methods. (2) II.
Mr. Gough

* Not to be given, 1959-1960.
Psychology

241E. Seminar in Personality and Culture. (2) II. Mr. Sarbin

*243E. The Social Psychology of Behavior Disorders. (2) II. Mr. Ballachiey

245E. Seminar in Social Psychology. (2) II. Mr. Smith

246E. Perception and Personality. (2) I. Mr. Lazarus

247. Advanced Group Dynamics and Group Therapy. (3) I. Two two-hour sessions per week. Social welfare and public health students may be admitted.

Ways in which groups may be utilized in the training and therapy of the individual, survey of pertinent literature, and actual experience with group techniques, such as role playing, psychodrama, reality testing, as training and therapeutic devices.

247E. Seminar in Group Dynamics and Group Therapy. (2) II. ———

*248E. Seminar in Personality. (2) I. Mr. Block

*249. Experimental Psychodynamics. (3) II. Mr. Block

Two hours of lecture and four hours of laboratory work per week to be arranged.

A general survey of the psychodynamics of behavior, with special emphasis upon the experimental literature.

249E. Seminar in Dynamic Psychology. (2) II. ———

250E. Seminar in Animal Psychology. (2) I and II. Mr. Beach, Mr. Ritchie

261A-261B. Clinical Methods. (3-3) Yr. Mr. Tuddenham Lectures and laboratory; four hours of field work per week to be arranged.

Consideration of clinical methods of measurement, interview, and observation.

263A–263B. Advanced Clinical Diagnostic Testing. (3-3) Yr. Mr. Gough, Mr. Rodgers, Mr. Speisman

Prerequisite: course 261B or consent of the instructor.

Theory and practice of personality testing. Administration, scoring, and interpretation of diagnostic tests used in clinical settings. Emphasis on the Rorschach method, the Thematic Apperception Test, and Minnesota Multiphasic Personality Inventory, and other established techniques.

264E–264F. Seminar in Case History. (2-2) Yr. Mr. Kostlan, Mr. Lazarus

Prerequisite: course 261B.

265E–265F. Advanced Seminar in Case History. (2-2) Yr. Mr. Speisman

Prerequisite: course 264F.

266E. Seminar in Theories of Therapy. (2) II. Mr. Sanford

*267E. Seminar in Medical Psychology. (2) II. ———

268E. Seminar in Abnormal Psychology. (2) I. Mr. Rodgers

269E. Seminar in Clinical Research Methods. (2) II. Mr. Lazarus

285E. Seminar in Applied and Industrial Psychology. (2) II. Mr. Ghiselli

* Not to be given, 1959–1960.
287E. Seminar in Psychology of Human Relations. (2) I. Mr. Porter

298. Proseminar in Research Methods. (2) II.
   Mr. Ballachey, Mr. Block, Mr. Crutchfield, Mr. Haire, Mr. Krech
   Introduction to research in psychology. Problems of experimental design
   and analysis considered in relation to individual projects.

299. Research. (1-6) I and II.
   The Staff
   Laboratory, library, or field work as the problem requires.

300. Seminar in the Presentation of Psychological Material. (2) II.
   Mr. Crutchfield
   Critical approach to presentation of psychological material in publications,
   lectures, demonstrations, etc., with emphasis on content, evidence, and sig­
   nificance of material, and relevant techniques of presentation.

PUBLIC HEALTH

(Department Office, 19 Earl Warren Hall)

Margaret Beattie, M.A., Gr.P.H., Professor of Public Health.
Jessie M. Bierman, M.D., M.S.P.H., Professor of Maternal and Child Health.
Sanford S. Elberg, Ph.D., Professor of Immunology and Bacteriology.
William C. Reeves, Ph.D., M.P.H., Professor of Epidemiology.
Edward S. Rogers, M.D., M.P.H., Professor of Public Health and Medical
   Administration.
Charles Edward Smith, M.D., D.P.H., Professor of Public Health (Chairman
   of the Department).
William W. Stiles, M.D., M.P.H., Professor of Public Health.
Keith O. Taylor, Ph.B., M.B.A., F.A.C.H.A., Professor of Hospital Adminis­
   tration.
Bernard D. Tebbens, Sc.D., Professor of Industrial Hygiene Engineering.
Jacob Yerushalmy, Ph.D., Professor of Biostatistics.
Robert T. Legge, Ph.G., M.D., F.A.C.S., Professor of Hygiene, Emeritus.
Dorothy Bird Nyswander (Dorothy Nyswander Palmer), Ph.D., Professor of
   Public Health Education, Emeritus.
William Griffiths, Ph.D., Associate Professor of Public Health.
Nell F. Hollinger, Ph.D., Associate Professor of Public Health.
Ruth L. Huenemann, D.Sc., Associate Professor of Public Health Nutrition.
Warren J. Kaufman, Sc.D., Associate Professor of Sanitation and Sanitary
   Engineering and Associate Professor of Civil Engineering and Irrigation.
Edith M. Lindsay, Ed.D., Associate Professor of Public Health.
Walter S. Mangold, B.S., Associate Professor of Public Health.
Beryl Roberts, M.Ed., Dr.P.H., Associate Professor of Public Health.
Reuel A. Stallones, M.D., M.P.H., Associate Professor of Public Health.
William Taylor, Ph.D., Associate Professor of Biostatistics.
Alan Burkhalter, M.S., Ph.D., Assistant Professor of Toxicology.
Chin Long Chiang, Ph.D., Assistant Professor of Biostatistics.
William R. Gaffey, Ph.D., Assistant Professor of Biostatistics.
William J. Oswald, Ph.D., Assistant Professor of Public Health.
Robert C. Cooper, Ph.D., Instructor in Public Health.
Roberta E. Christianson, B.S., Associate in Public Health.

* Not to be given, 1959–1960.
‡ In residence fall semester only, 1959–1960.
§ In residence spring semester only, 1959–1960.
Public Health

Michael Granich, B.S., Associate in Public Health.
Harold C. Gustafson, M.P.H., Associate in Public Health.
Flora J. Hanks, R.N., A.B., Associate in Public Health.
Theo M. Hawkins, B.S., Associate in Public Health.
Faith Flora Hodgson, A.B., R.N., Associate in Public Health.
Patricia Lee, B.S., Associate in Public Health.
Cecil Y. Martin, B.S., Associate in Public Health.
Catherine Prato, B.S., M.P.H, Associate in Public Health.
James E. Quon, B.S., Associate in Public Health.
Leona R. Shapiro, M.S., Associate in Public Health.
Allen Steinmetz, B.S., Associate in Public Health.

Rodney R. Beard, M.D., M.P.H., Clinical Professor of Occupational Health.
Mortimer A. Benioff, M.D., Lecturer in Public Health.
Charles F. Blankenship, A.B., M.D., M.P.H., Lecturer in Public Health.
Henrik L. Blum, M.D., M.P.H., Lecturer in Public Health.
Howard L. Bodily, Ph.D., Lecturer in Public Health.
Lester Breslow, M.D., Lecturer in Public Health.
Harold D. Chope, M.D., Dr.P.H., Lecturer in Public Health.
Elizabeth Clark, R.N., M.P.H., Lecturer in Public Health.
William H. Clark, M.D., M.P.H., Lecturer in Public Health.
Leslie Corsa, Jr., B.S., M.D., Lecturer in Public Health.
Robert McCall Drake, M.D., M.P.H., Lecturer in Public Health.
John E. Dunn, Jr., M.D., M.P.H., Lecturer in Public Health.
Robert Dyar, M.D., Dr.P.H., Lecturer in Public Health.
Seymour M. Farber, M.D., Lecturer in Public Health.
Alan Foord, M.D., M.P.H., Clinical Professor of Maternal and Child Health.
George M. Foster, Ph.D., Lecturer in Public Health and Professor of Anthropology.
Carl Goetsch, M.D., Lecturer in Public Health.
George L. Hall, LL.B., Lecturer in Hospital Administration.
Floyd W. Hartmann, Sc.D., Lecturer in Public Health.
Charles H. Hine, Ph.D., M.D., Lecturer in Public Health.
Arthur C. Hollister, Jr., M.D., M.P.H., Lecturer in Public Health.
Harald N. Johnson, M.A., M.D., Lecturer in Public Health.
Gerhard Klein, M.S., Lecturer in Public Health.
Andie L. Knutson, Ph.D., Lecturer in Public Health.
Edwin H. Lennette, M.D., Ph.D., Lecturer in Virology and Lecturer in Bacteriology for the spring semester.
Alvin R. Leonard, M.D., M.P.H. Clinical Professor of Public Health.
Arthur P. Long, M.D., M.P.H., Dr.P.H., Lecturer in Public Health.
Percy H. McGauhey, M.S., Professor of Sanitary Engineering and Lecturer in Public Health.
Alfred E. Maffly, B.S., F.A.C.H.A., Lecturer in Hospital Administration.
Harold E. Mann, A.B., M.D., Lecturer in Public Health.
Malcolm H. Merrill, M.S., M.D., M.P.H., Lecturer in Public Health.
Paul R. Mico, M.P.H., Lecturer in Public Health.
Emil E. Palmquist, M.P.H., M.D., Lecturer in Public Health.
Alberta Parker (Alberta Parker Horn), M.D., Lecturer in Public Health.
Beulah Parker (Beulah Parker Vaughan), M.D., Lecturer in Public Health.
Helen Stapley Ross, M.P.H., Lecturer in Public Health.
Edith P. Sappington, M.D., Dr.P.H., Lecturer in Public Health.
Ruth E. Simonson, M.P.H., Visiting Professor of Public Health.
Letters and Science List.—Courses 5A–5B, 35, 106, 160A–160B, 163 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

LOWER DIVISION COURSES

5A. Individual and Community Health. (3) I and II. Mr. Stiles
A survey of the entire field of public health, including field observations and a consideration of the evolution of disease prevention and control; the social, medical, and economic aspects of sickness, disability, and death.

5B. Individual and Community Health. (3) I and II. Mr. Stiles
Prerequisite: course 5A.
Continuation of course 5A.

35. Personal Health Problems. (3) I and II. Miss Lindsay
Enrollment limited to students in the lower division. Sections limited to fifty students.
A consideration of the factors which determine physical, mental, and emotional health and influence the prevention of disease. Application of these factors to the solution of individual health problems.

UPPER DIVISION COURSES

100. Introduction to Health Administration. (3) I and II.
Miss A. Parker, Mr. Leonard
Prerequisite: course 5A–5B or consent of the instructor.
Principles of public administration and fundamentals of organization and administration in public health.

101. Introduction to Health Administration. (3) II. Mr. K. O. Taylor
Principles of hospital and medical care organization and administration.

103A–103B. Hospital Organization and Management. (3–3) Yr.
Mr. K. O. Taylor
Prerequisite: Business Administration 1A–1B. Restricted to students enrolled in the hospital administration curriculum or consent of the instructor.
Consideration of the fundamentals of organization, business and financial management, personnel management, plant operation, staff organization, and community relationships as applied to hospital administration.

106. Medical Sociology. (3) I. Mr. Rogers
A consideration of the social and economic factors related to health, disease, and the receipt of medical care.

108. Advanced Problems in Public Health Administration. (1–5) II.
Mr. Rogers, Mr. Leonard

109. Advanced Problems in Medical Administration. (1–5) I and II.
Prerequisite: consent of the instructor. Mr. K. O. Taylor, Mr. Rogers
111. Environmental Sanitation. (2) I and II. Mr. Mangold, Mr. Oswald
   A condensed presentation of the principles and practices of environmental
   sanitation for advanced public health students.

112. Control of Vector and Reservoir Animals Affecting the Public Health. (3) I.
   Mr. Cooper
   Prerequisite: consent of the instructor.
   Principles and practices governing the control of invertebrate and low
   vertebrate animals harboring, transmitting, and causing diseases of public
   health importance.

113. Sanitary Control of Foods. (3) II. Mr. Hartmann
   Prerequisite: consent of the instructor
   Principles of sanitary science as related to food production, processing,
   and distribution, and to food-handling.

114. Advanced Problems in Sanitation. (1–5) I and II. Mr. Mangold

115. Radiological Aspects of Public Health Engineering. (2) I.
   Mr. Kaufman
   Lecture, one hour; laboratory, three hours and/or recitation and lecture
   per week. Prerequisite: consent of the instructor.
   Principles of environmental control of ionizing radiations. Theory and
   laboratory exercises in radiation detection, shielding design, monitoring pro­
   cedures, low-level assaying of food and water, waste disposal, and water
   decontamination. Regulation of radiation sources.

117. Sanitary Microbiology of Water and Sewage. (4) I. Mr. Cooper
   Primarily for students specializing in sanitary science or sanitary engi­
   neering, but open to others with consent of the instructor
   Principles of biology and their application to sanitary science, with empha­
   sis on the microbiology of water and sewage.

118. Sanitary Microbiology of Foods and Beverages. (4) II. Mr. Cooper
   Prerequisite: Bacteriology 2 or course 117, or the consent of the instructor.
   Principles of biology and their application to sanitary science, with em­
   phasis on the microbiology of foods and beverages.

119. Administrative Aspects of Sanitary Science. (2) I and II.
   Mr. Mangold
   Prerequisite: Civil Engineering 144 and course 113 (may be taken con­
   currently), or consent of the instructor.
   The administrative aspects of sanitary science as applied to the fields of
   communicable disease control, schools, recreation, housing, emergencies, and
   including organizations, laws, and personnel.

125. Child Health. (3) I. Miss Bierman
   Lectures, three hours per week: group conferences, and field observations.
   A consideration of factors pertaining to the health of children from con­
   ception to the end of puberty; community health facilities.

131. Health Education Laboratory. (2) II. Mr. Griffiths
   Prerequisite: consent of the instructor.
   Emphasis will be placed on techniques of teaching health to adults
   through the media of radio, films, slides, posters, press, printed materials,
   and lectures. Research in these fields will be evaluated, and exercises in
   preparing and using materials will be included.
132. **Group Study in Health Instruction.** (2) II. Miss Lindsay

Prerequisite: open to seniors majoring in health education and graduate students in public health.

Considerations basic to health instruction with community groups. Evaluation of objectives, methods, and resource materials.

133. **Introduction to Group Process.** (2) II. Mr. Griffiths

Prerequisite: open only to undergraduate students in public health with consent of the instructor.

Consideration of dynamics of interpersonal relationships as they affect group membership, leadership ability, and community work in the public health field.

134. **Community Health Education.** (3) II. Miss Roberts, Mr. Griffiths

Primarily for students specializing in some area of health work who have taken basic courses in biological sciences, education, and psychology.


135. **Individual Health.** (3) I. Miss Lindsay

A consideration of fundamental physiological mechanisms and application to promotion and protection of health.

136. **Health Programs for the School-Age Child.** (2) I. Miss Lindsay

Consideration of the community resources contributing to a health program for the school-age child; administrative and organizational principles involved.

*145. **Community Control of the Communicable Diseases.** (3) I. Mr. Blum

The epidemiology and community control of communicable diseases, including tuberculosis and the venereal infections.

147A. **Principles of Epidemiology.** (2) I.

Mr. Reeves, Mr. Smith, Mr. Stallones

Prerequisite: knowledge of medical microbiology.

Principles of epidemiology and a study of the infection chains of certain type diseases.

147B. **Applied Epidemiology.** (2) II. Mr. Reeves, Mr. Smith, Mr. Stallones

Discussion and lecture, one hour; laboratory, three hours per week. Separate discussion hours for undergraduate and graduate students. Prerequisite: course 147A or 245 and 162 or the equivalent, or consent of the instructor.

Methods of investigating epidemics, and collection, analysis, and reporting of data.

149. **Advanced Problems in Epidemiology.** (1-5) I and II.

Mr. Reeves, Mr. Smith, Mr. Stallones

Prerequisite: course 147B or consent of the instructor.

150A. **Clinical and Public Health Laboratory Procedures.** (8) I.

Miss Hollinger

Prerequisite: Biochemistry 102, Bacteriology 101, and consent of the instructor. Enrollment limited to forty students.

Basic principles and laboratory methods in clinical chemistry, hematology, and mycology, as required in clinical and public health practices.

* Not to be given, 1959-1960.
150B. Clinical and Public Health Laboratory Procedures. (8) II.  
Miss Beattie  
Prerequisite: Bacteriology 101 and consent of the instructor. Enrollment limited to forty students.  
Laboratory identification of the etiological agents of communicable diseases and bacteriological and chemical examination of water, milk, and utensils.

154. Advanced Problems in Public Health Laboratory. (1–5) I and II.  
Prerequisite: consent of the instructor. Miss Beattie, Miss Hollinger  
Special investigations of public health and clinical laboratory problems.

160A. Biometry. (3) I and II.  
Mr. Gaffey  
Lectures, two hours; laboratory, three hours per week. Prerequisite: 8 units of laboratory courses in the biological sciences or consent of the instructor. Primarily for students in the biological sciences and certain fields of public health.  
Elements of statistical analysis as applied to the biological sciences. Descriptive statistics, probability, probability distributions, point and interval estimation, and hypothesis testing for large and small samples.

160B. Biometry. (3) II.  
Mr. Gaffey  
Lectures, two hours; laboratory, three hours per week. Prerequisite: course 160A or consent of the instructor.  
Bivariate distributions, elementary methods of sampling, introduction to analysis of variance, special methods applicable to biological data.

161A–161B. Biostatistics. (3–3) Yr.  
Mr. Gaffey, Mr. Yerushalmy  
Lectures, two hours; laboratory, three hours per week. Primarily for majors in biostatistics.  

162A. Public Health Statistics. (3) I and II.  
(Formerly numbered 162.) Mr. Yerushalmy, Mr. Gaffey, Mr. W. Taylor  
Lectures, two hours; laboratory, three hours per week. Fall semester enrollment limited to graduate students; spring semester to undergraduates. Primarily for students in School of Public Health not majoring in biostatistics.  
Introduction to statistical methods in the field of public health. Tabulation and graphics, vital statistics, morbidity, mortality and natality, age adjusted rates, measures of location and variability, and statistical inference.

162B. Public Health Statistics. (2) II.  
Mr. W. Taylor  
Lectures, two hours; laboratory, three hours per week. Prerequisite: course 162A or the equivalent. Primarily for graduate students in Public Health not majoring in biostatistics.  
Extension of methods introduced in course 162A and their application to problems met in medicine and public health.

163. Demography. (3) II.  
Lectures, two hours; laboratory, three hours per week. Prerequisite: course 161A or Sociology 133 or the equivalent.  
Techniques for the measurement of fertility, mortality, migration, and mobility; analysis of population size, distribution, and composition; methods of estimation and projection.
164. **Advanced Biometry.** (2) I.  
Mr. W. Taylor  
Lecture, one hour; laboratory, three hours per week. Prerequisite: Statistics 130B or the equivalent.  
Extension of methods introduced in Statistics 130A–130B to methods of biological standardization, bioassay, and related topics.

165. **Principles of Evaluation in Medicine and Public Health.** (2) II.  
Mr. Yerushalmy  
Lecture, one hour; laboratory, three hours per week. Prerequisite: course 162A or the equivalent.  
Methodology of evaluation; formulation of long-range and immediate objectives; indices and measures, evaluation designs, sample designs, analysis.

169. **Advanced Problems in Biostatistics.** (1–5) I and II. Mr. Yerushalmy  
Lectures, two hours; laboratory, three hours per week. Prerequisite: consent of the instructor.

170. **Introduction to Occupational Health and Industrial Hygiene.**  
(3) I and II. Mr. Tebbens  
A survey of the field of industrial health and hygiene. Discussion of occupational hazards and their control; industrial safety; industrial health problems; and organizations concerned with industrial hygiene and health.

171. **Industrial Environment Control: Sanitary Air Analysis.** (2) II. Mr. Tebbens  
Prerequisite: Chemistry 5 or Civil Engineering 146 or the equivalent; Physics 2A–2B or the equivalent.  
Physical, chemical, and sanitary analysis of the condition of the air and other environmental factors affecting the health and welfare of workers in industry. Application of principles of sanitation in industry.

172. **Industrial Toxicology.** (2) II. Mr. Burkhalter  
Prerequisite: Chemistry 5 and 9, Physics 2A–2B, Physiology 1-1L; or equivalent courses.  
Chemical and clinical laboratory techniques applied to investigation of toxic manifestations of industrial hazards.

186. **Social, Medical, and Public Health Aspects of Venereal Disease Control.** (2) II. Mr. Koch  
Discussion and field observation, two hours per week. Prerequisite: consent of the instructor.  
Study of the social causes of the venereal diseases and remedial procedures; administrative control methods, etiology, epidemiology and treatment; importance of family life education and health education pertaining to their control.

189. **Nutrition Problems in Public Health.** (2) II. Miss Huenemann  
Study of the application of the science of nutrition to public health, emphasizing the responsibilities of public health workers in nutrition programs.

198. **Directed Group Study.** (1–5) I and II. Mr. Smith in charge

199. **Special Study for Advanced Undergraduates.** (1–5) I and II. Mr. Smith in charge

**Graduate Courses**

(Concerning conditions for admission to graduate courses, see page 18)

200A–200B. **Principles of Public Health Organization and Administration.**  
(3–2) Yr. Mr. Rogers
A systematic study of the principles of organization and administration and of their application to public health practice.

202. Special Studies in Hospital Administration. (1-5) I and II.
Prerequisite: consent of the instructor. Mr. K. O. Taylor
Special studies in the field of hospital administration under direction of the staff.

203A-203B. Seminar in Hospital Administration. (2-2) Yr.
Mr. K. O. Taylor, Mr. Stull

206A-206B. Seminar in Medical Care Administration. (2-2) Yr.
Mr. Rogers
Limited to graduate students specializing in hospital or medical care administration, or by consent of the instructor.
Detailed consideration of organization, operation, and appraisal of medical care programs.

209A-209B. Seminar in Public Health Administration. (1-1) Yr.
Mr. Leonard, Miss A. Parker

213. Advanced Study in Sanitation. (1-5) I and II. Mr. Mangold

214A-214B. Seminar in Sanitation. (2-2) Yr. Mr. Mangold

222. Investigative Techniques in Public Health Nursing Administration. (1-5) I and II. Miss Simonson
Problem selection and formulation, research design, methodological problems, analysis and interpretation.

223. Special Studies in Public Health Nursing Administration. (1-5) I and II. Miss Simonson
Special studies in the field of public health nursing administration under the direction of the staff.

224A-224B. Seminar in Public Health Nursing Administration. (2-2) Yr. Miss Simonson
Consideration of organizational patterns and administrative techniques in public health nursing administration.

227. School Health Administration. (2) II. Mr. Foord, Miss Bierman
Consideration of the principles basic to organization, administration, and supervision of school health programs in elementary and secondary schools. Health services, environmental factors, communicable disease control, and hygiene of the school day. Students will undertake field studies and will furnish their own transportation.

228. Special Studies in Maternal and Child Health. (1-5) I and II. Miss Bierman, Mr. Foord, Mr. Corsa
Special studies undertaken by students under the direction of the staff.

229A-229B. Seminar in Maternal and Child Health. (1-1) Yr. Miss Bierman, Mr. Foord

231. Seminar in Mass Media Techniques of Health Education. (1) I.
Prerequisite: consent of the instructor. Mr. Griffiths, Mr. Knutson
Problems associated with the use of mass media in health education. Field experience in evaluative procedures will be undertaken and new trends in the use of mass media will be reviewed.
233. Group Work Procedures in Health Education. (2) I.
Mr. Griffiths, Miss Roberts, Mrs. Ross
Prerequisite: open only to graduate students in public health.
A consideration of the more usual techniques of group work, together with
investigations of the social and psychological factors which determine the
effectiveness of group work in promoting public health activities.

234A–234B. Seminar in Community Health Education. (1–2) Yr.
Miss Roberts, Mr. Griffiths
Prerequisite: course 200A–200B (may be taken concurrently).
Problems in relating the philosophy of health education to public health
administration. Field observations and studies.

238. Seminar in Mental Health. (1) II.
Miss B. Parker

239. Special Studies in Health Education. (1–5) I and II.
Mr. Griffiths, Mr. Knutson, Miss Roberts
Prerequisite: consent of the instructor.
Research projects in public health education.

245. Biology of Infectious Diseases (Epidemiology). (4) I.
Mr. Reeves, Mr. Smith, Mr. Stallones
Lectures and demonstrations, six hours per week. Prerequisite: an M.D.
degree or consent of the instructor for those with adequate background in
medical bacteriology, immunology, and medical entomology. To be taken con­
currently with course 162.
Discussion of parasite, vector, reservoir host, and the infection chain. Con­
sideration of most recent advances in microbiological laboratory methods and
interpretation of results, particularly as applied to epidemiological investiga­
tions.

†248. Advanced Problems in Epidemiology. (1–5) I and II.
Mr. Reeves, Mr. Smith, Mr. Stallones
Prerequisite: courses 245 and 147B; 162 or 160A and 161A.

249A–249B. Seminar in Epidemiology. (1–1) Yr.
Mr. Reeves, Mr. Smith, Mr. Stallones

254. Special Studies in Public Health Laboratory. (1–5) I and II.
(Formerly numbered 254A–254B.) Miss Beattie, Miss Hollinger

260. Statistical Methods in Biology. (3) I.
Mr. W. Taylor
Lectures, two hours; laboratory, three hours per week. Prerequisite: course
164 or the equivalent.
Underlying distribution theory related to particle counting, graded and
quantal response in bioassay, and standardization of drugs. Development of
probability models for the study of such phenomena as: competing risks,
epidemics, and medical diagnosis.

261A–261B. Advanced Biostatistics. (3–3) Yr.
Mr. Yerushalmy, Mr. W. Taylor
Lectures, two hours; laboratory, three hours per week. Prerequisite: course
161B or the equivalent. Primarily for graduate students in biostatistics.
Methods of epidemiometric investigations; evaluation of therapy; advanced
life table methods, program evaluation, design of surveys in human popula­
tions, utilization of routine records for research. Special biostatistical
methods and techniques.

† To be given if a sufficient number of students enroll.
262. Selected Topics in Biostatistics. (3) II. Mr. Gaffey
   Lectures, two hours; laboratory, three hours per week. Prerequisite: course 261B.
   Biostatistical problems associated with current research in cancer, heart disease, tuberculosis, and other medical and public health problems.

268. Special Studies in Biostatistics. (1-5) I and II. Mr. Yerushalmy
   Research projects undertaken by students under the direction of the staff.

269A–269B. Seminar in Biostatistics. (1-1) Yr. Mr. Yerushalmy

†274A–274B. Seminar in Industrial Health. (1-2) Yr. Mr. Tebbens

278. Special Studies in Industrial Health. (1-5) I and II.
   Mr. Tebbens, Mr. Beard, Mr. Burkhalter
   Research projects in industrial environment control, industrial toxicology, sanitary air analysis, or industrial medical administration.

286. Special Studies in Public Health Nutrition. (1-5) II.
   Prerequisite: consent of the instructor. Miss Huememann
   Special studies in the field of public health nutrition under direction of the staff.

287. Clinical Problems in Public Health. (1-4) II.
   Mr. Smith, Mr. Stallones
   Deals with selected clinical subjects of major importance to public health and presents clinical observations and discussions of the most recent advances in diagnosis, treatment, and prevention.

289A–289B. Seminar in Public Health Nutrition. (2-2) Yr.
   Miss Walsh, Miss Huememann

297. Directed Field Study. (No credit.) Given immediately following the close of each semester. Mr. Smith

298. Directed Group Study for Graduate Students. (1-5) I and II.
   Mr. Smith in charge

299. Special Study for Graduate Students. (1-5) I and II.
   Mr. Smith in charge

RANGE MANAGEMENT

(Department Office, 243 Walter Mulford Hall)

Committee in charge:
Harold H. Biswell, Ph.D., Professor of Forestry.
R. Merton Love, Ph.D., Professor of Agronomy, Davis.
Henry J. Vaux, Ph.D., Professor of Forestry (Chairman of the Committee).
Harold F. Heady, Ph.D., Associate Professor of Forestry.
William C. Weir, Ph.D., Associate Professor of Animal Husbandry, Davis.

The Major.—Instruction in range management is not organized as a single administrative unit in the College of Agriculture of the University, but the relevant courses are offered by a number of departments at Berkeley and at Davis, and are coordinated by the committee in charge. See page 83 of the Circular of Information.

Major Adviser: Mr. Heady.

† To be given if a sufficient number of students enroll.
LOWE R DI VISION COURSE

49. Range Management Field Practice Course. (No credit) Mr. Heady  
Approximately four weeks devoted to field studies of range conditions and 
methods of utilization in various parts of the state.  
Required of all students with a major in range management.

UPPER DI VISION COURSES

101. Introduction to Range Management. (3) I. Mr. Biswell  
Basic principles of range management and development in the United 
States; relation to agriculture and wildland management.

102. Advanced Range Management. (3) II. Mr. Heady  
Lecture and laboratory. Prerequisite: Engineering 21 or the equivalent; a 
course in plant ecology. Recommended: Botany 108.  
Field and laboratory procedure in determination of range adequacy and 
quality. Special field trips will be arranged.

123. Range Forage Utilization. (3) I. Mr. Biswell  
Lectures and laboratory. Prerequisite: course 49 or 101.  
Principles of range forage utilization and effects; forage preference of 
animals; control means to obtain proper utilization. Special field trips will 
be arranged.

133. Grassland Ecology. (3) II. Mr. Heady  
Prerequisite: Forestry 103.  
Composition, structure, development, and habitat factors of the native 
North American grasslands. Principles of grassland management for for­
age production.

199. Special Study for Advanced Undergraduates. (1-5) I and II.  
Mr. Biswell, Mr. Heady  
Prerequisite: senior standing and consent of the instructor.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

201A–201B. Seminar in Range Management. (2-2) Yr.  
201A is not prerequisite to 201B. Mr. Biswell, Mr. Heady  
201A. Mr. Biswell; 201B. Mr. Heady.

299. Research in Range Management. (1-6) I and II. Mr. Biswell  
(Formerly numbered 200A–200B.)

ROMANCE PHILOLOGY

Francis J. Carmody, Ph.D., Professor of French.  
Yakov Malkiel, Ph.D., Professor of Romance Philology.  
Aldo D. Scaglione, Dottore in Lettere, Associate Professor of Italian.  
Ronald N. Walpole, Ph.D., Professor of French.  
Manfred M. G. Sandmann, Ph.D., Lecturer in French for the fall semester.

Departmental Major Advisers: Mr. Malkiel, Mr. Scaglione.

*200. Linguistic History of the Roman Empire. (2) I. Mr. Malkiel  
The external history of the spread of Latin over the Western Medi­
terranean area, its gradual diversification, and change into the Romance dia­
clects, with emphasis on substrata and superstrata.

* Not to be given, 1959–1960.
Romance Philology

201. Late Latin Language and Literature. (2) I. Mr. Sandmann
The internal history of colloquial Latin and Late Latin, down to the Carolingian period, on the basis of original sources.

202. General Romance Linguistics. (2) II. Mr. Malkiel
Prerequisite: graduate standing and undergraduate major in languages.
Problems of methodology in historical linguistic reconstruction, applied to the major and minor Romance languages.

203A-203B. Old Provençal. (2-2) Yr. Mr. Walpole
An introductory study of Old Provençal language and literature, with emphasis on the form and content of the different literary genres and on questions of cultural origins and influences.

204. Humanistic Literature in Latin. (1) II. Mr. Scaglione
Prerequisite: graduate standing and consent of the instructor.
A study of the growth of Humanism through the reading and interpretation of selected Latin texts, from Petrarch to Erasmus.

*205. Romance Dialect Geography. (2) II. Mr. Malkiel
Methods of interpreting maps of linguistic atlases (with special reference to Romance-speaking countries) and of using them as a basis for various types of dialectological studies.

206. Medieval Latin and Romance Learning. (2) II. Mr. Carmody
Prerequisite: consent of the instructor.
Interpretation of original texts in Latin, Old French, and Old Spanish, and the cultural problems involved in their transmission.

207. Peninsular Spanish Dialectology. (1) II.
Prerequisite: graduate standing and consent of the instructor.
Problems and methods in the study of the Spanish linguistic areas, in diachronic and synchronic projection. Historical and structural factors determining dialectal fragmentation.

299. Special Advanced Study. (1-4) I and II.
Mr. Carmody, Mr. Malkiel, Mr. Scaglione, Mr. Walpole

RELATED COURSES IN OTHER DEPARTMENTS

Introduction to Linguistics (Linguistics 100).
Phonetics and Phonemics (Linguistics 130).
Introduction to Indo-European Comparative Grammar (Linguistics 150).
Gothic (German 265).
Islamic Civilization (Near Eastern Languages 125).
The Age of Chaucer (English 155).
Dante's Divina Commedia (Italian 109A-109B).
A History of the Spanish Lexicon (Spanish 131).
The Ballad (Spanish *208A-208B).
Old Spanish (Spanish 212A-212B).
Historical French Grammar (French 201A-201B).
Reading and Interpretation of Typical Old French Texts (French 206A-206B).
The Medieval Mind (220A-220B).

* Not to be given, 1959-1960.
**SANSKRIT**

For courses in the Sanskrit language and literature, see under Department of Classics, page 89.

**SCANDINAVIAN**

(Department Office, 1218 Dwinelle Hall)

†Assar Götrik Janzén, Ph.D., Professor of Scandinavian.
Håkon Hamre, Associate Professor of Scandinavian (Chairman of the Department).
Eric O. Johannesson, Ph.D., Assistant Professor of Scandinavian.
Børge G. Madsen, Ph.D., Assistant Professor of Scandinavian.

Madison S. Beeler, Ph.D., Professor of German and Linguistics.
Jules Zentner, M.A., Lecturer in Scandinavian.

*Letters and Science List.*—All undergraduate courses in Scandinavian are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

*Departmental Major Adviser:* Mr. Johannesson.

*Preparation for the Major.*—16 units from the lower division course sequences 1A-1B, 3A-3B, 4A-4B, 11A-11B, 13A-13B, 14A-14B; or the equivalent.

*The Major.*—Twenty-four units in upper division courses, including at least 6 units made up from courses 101A-101B, 103A-103B, 104A-104B, 111, 113, 114. Six of the 24 units may be in related work in other departments.

*Honors.*—Candidates for honors should communicate with the major adviser.

**LOWER DIVISION COURSES**

1A-1B. Elementary Swedish. (4-4) Yr.  
Mr. Zentner  
1A. Elementary grammar, reading of easy prose.  
1B. Elementary grammar, reading, conversation, composition.

3A-3B. Elementary Norwegian. (4-4) Yr.  
Mr. Hamre (in charge)  
3A. Elementary grammar, reading of easy prose.  
3B. Elementary grammar, reading, conversation, composition.

4A-4B. Elementary Danish. (4-4) Yr.  
Mr. Madsen (in charge)  
4A. Elementary grammar, reading of easy prose.  
4B. Elementary grammar, reading, conversation, composition.

11A-11B. Intermediate Swedish. (4-4) Yr.  
Mr. Zentner  
Prerequisite: course 1A-1B or the equivalent.  
Intermediate grammar, extensive reading, conversation, composition.

13A-13B. Intermediate Norwegian. (4-4) Yr.  
Mr. Hamre (in charge)  
Prerequisite: course 3A-3B or the equivalent.  
Intermediate grammar, extensive reading, conversation, composition.

14A-14B. Intermediate Danish. (4-4) Yr.  
Mr. Madsen (in charge)  
Prerequisite: course 4A-4B or the equivalent.  
Intermediate grammar, extensive reading, conversation, composition.

† Absent on leave, 1959-1960.
**Scandinavian**

### Upper Division Courses

#### A. Language Courses

*101A-101B. Advanced Swedish. (3-3) Yr.
Prerequisite: course 11A-11B or the equivalent.
Advanced grammar, with emphasis on syntax and phraseology, reading, conversation, composition.

*103A-103B. Advanced Norwegian. (3-3) Yr.
Prerequisite: course 13A-13B or the equivalent.
Advanced grammar, with emphasis on syntax and phraseology, reading, conversation, composition.

*104A-104B. Advanced Danish. (3-3) Yr.
Prerequisite: course 14A-14B or the equivalent.
Advanced grammar, with emphasis on syntax and phraseology, reading, conversation, composition.

*111. Swedish Poets of the Nineteenth Century. (1) II.
Prerequisite: a reading knowledge of Swedish.

*113. Romanticism in Norway. (1) II.
Prerequisite: a reading knowledge of Norwegian.

*114. Holberg and Oehlenschläger. (1) II.
Prerequisite: a reading knowledge of Danish.

H195. Special Study for Honors Candidates. (1-3) I and II.
The Staff

198. Directed Group Study for Advanced Undergraduates. (1-3) I and II.
The Staff (Mr. Madsen in charge)
Prerequisite: at least two years of one of the Scandinavian languages.
Advanced reading and interpretation of Modern Scandinavian texts.

199. Special Study for Advanced Undergraduates. (1-3) I and II.
The Staff (Mr. Johannesson in charge)

#### B. Courses on Scandinavian Literature

Courses listed below require only a knowledge of English. They are open to students with at least junior standing and, with the consent of the instructor, to properly qualified students with sophomore standing.

100A*-100B-100C. History of Scandinavian Literature.
Survey course: reading of selected works of Danish, Norwegian, and Swedish literature in translation; lectures.

*100A. From 1300 to 1850. (3) I. Mr. Madsen
100B. From 1850 to World War I. (3) II. Mr. Madsen
100C. From World War I to the present. (3) I. Mr. Johannesson

106. History of Scandinavian Drama up to 1900. (2) I.
Mr. Hamre
Reading of Danish, Norwegian, and Swedish plays in translation; discussions; lectures on the development of the drama.

107. The Plays of Ibsen. (3) I.
Mr. Madsen
Reading and discussion of Ibsen's most important plays; lectures.

* Not to be given, 1959–1960.
108. Strindberg and His Writings. (3) II. Mr. Madsen
Reading and discussion of the most important of Strindberg's works in connection with his biography; lectures.

109. Scandinavian Drama of the Twentieth Century. (2) II. Mr. Hamre
Reading of modern Scandinavian dramas in translation; discussions; lectures.

120A-120B. The Novel in Scandinavia. (3-3) Yr. Mr. Johannesson
120A is not prerequisite to 120B.
Reading and discussion of great Scandinavian novels; lectures on the development of the novel.

*125. Masterpieces of Old Norse Literature. (3) I. Mr. Janzén
Reading and discussion of some of the sagas and representative selections from the Eddas and the Scaldic songs; lectures on Scandinavian literature in the Middle Ages.

175. Kierkegaard. (3) II. Mr. Johannesson
Prerequisite: good background in literature or philosophy.
Analysis of Kierkegaard the man, the writer, the thinker and his influence on European writers to the present day.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

Prerequisite: for the literary courses, courses 100A-100B, 125. Compulsory courses for all graduate study: 206, and at least one semester of seminar work. For advanced study in Scandinavian literature, a general acquaintance with Scandinavian history is strongly advised. For advanced linguistic work, introductory courses to General Linguistics, Indo-European Comparative Grammar, and Germanic Linguistics are highly recommended. For doctoral study in linguistics, Gothic (German 265) is required and knowledge of German is indispensable.

A. Language Courses

*201. Old Swedish. (3) II. Mr. Janzén
Phonology, historical grammar, texts.

*203. Old Icelandic. (3) I. Mr. Beeler
Descriptive and historical phonology and grammar; texts. Some attention is given to Old Norwegian.

206A-**206B. Readings of Old Icelandic Sagas. (2-2) Yr. Mr. Hamre
206A is not prerequisite to 206B.
206B: I.
206A: II.
One of the longer or two of the shorter Old Icelandic sagas will normally be read in each course.

208. The Poems of the Poetic Edda. (3) I. Mr. Hamre
Reading of some more important poems with emphasis on the mythological songs.

215. Scandinavian Dialects. (2) II. Mr. Hamre
A survey of the Scandinavian dialects with special reference to their relation to the standard languages of the different countries.

* Not to be given, 1959-1960.
Scandinavian

*250. Seminar in Scandinavian Linguistics. (2) II. Mr. Hamre
Conference work on chosen or assigned topics; at least one shorter paper a semester is normally required.

B. Literature Courses

*230. Scandinavian Literature, 1200–1800. (2) I. Mr. Madsen
Reading and analysis of representative works; lectures.

231. Romanticism in Scandinavia. (2) II. Mr. Madsen
Reading and analysis of representative works; lectures.

*232. Realism and Naturalism in Scandinavian Literature. (1870–1900). (2) I. Mr. Johannesson
Reading and analysis of representative works; lectures.

*233. Scandinavian Literature of the 20th Century. (2) II. Mr. Johannesson
Reading and analysis of representative works; lectures.

251. Seminar in Scandinavian Literature. (2) I and II. Mr. Johannesson, Mr. Madsen
Prerequisite: courses 100B, 100C and at least one of the following courses: 106, 109, 125.
A. Georg Brandes and Scandinavian Literature. I. Mr. Madsen.
B. Problems in the Twentieth-Century Scandinavian Novel. I. Mr. Johannesson.
C. Twentieth-Century Danish Drama. II. Mr. Madsen.
D. Problems in the Nineteenth-Century Scandinavian Novel. II. Mr. Johannesson.

298. Special Study for Graduate Students. (1–4) I and II.
The Staff (Mr. Hamre in charge)

RELATED COURSES IN OTHER DEPARTMENTS

Romanticism in Western Europe (Comparative Literature *121).
The Symbolist Movement in European Literature (Comparative Literature 201A*–201B).
The Theater in Western Civilization (Dramatic Art 140A–140B).
The Novel in Western Civilization (English 125B)
British and American Drama from 1850 to the Present (English 114C).
Early German Romanticism, 1795–1810 (German 228).
German Realism, 1850–1900 (German *238).
Germanic Linguistics (German 260).
Gothic (German 265).
Introduction to Linguistics (Linguistics 100).
Introduction to Indo-European Comparative Grammar (Linguistics 150).

* Not to be given, 1959–1960.
SLAVIC LANGUAGES AND LITERATURES

(Department Office, 4120 Dwinelle Hall)

1 Gleb Struve, B.A. (Oxon.), Professor of Slavic Languages and Literatures.
Francis J. Whitfield, Ph.D., Professor of Slavic Languages and Literatures (Chairman of the Department).
Waclaw Lednicki, Ph.D., Professor of Slavic Languages and Literatures, Emeritus.
George Gibian, Ph.D., Associate Professor of Slavic Languages and Literatures.
Oleg A. Maslenikov, Ph.D., Associate Professor of Slavic Languages and Literatures.
Michael Samilov, M.A., Acting Assistant Professor of Slavic Languages and Literatures.
Lawrence L. Thomas, Ph.D., Assistant Professor of Slavic Languages and Literatures.
Emil Kovtun, M.A., Acting Assistant Professor of Slavic Languages and Literatures.
Olga Astromoff, M.A., Associate in Russian.
Michael K. Pawlikowski, LL.M., Associate in Polish and Russian.
Lottie W. Salz, M.A., Associate in Czech.

Mieczyslaw F. Giergielewicz, Ph.D., Lecturer in Slavic Languages and Literatures.
Ludmilla A. Patrick, M.A., Lecturer in Russian.

Letters and Science List.—All undergraduate courses in this department are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Thomas.

The Major.—Required: courses 1, 2, 130, 140 and 198; in addition, 12 units in upper division language courses (not including course 100) and 5 units in upper division lecture courses in Slavic literatures, and the passing of a comprehensive examination.

Honors.—In addition to satisfying the requirements for the major, candidates for honors must take 3 units in an upper division course in the language of specialization (not including courses 100, 105, 119, or 120) and 3 units of advanced, independent study (course 199) of the literature of specialization. Honors candidates will be required to answer special questions on the comprehensive examination.

LOWER DIVISION COURSES

1. Elementary Russian. Beginners’ Course. (4) I and II.
   Mr. Thomas (in charge)
   Two lectures and three recitation hours per week.
The conversation course of corresponding level is 18A.

2. Elementary Russian (continuation of 1). (4) I and II.
   Mr. Whitfield (in charge)
   Two lectures and three recitation hours per week. Prerequisite: course 1.
The conversation course of corresponding level is 18B.

3. Intermediate Russian. (4) I and II.
   Mr. Pawlikowski (in charge)
   Three lectures and two recitation hours per week. Prerequisite: course 2.

1 In residence fall semester only, 1959–1960.
Reading, composition, translation. The conversation course of corresponding level is 19.

*5A-5B. Elementary Ukrainian. (3–3) Yr. Mr. Thomas
6A-6B. Elementary Polish. (3–3) Yr. Mr. Thomas, Mr. Whitfield
10A-10B. Elementary Serbo-Croatian. (3–3) Yr. Mr. Samilov
*12A-12B. Elementary Bulgarian. (3–3) Yr. Mr. Whitfield
14A-14B. Elementary Czech. (3–3) Yr. Mrs. Salz

18A. Elementary Russian Conversation. (2) I and II. Mrs. Astromoff
Open only to students who are taking course 1.

18B. Elementary Russian Conversation. (2) I and II. Mrs. Astromoff
Open only to students who are taking course 2.

19. Intermediate Russian Conversation. (2) I and II. Mr. Pawlikowski
Open only to students who are taking course 3.

39. Great Writers of Russian Literature. (3) I. Mr. Maslenikov
No knowledge of Russian is required.

UPPER DIVISION COURSES

A. Language Courses

100. Specialized Russian Reading. (3) I. Mr. Thomas
(Formerly numbered 125.)
Prerequisite: course 3 or consent of the instructor.
Rapid reading of texts in the natural and social sciences.

102. Intensive Russian Reading, Grammar, and Composition. (3) II.
Prerequisite: course 3. Mr. Maslenikov
The conversation course of corresponding level is 119.

103A–103B. Advanced Russian. (3–3) Yr. Mrs. Patrick
Prerequisite: course 102.
The conversation course of corresponding level is 120.

104. Russian Composition. (3) I. Mr. Struve
Prerequisite: course 103B.

105. Written Translation from Slavic Languages. (1–3) I and II.
The Staff (Mr. Whitfield in charge)
May be taken only in combination with some other advanced course in Slavic languages.

Prerequisite: course 6B. Mr. Pawlikowski

108. Advanced Studies in Polish Grammar. (3) II. Mr. Thomas
Prerequisite: course 107B.

Prerequisite: course 10B. Mr. Samilov

112. Advanced Studies in Serbo-Croatian Grammar. (3) I. Mr. Samilov
Prerequisite: course 111B.

Prerequisite: course 14B. Mrs. Salz

* Not to be given, 1959–1960.
116. **Advanced Studies in Czech Grammar.** (3) I. Mr. Kovtun  
Prerequisite: course 115B.

119. **Advanced Russian Conversation.** (2) II. Mr. Pawlikowski  
Open only to students who are taking course 102.

120. **Advanced Russian Conversation (continuation of 119).** (2) I.  
Open only to students who are taking course 103. Mrs. Patrick

124. **Advanced Russian Composition.** (3) II. Mrs. Patrick  
Prerequisite: course 104.

198. **Group Conference and Assigned Reading.** (2) I and II.  
The Staff (Mr. Whitfield in charge)  
Intended as preparation for the comprehensive examination.

199. **Special Study for Advanced Undergraduates.** (1-5) I and II.  
The Staff (Mr. Whitfield in charge)

**B. Lecture Courses on Slavic Literatures**

Except where otherwise indicated, these courses are given in English and  
require no knowledge of any other language. They are open to all students of  
least junior standing and, with the consent of the instructor, to properly  
qualified sophomores.

130. **Introduction to Russian Literature.** (3) I. Mr. Struve  
Survey of Russian literature and intellectual trends.

*131. **Russian Literature (1880–1917).** (3) II. Mr. Maslenikov  
Garshin, Chekhov, Gorky, Andreev, Bunin, Kuprin, Korolenko, the  
Symbolists, and others.

*132. **Russian Literature since 1917.** (2) II. Mr. Struve

133A. **Russian Novelists of the Nineteenth Century and Western European**  
Literatures. (3) I. Mr. Gibian  
Emphasis will be placed on the influence of western European literatures on  
the development of the Russian novel. Tolstoy and Dostoevsky are not in­
cluded.

133C. **Dostoevsky.** (3) I. Mr. Gibian

133D. **Tolstoy.** (3) II.  

*133E. **Turgenev.** (2) I.  

133F. **Chekhov.** (2) II.  

*134. **Russian Folklore.** (2) I. Mrs. Patrick

135. **The Russian Drama.** (2) I. Mrs. Patrick  
Survey of Russian drama from the seventeenth century to the twentieth.

140. **Survey of Slavic Literatures.** (3) I. Mr. Kovtun  
Reciprocal relations of the Slavic literatures, with particular reference to  
the literary development and intellectual history of the Western and Southern  
Slavs.

143. **Introduction to Modern Slavic Literary Theory.** (2) II. Mr. Kovtun  
A survey of main trends in the development of literary theory in twentieth-
century Russia, Poland, and Czechoslovakia, with special attention to the  
writing and theories of the Formalist and Structuralist schools.

* Not to be given, 1959–1960.
151. Polish Literature: Sixteenth–Eighteenth Centuries. (3) II.  
Mr. Giergielewicz  
Polish writers of the Golden Age (sixteenth century); of the seventeenth century; and of the Renaissance of the eighteenth century.

153. Polish Literature of the Post-Romantic Period. (2) I.  
Mr. Giergielewicz  
Novelists of the period of Positivism, and Young Poland.

154. Polish and Russian Romanticism. (2) II.  
Mr. Giergielewicz

*155. Mickiewicz. (2) I.  

160. Survey of Czech and Slovak Literature. (2) I.  
Mr. Kovtun  
The development of Czech and Slovak literature from the sixteenth century to the present.

*161. Czech and Slovak Literature of the Nineteenth Century. (2) II.  
Mr. Kovtun

170. Survey of South Slavic Literatures. (2) II.  
Mr. Samilov

*180A–180B. Survey of Russian Culture. (2–2) Yr.  
Mr. Struve  
180A. Origin of Russian culture and its peculiarities. Eastern and Byzantine influences. Rapprochement with the West and development of a national consciousness, literature, art, religion, science, and social institutions in the seventeenth and eighteenth centuries.  
180B. Development of Russian material, social, and spiritual culture since the beginning of the nineteenth century and its features before and after the Revolution.

182. History of Polish Culture. (2) I.  
Mr. Giergielewicz  
Development of the arts, thought, and institutions of Poland.

187. Russian Poetry. (2) II.  
Prerequisite: course 103A or consent of the instructor.  
Lecture course given in Russian.

188. The Slavic-Speaking World. (3) II.  
Mr. Kovtun

GRADUATE COURSES

Language Courses

220. Seminar in Comparative Slavic Linguistics. (2) II.  
Mr. Thomas  
Descriptive and historical studies within the Slavic family of languages. The subject matter will vary according to the needs and interests of the students enrolled.

224. Old Church Slavic. (3) I.  
Mr. Thomas

226. Seminar in Russian Linguistics. (2) I.  
Mr. Maslenikov  
Description and history of the Russian language. Phonetics and phonemics, morphology, syntax, and historical grammar will constitute the varying subject matter of the course.

Literature Courses

235. Seminar in Russian Literature. (2) I.  
Mr. Struve  
Advanced studies, according to the needs of the students enrolled, in the history of the Russian literary language, eighteenth-century Russian literature, post-Revolutionary Russian literature, and the Russian critics.

* Not to be given, 1959–1960.
237. Seminar in Early Russian Literature. (2) II. Mr. Maslenikov

240. Seminar in Russian Poetry and Fiction, 1800–1880. (2) II. Mr. Maslenikov
The subject matter of the course will vary according to the needs and interests of the students enrolled.

*248. Seminar in Russian Poetry and Fiction, 1880–1917. (2) I. Mr. Maslenikov

255. Russian Prose. (2) I. Mr. Gibian
Lecture course given in Russian.

*288. Seminar in Polish Literature. (2) I. Mr. Samilov

*289. Seminar in South Slavic Literature. (2) I. Mr. Samilov

290. Seminar in Czech and Slovak Literature. (2) II. Mr. Kovtun

298. Individual Work. (1–4) I and II. The Staff (Mr. Whitfield in charge)
Graduate students will be offered opportunities for independent reading and study. Credit will be assigned according to the amount of work done.

Scientific Russian for Graduate Students. First Course. (No credit) I. Mr. Maslenikov
A course designed to prepare students for graduate reading examinations in the sciences.

Scientific Russian for Graduate Students. Second Course. (No credit) II. Mr. Maslenikov
Prerequisite: first course.
A course designed to prepare students for graduate reading examinations in the sciences.

**SOCIAL SCIENCE**

(Department Office, 220 Wheeler Hall)

Lewis S. Feuer, Ph.D., Professor of Philosophy.
Eugene L. Burdick, Ph.D., Associate Professor of Political Science.
Fred H. Goldner, M.A., Associate in Social Science.
Thomas R. Morrison, B.A., Associate in Social Science.
Gayl D. Ness, M.A., Associate in Social Science.
Guenther Roth, Associate in Social Science.
Marshall Windmiller, M.A., Associate in Social Science.

Shanti S. Tangri, M.A., Lecturer in Economics and Social Science.

1A–1B. Introduction to Social Science. (3–3) Yr. The Staff (Mr. Feuer in charge)
Two lectures and two discussion sections per week.
Basic theories, concepts, and findings of the social sciences with reference to underlying questions of policy. Among problems to be considered are class structure, economic stability and growth, racial relations, democratic process, and cultural change among peoples of underdeveloped areas.

* Not to be given, 1959–1960.
Milton Chernin, Ph.D., Professor of Social Welfare (Chairman of the Department).
Henry S. Maas, Ph.D., Professor of Social Welfare.
*Davis McEntire, Ph.D., Professor of Social Welfare.
†Gertrude Wilson, M.A., Professor of Social Welfare.
Walter Friedlander, Ph.D., Professor of Social Welfare, Emeritus.
Ruth Cooper, D.S.W., Associate Professor of Social Welfare.
*Ernest Greenwood, Ph.D., Associate Professor of Social Welfare.
Gordon Hearne, Ph.D., Associate Professor of Social Welfare.
Maurine McKeany, Ph.D., Associate Professor of Social Welfare.
*Margaret S. Schubert, Ph.D., Associate Professor of Social Welfare and Field Work Supervisor.
Kermit T. Wiltse, D.S.W., Associate Professor of Social Welfare.
Martin Wolins, M.S.W., Associate Professor of Social Welfare.
Irving P. Babow, Ph.D., Acting Assistant Professor of Social Welfare.
Joseph S. Briar, M.S.W., Assistant Professor of Social Welfare.
Irving M. Piliavin, M.S.W., Acting Assistant Professor of Social Welfare.

Florence Clemenger, M.S.W., Lecturer in Social Welfare and Field Work Supervisor.
George A. De Vos, Ph.D., Lecturer in Social Welfare.
Sally Dewees, M.S., Lecturer in Social Welfare.
Margaret Gordon, Ph.D., Lecturer in Social Welfare.
Herbert Maccoby, Ph.D., Lecturer in Social Welfare.
Anna Maenchen, Ph.D., Lecturer in Social Welfare.
Sheldon Margen, M.D., Lecturer in Social Welfare.
Charles O'Shea, M.S.W., Lecturer in Social Welfare and Field Work Supervisor.
Elizabeth E. Pfeiffer, M.S.W., Lecturer in Social Welfare and Field Work Supervisor.
Ralph H. Potter, Jr., M.D., Lecturer in Social Welfare.
Margaret E. Purvine, M.S.W., Lecturer in Social Welfare and Field Work Supervisor, in Charge of Admissions.
Mary A. Sarvis, M.D., Lecturer in Social Welfare.
Alexander Simon, M.D., Professor of Psychiatry and Lecturer in Social Welfare.
Hasseltine Byrd Taylor, J.D., Ph.D., Lecturer in Social Welfare.
Kent Zimmerman, M.D., Lecturer in Social Welfare.

Alice Barber, M.A., Field Work Supervisor in Social Welfare.

The School of Social Welfare administers a two-year graduate program of education for social work, leading to the degree of Master of Social Welfare. For information regarding admission to and requirements prescribed for the graduate program, see the Announcement of the School of Social Welfare.

The department administers the group major in social welfare (in the College of Letters and Science), a preprofessional preparatory program, which is described in the Circular of Information.

Letters and Science List.—Courses 100, 106, and 110A–110B are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

**Upper Division Courses**

100. The Field of Social Welfare. (3) I and II. Mr. Chernin

Not open to students who are taking or have completed course 110A–110B.

A survey of the field of social welfare and social work functions. The rise of modern social work and the distinctive techniques of the social work profession. Designed to acquaint undergraduates and nonprofessional students with the field of social welfare.

102. Methods in Social Work. (3) I and II. Mr. O'Shea

Prerequisite: for students in the social welfare major, senior standing and course 110A (may be taken concurrently); others, course 110A (may be taken concurrently) or course 100, and consent of the instructor.

An introduction to social work methods, including social case work, social group work, and community organization for social welfare. Designed to acquaint students with the basic philosophy, concepts, and applications of these methods. Observational visits to social agencies and institutions will be arranged.

*106. Community. (2) II.

The concept of community; the major institutions of the modern community; community surveys in the United States; how to study the community; the sociological background of "community organization."

110A–110B. The Social Services. (3–3) Yr. Mr. Piliavin

Course 110A is prerequisite to 110B.

110A. Basic concepts of the social services; history of their development in England and the United States from the British Poor Law to the present.

110B. Present system of social services in the United States. Problems of organization and administration of public assistance, child welfare, medical care, mental hygiene, corrections, veterans' services, and social insurance.

* Not to be given, 1959–1960.
*198. Group Study for Advanced Undergraduates. (1-3) I and II.
   The Staff (—— in charge)
   Prerequisite: upper division standing and consent of the instructor.

199. Special Study for Advanced Undergraduates. (1-3) I and II.
   The Staff (Mr. Hearn in charge)
   Prerequisite: senior standing and approval of the major adviser.
   Individual readings, research, and conferences with the instructor in a
   field chosen by the student with approval of the instructor.

GRADUATE AND PROFESSIONAL COURSES

These courses are intended primarily for students enrolled in the graduate
program of the department, and are limited to such students except by per­
mission of the department.

201. Law and Social Welfare. (1) I. Mrs. Taylor
   Legal information for social workers; the sources of California laws. The
courts of California; fundamentals of law governing domestic relations, neg­
lected and dependent children, delinquents, landlord and tenant, etc.; prob­
lems of legal procedure.

202A–202B. Social Case Work. (2–2) Yr.
   Miss Alexander, Miss Cooper, Mrs. Dewees, Miss Pfeiffer
   Introduction to the theory and practice of social case work.

203. Community Organization. (2) I and II. Mr. Wolins
   A study of the social resources of the community and of methods of organ­
izing these resources for the meeting of human needs.

205A–205B. Growth and Change of the Individual. (2–2) Yr.
   Mr. Maas (in charge), Mr. DeVos, Mrs. Dewees, Mr. Margen, Mr. Potter, Mr. Zimmerman
   Basic facts, theories, and problems in the physiological, psychological, and
   social development of the individual, with emphasis on adaptation to stress,
as related to social welfare.

207. Social Welfare Organization. (2) I and II. Mrs. Taylor, Mr. Wiltse
   Major concepts of organization and administrative relationships in the
   public and private social welfare programs.

208. Social Welfare and Income Maintenance. (2) I and II.
   Mrs. Gordon, Miss McKeany
   Critical and evaluative study of social welfare policies, methods, problems,
   and issues in the use of public assistance and social insurance programs to
   maintain income.

209. Theory of Group Development. (2) I. Mr. Hearn
   The scientific bases of group behavior with emphasis on understanding the
   universal properties of groups. Open to graduate students in other depart­
ments.

*252. Public Welfare Administration. (2) I.
   The administrative process within the public welfare agency. Problems of
   administration.

* Not to be given, 1959–1960.
253. Family and Child Welfare Service. (2) I. Mr. Wiltse
The development, organization, and administration of specific family and child welfare services, including family and marital counseling, and programs for the care and protection of dependent and neglected children.

254. Medical Social Work. (1) II. Miss Hoodwin
The development, organization, and administration of medical social service functions in institutional and extramural settings including public health.

257A–257B. The Treatment of Delinquency. (2–2) Yr. Mr. Chernin
257A. Institutional treatment; history and development of penal and correctional institutions for adults and juveniles; theories and programs of treatment; organization and administration of correctional services.
257B. Noninstitutional treatment, probation, and parole; theory and development of probation, parole, and the indeterminate sentence; the organization and administration of parole and probation services.

258A–258B. Advanced Social Case Work. (2–2) Yr. Mr. Briar, Miss Cooper, Mr. O'Shea, Miss Pfeiffer, Mrs. Wertheimer, Mr. Wiltse
258A. Assignment to sections according to field work placement as follows: corrections; family and child welfare; medical; psychiatric. Emphasis on particular knowledge required in social case work practice in these settings, including organization and administrative structure.
258B. Each section includes students from all settings; emphasis on common elements of social case work practice.

*259. Principles and Methods of Supervision in Social Welfare. (2) II.
Prerequisite: completion of one year of education in a recognized school of social work, including a case work or group work and field work sequence. Educational and psychological principles involved in supervision; purposes, possibilities, and current practices of supervision in social agencies; critical evaluation of supervising case material drawn from present practice.

262. Psychiatry and Social Work. (2) I. Miss Sarvis, Mr. Simon
The diagnosis and treatment of the psychoneuroses, neuroses, psychoses, and mental deficiencies, and their social implications. Various schools of psychiatric thought.

265. Social Welfare Research. (2) I and II. Mr. Wolins
Prerequisite: Economics 2 or Psychology 5 or the equivalent.
Fields and methods of social welfare research; techniques of collecting data; analytical methods.

266. Psychoanalysis and Social Work. (2) II. Mrs. Maenchen, Miss Sarvis
The contribution of psychoanalytic theory to social work.

280. Group Method in Social Work. (2) II. Mrs. Clemenger, Mr. Hearn
Underlying concepts, principles, and techniques of social work methods with groups. Application to groups served by agencies in all fields of social work practice.

281A–281B. Social Group Work. (2–2) Yr. Mrs. Clemenger
Introduction to the theory and practice of social group work.

*282A–282B. Advanced Social Group Work. (2–2) Yr.
282A. Advanced analysis of social group work theory and practice; social group work practice in secondary settings.
282B. Administrative aspects of social group work practice.

* Not to be given, 1959–1960.
283. Group Process in Professional Practice. (2) I and II.
(Formerly numbered 280.)
Mr. Hearn
Prerequisite: for social welfare students, course 280.
Theory of group action and leadership essential in the development of
cOMPETENCE to participate in professional groups. Open to graduate students
in other departments.

*291. International Social Services. (2) I.
An examination of the international social agencies and their activities.
Comparative analysis of the development and main characteristics of the sys-
tem of public and private social services in selected foreign countries.

*292. Cultural and Social Aspects of Social Welfare Practice. (2) II.
Prerequisite: open to graduate students in any school or department whose
interest and research is concerned with such problems, and who have consent
of the instructor.
Intensive survey of the relationships of diverse social and cultural back-
grounds of groups (ethnic, racial, religious, class, caste) in the United States
to the problems and practice of professional social work.

293. Seminar on Social Security. (2) I.
Mrs. Gordon
Prerequisite: Economics 185 or an equivalent course in social insurance.
Advanced study and research in social security; special emphasis on rela-
tionships between the social insurances and social welfare programs.

*295. Seminar in Research Problems and Methods. (2) II. Mr. McEntire
Prerequisite: course 265 or the equivalent, and consent of the instructor.
Selection and definition of research problems; design of social surveys and
experiments; methodological problems.

296A–296B. Social Work Practice in Public Health. (2–2) Yr.
Miss Hoodwin
Limited to graduate social workers admitted to the intern year and medical
social workers employed in public health.
Theory, problems, and practice of social work in the field of public health.

298. Special Studies. (1–6) I and II. The Staff (Mr. Chernin in charge)
Individual or group study, with emphasis on original research, as may be
arranged.

299. Special Research. (2) I and II.
Mr. Babow, Mr. Briar, Mr. De Vos, Mr. Hearn,
Mr. Maas, Mr. Maccoby, Mr. Piliavin
Open to candidates for the degree of Master of Social Welfare who have
completed course 265 or the equivalent.
Group research on selected problems in social welfare.

401.Field Work. (2–12) I and II.
Miss Pettes (in charge), Miss Alexander, Miss Barber, Mr. Bauer,
Miss Bland, Mr. Briar, Mrs. Clemenger, Mrs. Cole, Miss Cooper,
Mrs. Dawes, Mrs. Ferguson, Miss Godfrey, Mr. Hearn, Mr. Jennings,
Mr. Kramer, Mrs. Mounts, Miss Neel, Mr. O'Shea, Mrs. Oswald,
Mrs. Panaccion, Miss Pfeiffer, Mr. Piliavin. Mrs. Stewart, Miss
Watt, Mrs. Wertheimer, Miss Wilson
Field work in social agencies under supervision, as prescribed and arranged
by the staff. The normal program for first-year students is 400 hours of super-

* Not to be given, 1959–1960.
vised work (two days per week during two semesters), for which 8 units of credit are granted; for less work, proportionately less credit is allowed. For second-year students, advanced field practice in specialized types of social work, to be offered two or three days a week during each semester, or to be arranged in periods of continuous work, is normally required. Field work arrangements vary in extent and credit in accordance with the needs of individual students.

404. Internship in Social Work Practice in Public Health. (6-10) I and II. Miss Hoodwin (in charge),

Limited to graduate social workers admitted to the intern year.
Supervised social work practice in public health departments four or five days a week during an eleven-month period.

410A-*410B. Program Media in Social Group Work. (1-1) Yr. Mrs. Clemenger

The development of diagnostic skill in the use of program media in social group work programs in various settings; practice as necessary.

*Conference on Social Welfare. (No credit) I and II.
The Staff (——in charge)

Lectures and discussion on current problems in social welfare by members of the staff and by visitors.

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**SOCIOMETRY AND SOCIAL INSTITUTIONS**

(Department Office, 206 South Hall)

Reinhard Bendix, Ph.D., Professor of Sociology and Social Institutions (Chairman of the Department).
Herbert Blumer, Ph.D., Professor of Sociology and Social Institutions and Director, Institute of Social Science.
Kingsley Davis, Ph.D., Professor of Sociology and Social Institutions.
Wolfram Eberhard, Ph.D., Professor of Sociology and Social Institutions.
Charles Y. Glock, Ph.D., Professor of Sociology and Social Institutions, and Director, Survey Research Center.
Seymour M. Lipset, Ph.D., Professor of Sociology and Social Institutions.
Leo Lowenthal, Ph.D., Professor of Sociology and Social Institutions, and Professor of Speech.
Philip Selznick, Ph.D., Professor of Sociology and Social Institutions (Vice-Chairman of the Department).
Margaret T. Hodgen, Ph.D., Professor of Sociology and Social Institutions, Emeritus.
Kenneth E. Bock, Ph.D., Associate Professor of Sociology and Social Institutions.
Erving Goffman, Ph.D., Associate Professor of Sociology and Social Institutions.
William Petersen, Ph.D., Associate Professor of Sociology and Social Institutions.
William A. Kornhauser, Ph.D., Assistant Professor of Sociology and Social Institutions.
Herbert F. Schurmann, Ph.D., Acting Assistant Professor of Sociology and Social Institutions and Acting Assistant Professor of History.

* Not to be given, 1959-1960.
1 In residence fall semester only, 1959-1960.
* In residence spring semester only, 1959-1960.
Letters and Science List.—All undergraduate courses in this department are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Bock, Mr. Kornhauser.

The Major.—Candidates’ programs must be submitted to a departmental adviser for approval. The department will certify to the completion of the major program for graduation upon fulfillment of the following requirements: completion of the following courses in sociology: 1, 30, 40, 105, 109, and 141, plus 15 units from other courses within the department. Recommended: Anthropology 2A–2B, Economics 1A–1B, History 4A–4B, Philosophy 20A–20B, Psychology 1A–1B, Social Science 1A–1B. The completion of the major will require the maintenance of at least a C average. (The above requirements apply to students beginning their junior year in 1958-1959. Students entered before 1958-1959 may fulfill former requirements listed in the 1957-1958 Announcement of Courses, Departments at Berkeley.)

1. Man and Society. (3) I and II. Mr. Selznick, Mr. Lipset
   Two lectures and one weekly discussion section to be arranged.
   An introduction to sociology. Analysis of human group life through principles, concepts, and theories: culture, institutions, community, collective behavior, personality, social roles, social disorganization, social planning, etc.

30. Society and Personality. (3) II. Mr. Goffman
   Two lectures and one weekly discussion section to be arranged. Recommended preparation for upper division courses in social psychology; also open to general students.
   Consequences of participation in group life: the social organization of perspective and personality, and the social control of conduct.

40. Introductory Statistics in Sociology. (3) I. Mr. Nicholls
   (Formerly numbered 106.)
   Prerequisite: Mathematics D or equivalent.
   Two lectures and one three-hour laboratory per week.
   An introduction to basic procedures of statistical analysis of social data; frequency distributions, measures of central tendency and dispersion, simple correlation techniques, measures of reliability and significance.

100A–100B. Theory of Social Process. (3–3) Yr. Mr. Bock
   100A is not prerequisite to 100B.
   100A. Traditional perspectives in the study of social and cultural development; the idea of cycles and the idea of progress.
   100B. Objectives and procedures of nineteenth-century studies of social process. Recent approaches and the break with traditional orientations.

1 In residence fall semester only, 1959–1960.
2 In residence spring semester only, 1959–1960.
*104. Group Life and the Social Self. (3) II.
Recommended: course 1 or 30.
Coordination in group behavior, with special reference to the genesis and functioning of the self. Introduction to the social psychology of G. H. Mead, with elaboration and evaluation in the light of current research.

105. Introduction to Methods of Sociological Study. (3) II. Mr. Nicholls
Prerequisite: course 40 and 6 additional units in sociology, or the equivalent.
Examination of methodological problems and technical procedures involved in the selection and definition of problems of investigation; and in the selection, description, classification, and analysis of data.

107. Social Control. (3) II.
Critical evaluation of divergent approaches to the analysis of social control.

108. Principles of Sociology. (3) I. Mr. Kornhauser
Prerequisite: courses 1 and 30; or Social Science 1A-1B.
A comprehensive survey of the fundamentals of general sociology at an advanced level. Consideration of the concepts and principles underlying the various areas of sociological concern.

109. Sociology and Social Thought. (3) II. Mr. Smelser
History of social thought treated as the source of contemporary problems and hypotheses.

110. Inter-Ethnic Contacts. (3) II. Mr. Schurmann
Prerequisite: course 1 or consent of the instructor.
Consequences of the contact of peoples: the symbolic significance of identification marks, multi-ethnic status systems, minority groups and movements, inter-ethnic tensions, race ideology and public policy.

114. Advanced Quantitative Methods in Sociology. (3) II. Mr. Selvin
Prerequisite: course 106 or the equivalent.
Analysis of variance and its application to sociological problems. Linear, nonlinear, multiple and partial correlation and regression. Analysis of covariance. Sampling procedures. Scaling theory for questionnaire and interview material. Introduction to factor analysis; logic of measurement.

115. Major Social Problems. (3) I. Mrs. Powell
The bearing of sociological investigation on the diagnosis and treatment of problems arising from social and cultural disorder. Race relations, crime, old age, industrial conflict, and political disorder will be among the topics discussed.

118. Political Sociology. (3) II. Mr. Alford
Introduction to the study of political processes in organized groups, with particular regard to the social bases of power. The role of social classes, occupational groups, and religious groups, and the influence of cultural values.

120. Organizations and Institutions. (3) II. Mr. Cain
Not open to students who have received credit for course 102 or 111.
Sociological analysis of administrative organizations and voluntary associations, with emphasis on the major social institutions in industry, government, religion, and education.

125. Sociology of Intellectual Life. (3) II. Mr. Bendix
The social status of the intellectual and the problem of knowledge and action in social thought are discussed. The treatment of this problem by major

* Not to be given, 1959-1960.
social theorists is analyzed, together with related issues in the sociology of intellectual life.

129. Sociology of Occupations and Professions. (3) I. Mr. Kornhauser
An historical and comparative study of selected occupational and professional groups, with emphasis on the social significance of occupational ideologies and the sociological factors related to their development.

130. Sociology of the Family. (3) I. Mr. König
Systematic and comparative analysis of family structure and change in relation to other aspects of society, including study of family processes such as marriage, reproduction, child-rearing, and marital dissolution.

*131. Study of Social Processes. (3) I. Mr. Bock
Laboratory and discussion sessions, personal conferences, occasional lectures.
Research course in the comparative and historical study of institutional processes. Individual or group projects in the investigation of processes involved especially in conflict or peaceful contact situations between peoples and groups; other projects accepted with consent of the instructor. Emphasis on the sociological use of historical materials.

132. Social Stratification. (3) I. Mr. Lipset
Analysis of recent occupational trends and of social problems of occupational stratification; social classes in local communities and the nation as related to interest organizations.

133. Population: Theory and Methods of Study. (3) I. Mr. Petersen
Introduction to the science of population, including statistical techniques and theoretical interpretation. Social causes and consequences of population trends; changes in population structure, geographical distribution, and migration; relation of population to resources and levels of living; national population policies.

*134. Sociology of War and Conflict. (3) II. Mr. Bock
War as a form of social conflict; violent and peaceful procedures in the pursuit of national objectives; analysis of attempts to specify the common antecedents of war.

135. Social Change in Underdeveloped Countries. (3) I. Mr. Schurmann
The problem of progress; the process of change; analysis of factors influencing social change, especially in modern Western and Asiatic society.

140. Social Change. (3) I. Mr. Alford
An explanation of the major sources of change in societies and of ways of predicting future changes.

141. Social Organization of Modern Western Societies. (3) I. Mr. Petersen
Major social changes in Western industrial society since the breakdown of feudalism.

142. Comparative Institutions. (3) I. Mr. Eberhard
Comparative treatment of selected social institutions, with special reference to present industrial, modern societies. Relation of ideas to institutions; institutions and social change.

*145. Pre-Industrial Societies. (3) I. Mr. Eberhard
Comparative treatment of social institutions of political character and their transformation. Village, city, state, and the problem of stratification.

* Not to be given, 1959–1960.
146. Sociology of Religion. (3) I. Mr. Glock
A systematic survey of the sociology of religion covering sociological theory of religion, the organizational structure of religion, the character of religious authority and leadership, the individual and his religion, and the interplay between religion and other spheres of social life.

148. Elementary Collective Behavior. (3) II. Mr. Blumer
Spontaneous, non-institutionalized forms of group behavior; social contagion and crowd behavior, psychic epidemics, popular arts and interests, fashion movements, formation and manipulation of public opinion.

149. Social Movements and Public Action. (3) II. Mrs. Powell
Analysis of social movements, the formation and play of public opinion, and the behavior of interest groups.

*157. Rural Social Organizations. (3) I.
Study of differences in the social organization of agricultural communities in Latin America, the Orient, South Africa, Canada, and the United States, with emphasis on the effects of industrialization in these areas.

160. Urbanization and the City. (3) II. Mr. Petersen
Analysis of the nature, causes, and consequences of urbanization throughout the world; the growth and structure of metropolitan areas; the location and types of cities; the social and demographic characteristics of urban populations.

161. Community and Modern Industry. (3) I. Mr. König
Institutional and ideological setting of industry; effects of size and composition of the community on industry and trade unions; social groupings in the community and the factory.

166. Oriental Societies. (3) I. Mr. Eberhard
Main characteristics of Asiatic agricultural societies (China, Japan, India). Differences from Western cultures. Research methods. Emphasis on the medieval periods.

*167. Nomadic Societies. (3) II. Mr. Eberhard
Main characteristics of Asiatic nomadic societies (Central Asia, Turks, Mongols, Middle East). Their contacts with non-nomadic cultures.

*168. Culture Contacts and Colonial Policies. (3) II. Mr. Schurmann
Study of the impact of Western colonial policies and practices upon the indigenous social structure of non-Western countries, with special reference to India and Southeast Asia.

*175. Communication and Social Contact. (3) II. Mr. Goffman
Recommended: course 1 or 30.
The establishment of communication channels through differential contact and association; the emergence of consensus in selected primary and secondary groupings. Special emphasis upon the organization and modification of perspectives in mass societies.

178. Social Interaction and Personal Organization. (3) I. Mr. Blumer
A critical analysis of social interaction and personality. Dominant theoretical approaches and schemes of research in social psychology will be considered.

*180. Industrial Societies. (3) I. Mr. Bendix
Industrialization and other forms of economic modernization in relation to the changing social structure of selected western societies.

* Not to be given, 1959–1960.
182. The Metropolitan Community. (3) II. Mr. Cain
Analysis of the growth and development of metropolitan communities in the United States; the decentralization of population, industry, trade, services; the rise of suburbs, satellite cities, urban corridors; the changing functions of the metropolis; implications for political organization and planning.

H194. Senior Honors Seminar. (3) I. Mr. Bock
Two lectures and three discussion sections weekly. Prerequisite: open only to senior candidates for honors with bachelor's degree.
Intensive study of selected topic to provide background for honors thesis.

H195. Honors Thesis. (3) II. Mr. Bock
One lecture and six section meetings weekly. Prerequisite: H194 with grade of A or B.
Group and individual conferences.

199. Special Study for Advanced Undergraduates. (1-4) I and II.
The Staff (Mr. Bock in charge)

Introduction to Social Science (Social Science 1A-1B). (3-3) Yr. Mr. Feuer
Speech and Society (Speech 121A-121B). (3-3) Yr. Mr. Lowenthal
Rural Sociology (Agricultural Economics 112A-112B). (2-2) Yr. Mr. Taylor
Theory of Historical Inquiry (Philosophy 147). (2) II. Mr. Strong

GRADUATE COURSES

200A*-200B. Practicum in Sociological Field Research. (2-2) Yr. Mr. Trow
Prerequisite: consent of the instructor.
Conceptualization and problem formulation; hypotheses and study designs; techniques of observation, recording, and analysis. Participation in joint field studies on selected problems.

201A-201B. Methods of Sociological Research. (3-3) Yr. Mr. Trow, Mr. Selvin, Mr. Nicholls
Prerequisite: Sociology 40, or equivalent, which may be taken concurrently with 201A.
Design of theoretically oriented research; gathering, processing, and analyzing qualitative and quantitative data, including field methods, use of documents, and punched-card techniques. Problems of inference, causality, and measurement.

202. Seminar in Social Problems in Large-Scale Organization. (2) II. Mr. Goffman

203. Seminar in Contemporary Social Theory. (2) II. Mr. Bendix, Mr. Lipset

204. Seminar in Social Contacts. (2) II. Mr. Goffman
Types of social contact and the conditions of their establishment and dissolution.

207. Seminar in Social Action. (2) II. Mr. Blumer
Analysis of the social direction of human conduct: theories and research.

* Not to be given, 1959-1960.
*208. Seminar in Small Group Research. (2) II.

The major theoretical bases and empirical findings of small group research. Covers the procedures for observing group discussions, and techniques for the experimental study of groups. Practice in sociological observation of field and laboratory groups.

210. Seminar in Comparative Social Process. (2) II. Mr. Bock

(Formerly offered as 210A-210B.)

A study of comparable historical events or event series for the purpose of discovering social or cultural processes.

217. History of Social Thought Since the Enlightenment. (3) I.

Mr. Bendix, Mr. Fallers, Mr. Bock

Intellectual background of social theory; surveys of utilitarianism, historicism, conservatism, Marxism, positivism, theories of social evolution, functionalism. Selected writings of major precursors of modern social science will be discussed.

218. Modern Sociological Theory. (3) II. Mr. Davis, Mr. Smelser

A graduate lecture course presenting a systematic and critical treatment of the major points of view and approach in sociology.

219. Sociology of Law. (2) II. Mr. Selznic

A graduate lecture course; functions of law in society; social sources of legal change; social conditions affecting the administration of justice; role of social science in jurisprudence.

220. Seminar in Systematic Sociological Theory. (2) I. Mr. Selznic

221A*-221B. Seminar in Social and Historical Processes. (2-2) Yr. 221A is not prerequisite to 221B. Mr. Cain

*224. Seminar in Social Change. (2) I. Mr. Smelser

Delineates and explains patterns of social change, especially in the rise and spread of industrial regions. Particular application to underdeveloped countries. Individual projects by students, involving a combination of empirical and theoretical analysis.

225. Seminar on the Sociological Analysis of Economic Behavior. (2) II. Mr. Smelser

The general nature of economic behavior; the economy as a social system; consumer psychology and consumer spending patterns; the institutional context of production and exchange; the institutional aspects of economic growth.

229. Seminar in the Sociology of Professions. (2) II. Mr. Kornhauser

Sociological analysis of professions and professionalization. Recruitment, socialization, autonomy, authority, organization, control, etc., of professionals. Relation of professions to universities, government, industry, etc. Comparative study of professions in different societies.

230. Seminar in Population. (2) II. Mr. Petersen

An analysis of varied problems in the theory of population with particular reference to institutional and motivational aspects of demographic behavior.

231. Research Seminar on Comparative Family Structure. (2) II.

Prerequisite: graduate standing. Mr. Davis

Analytical research on comparative family structures with particular reference to demography, urbanization, stratification, and social change.

* Not to be given, 1959—1960.
235. Seminar in Non-European Cultural Stratification. (2) I.  Mr. Eberhard

Social processes in Asiatic and North African pre-industrial societies resulting from conquest of agrarian communities by nomads. Problem of feudalism.

*236. Social Change in Underdeveloped Countries. (2) II. Mr. Eberhard

Study of the process of modernization and industrialization of non-Western societies, with special reference to colonial and non-colonial areas of Asia.

237. Seminar: Comparative Study of Totalitarian Societies. (2) II.  Mr. Schurmann

Prerequisite: A previous course in sociological or political theory, or consent of instructor.
Analysis of theories of totalitarianism; comparative study of society, politics, and ideologies of modern totalitarian societies, particularly the U.S.S.R. and Communist China.

*238. Seminar in Colonization by Non-Western Societies. (2) II.  Mr. Schurmann

Study of migratory processes in Asia, especially the Far East, in the medieval and modern period. Chinese, Japanese, and Indian expansion and their influence upon social change in the area of penetration.

240. Seminar in Leadership and Social Structure. (2) II.  Mr. Selvin

Theoretical and empirical analysis of the relationships between leaders and their followers in organized groups. Methods for measuring leadership and other aspects of group structure.

241. Seminar in Institutional Analysis. (2) I.  Mr. Selznick

Prerequisite: course 120 or the equivalent.
The social conditions affecting the structure and functioning of voluntary associations and administrative organizations; the relation of such organizations to community integration.

*244. Seminar in Quantitative Sociology. (2) I.

Prerequisite: course 106, or the equivalent.
Application of statistical methods to changes in individual and group behavior. Design and analysis of panel, trend, and prediction studies. Typical problems will include development of political preferences during an election campaign, acquisition of professional values by medical students, etc.

246. Seminar in the Sociology of Religion. (2) II.  Mr. Glock

Prerequisite: course 146, or consent of the instructor.
The interplay between theory and research in the sociological study of religion; emphasizing particularly those problems in the field bearing on the interrelationship between religious ideas and institutions and the form of economic, political and social order.

248. Seminar in Collective Behavior. (2) I.  Mr. Blumer

Studies in mass behavior, social movements, and political action.

251. Seminar in Sociology of Literature. (2) II.  Mr. Lowenthal

Analysis of social change since the Renaissance as reflected in selected literary works and in concepts of the writer's role in society.

253. Seminar in Popular Opinion and Culture. (2) I.  Mr. Lowenthal

Theories of elite and popular cultures, particularly in modern mass society.

* Not to be given, 1959–1960.
260. Seminar in Political Sociology. (2) II. Mr. Kornhauser
(Formerly numbered 260A—260B.)
Contributions of sociology to theory and research in politics. Analysis of
structure and ideology of organized groups.

261. Seminar in Industrial Sociology. (2) I. Mr. Lipset
(Formerly numbered 261A—261B.)
Contributions of sociology to theory and research in industrial relations.
There will be special emphasis on study of the situation of the worker and
the employee in modern industry and on their involvement in various organi­
zations and the community.

*262. Seminar in Urbanization. (2) II.
A comparative study of the process of urbanization in the world as a whole
and in particular regions and countries. Causes and consequences of organiza­
tion, theory of urban location, patterns of city growth, and problems of
measurement.

*263. Seminar in Human Ecology. (2) I.
Intensive review of ecological theory and research; critical assessment of
technology, the physical environment, and demographic phenomena as factors
affecting the form and development of human communities; evaluation of the
present status of human ecology as a viewpoint within sociology.

299. Individual Study and Research. (1—6) I and II.
The Staff (Mr. Selznick in charge)

Systematic Theory of Human Societies (Anthropology 201). (3) II.
Mr. Schneider

The Metropolitan Region (City and Regional Planning 226). (2) II.
Mr. Foley

Seminar in Theories of History (Philosophy 247). (3) II. Mr. Strong

SOILS AND PLANT NUTRITION
(Department Office, 139 Giannini Hall)

Daniel G. Aldrich, Ph.D., Professor of Soils.
Daniel I. Arnon, Ph.D., Professor of Plant Physiology.
Geoffrey B. Bodman, Ph.D., Professor of Soil Physics.
Paul R. Day, Ph.D., Professor of Soil Physics.
Frank F. Harradine, Ph.D., Professor of Soil Technology, Davis.
Louis Jacobson, Ph.D., Professor of Soils and Plant Nutrition.
Hans Jenny, ScD., Professor of Soil Chemistry and Morphology.
A. Douglas McLaren, Ph.D., Professor of Soil Chemistry.
Roy Overstreet, Ph.D., Professor of Soil Chemistry.
R. Earl Storie, B.S., Professor of Soils and Plant Nutrition.
Perry R. Stout, Ph.D., Professor of Soil Science (Chairman of the Depart­
ment).
James P. Bennett, Ph.D., Professor of Plant Physiology, Emeritus.
John S. Burd, B.S., Professor of Soils and Plant Nutrition, Emeritus.
Walter H. Dore, B.S., Professor of Soils and Plant Nutrition, Emeritus.

* Not to be given, 1959—1960.
* In residence spring semester only. 1959—1960.
Soils and Plant Nutrition

Walter P. Kelley, Ph.D., Professor of Soil Chemistry, Emeritus.
Kenneth L. Babcock, Ph.D., Assistant Professor of Soil Chemistry.

Isaac Barshad, Ph.D., Lecturer in Soils and Plant Nutrition.
Theodore C. Broyer, B.S., Lecturer in Soils and Plant Nutrition (Vice-Chairman of the Department).
Homer D. Chapman, Ph.D., Professor of Soils and Plant Nutrition, Riverside.
Eric E. Conn, Ph.D., Assistant Professor of Plant Biochemistry.
Constant C. Delwiche, Ph.D., Associate Professor of Soil Science.
Leonard Machlis, Ph.D., Associate Professor of Botany.
Gordon Mackinney, Ph.D., Professor of Food Technology.
Edward C. Stone, Ph.D., Assistant Professor of Forestry.
John G. Torrey, Ph.D., Associate Professor of Botany.
Albert Ulrich, Ph.D., Lecturer in Soils and Plant Nutrition.
Frederick R. Whatley, Ph.D., Lecturer in Plant Physiology.
D. Emerton Williams, Ph.D., Lecturer in Soils and Plant Nutrition.

Letters and Science List.—Soil Science 110, 111, 112, 113, 114, and Plant Nutrition 115, 117 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser: Mr. Babcock.

Preparation for the Major.—For details, see the soil science curriculum, College of Agriculture, on page 84 of the Circular of Information.

No student will be accepted as a major student who has not attained at least an average grade of C in each of the fields of required courses in chemistry, physics, botany, bacteriology, and the geological sciences.

SOIL SCIENCE

LOWER DIVISION COURSES

10. The Soil and Its Significance to Man. (3) II. Mr. Jenny
Prerequisite: Chemistry 1A or high school chemistry. Cannot be used for credit in the soil science majors.
Designed for students who desire a general knowledge of soils, soil resources, soil conservation, and the relationship of soil to man and society.

10L. The Soil and Its Significance to Man. Laboratory. (1) II, Mr. Williams
Laboratory, demonstrations, and field trips. Prerequisite: course 10 (may be taken concurrently).

UPPER DIVISION COURSES

100. Soil Characteristics. (4) I. Mr. Day
Lectures, laboratory, and field trips. Prerequisite: Chemistry 1A-1B, Physics 2A-2B. Recommended: Geology 1 or 10, or the equivalent.
An introduction to the physical, chemical, and biological properties of the soil.

101. Development and Morphology of Soils. (3) II. Mr. Jenny
Prerequisite: Geology 1, Chemistry 1A-1B. Recommended: course 100.
Influence of climate, vegetation, parent material, topography, and time on soil development; chemistry of soil formation; classification of soils; relationships between soil groups and agricultural use; developed and illustrated by a critical study of representative soils of the world.
101F. Development and Morphology of Soils. (1) II.  Mr. Arkley
Field trips. Prerequisite: course 101 should be taken concurrently.
Excursions on Saturdays to illustrate facts and principles discussed in course 101.

102. Soil Physics. (2) II.  Mr. Bodman
Prerequisite: course 100, calculus (Mathematics 3A–3B, or 16A–16B).
Recommended: physical chemistry. Course 102L should be taken concurrently.
The physical properties of soils and their measurement.

102L. Soil Physics. (2) II.  Mr. Day
Laboratory. Prerequisite: course 102 (may be taken concurrently).
Laboratory experiments to accompany course 102.

103. Soils of California. (3) I.  Mr. Storie
Lectures and discussion section. Two field trips during the semester to be arranged. Prerequisite: Geology 1 and Chemistry 1A–1B.
The general character, mode of formation, classification, geography, use, and conservation of the soil resources of the State. Practice in identifying, rating, and judging the probable value of the important soils in California for agricultural, grazing, and forest use.

105. Summer Field Course. (5) Mr. Harradine
Six weeks, daily. Prerequisite: courses 100, 101, or 103, and consent of the instructor.
Study of soil characteristics, development, and morphology of soils. Soil surveying, including mapping and classifying soils; preparation of soil reports. Practice in identifying and judging the probable value of the dominant soils of the State for agricultural, grazing, and forest use.

110. The Soil as a Medium for Plant Growth. (4) I.  Mr. Babcock, Mr. Overstreet
Lectures and one other hour to be arranged. Prerequisite: Chemistry 1A–1B and 8. Recommended: Geology 1.
Composition and properties of soils; factors determining productivity; the causes and effects of the soil's reaction, with particular reference to "acid" and "alkali" soils; the nature of fertilizers and some of their effects upon soil and plant; current theory of the soil solution.

111. Soil Microbiology and Soil Biochemistry. (3) II.  Mr. McLaren
Lectures and laboratory. Prerequisite: Chemistry 5 and 8, Bacteriology 1, or consent of the instructor.
Microorganisms occurring in soils, biochemical activities of the soil population, and the formation and properties of soil organic matter.

112. Soil Chemistry in Relation to Plant Growth. (2) II.  Mr. Babcock
Lectures. Prerequisite: course 110 and Chemistry 5.
The chemical properties of soils as related to plant growth, and their measurement.

113. Soil Chemistry in Relation to Plant Growth. (2) II.  Mr. Delwiche, Mr. Babcock
Laboratory. Prerequisite: Chemistry 5, course 112 (usually taken concurrently).
Soil conditions as phenomena and in relation to factors influencing fertility; liquid and solid phases of the soil, including adsorption phenomena, cation exchange, and buffer effects.

114. Properties of Colloidal Particles and Systems. (3) I.  Mr. Jenny
Lectures with demonstrations. Prerequisite: a course in physical chemistry.
Properties of colloidal systems of importance in agriculture and biology. Chemistry and physics of surfaces (adsorption, ion interchange), electric double layer, flocculation, polymerization, colloid optics, viscosity, swelling.

116. Soil Management. (2) I. Mr. Bodman, Mr. Ulrich
   Lectures, discussions, and demonstrations by various specialists. Prerequisite: senior standing in soil science.
   Evaluation of soil fertility by field experiments; use of fertilizers; cultivation practices; aspects of soil erosion control.

199. Special Study for Advanced Undergraduates. (1-5) I and II.
   Open only to students with an average grade of at least B, and subject to the approval of the undergraduate adviser in soil science.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

201A–201B. Research in Soil Science. (1-9; 1-9) Yr. The Staff

203. Soil and Land Classification. (3) I. Mr. Storie
   Prerequisite: training in any one of the following fields: soil science, forestry, range management, irrigation, land economics, geography.
   Basic soil resource surveys and physical land inventories. Application of interpretative data, including soil productivity and land-use productivity ratings. Classification of land for: agriculture, forestry, rural land appraisal, tax assessment, engineering, wildlife, and recreational use.

212. Advanced Soil Chemistry. (3) I. Mr. Babcock, Mr. Overstreet
   Prerequisite: courses 110, 114; Chemistry 110A–110B, or Chemistry 109 and consent of the instructor. Open to graduates and qualified seniors.
   Applications of thermodynamics to soil systems. Theoretical treatment of ion exchange and membrane phenomena.

213. Pedochemistry and Mineralogy of Soils. (4) II. Mr. Barshad
   Prerequisite: graduate standing in soil science or consent of the instructor.
   Lecture: Methods, objectives, and applications of chemical and mineralogical analyses to evaluate soil profile formation. Laboratory: Total-elemental and free-oxide analyses; X-ray, integral, and differential thermal analyses of soil clays; mineralogical analysis of the nonclay fraction.

235. Seminar. (1) I. The Staff (Mr. Barshad in charge)
   Prerequisite: graduate standing in soil science, plant physiology, or related subjects.

Staff Seminar in Soil Science. (No credit) Yr. The Staff

PLANT NUTRITION

UPPER DIVISION COURSES

115. The Nutrition of Green Plants. (2) I. Mr. Arnon
   Prerequisite: Botany 111.
   Evolution of modern concepts of plant nutrition; absorption, accumulation, assimilation, and functional aspects of inorganic nutrients; special phases of photosynthesis; nitrogen metabolism; effects of hydrogen ion; deficiency and toxicity diseases; certain relations of plant nutrition to animal nutrition.
117. The Nutrition of Green Plants Laboratory. (2) I. Mr. Jacobson
Prerequisite: Chemistry 5, course 115 (taken concurrently if possible).
Laboratory and greenhouse experiments in plant nutrition to accompany course 115.

199. Special Study for Advanced Undergraduates. (1-5) I and II.
The Staff
Prerequisite: senior standing and consent of the student's major adviser.

GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

201A-201B. Research. (1-9; 1-9) Yr.
The Staff
Prerequisite: graduate standing and consent of the instructor.
Research on problems of plant nutrition and plant physiology.

206. Seminar in Plant Physiology. (1) I.
Mr. Overstreet (in charge), Mr. Arnon, Mr. Babcock,
Mr. Broyer, Mr. Jacobson, Mr. Machlis, Mr. Mackinney,
Mr. Stone, Mr. Stout, Mr. Torrey, Mr. Ulrich,
Mr. Whatley
Prerequisite: graduate standing and consent of the staff member in charge.
The spring semester of this seminar is listed under Botany 206.
Seminar in problems of plant physiology in the fields of botany, food technology, forestry, plant nutrition, and soil science.

*280. Chemistry of Plant Growth. (2) I.
Prerequisite: Chemistry 1A-1B, 8; Biochemistry 102; Botany 160B.
Recent advances in knowledge of biochemical mechanisms influencing plant growth; chemistry of plant growth substances and their physiological effects on plants; correlation of chemical changes accompanying growth; methods of research.

Staff Seminar in Plant Nutrition. (No credit) Yr.
The Staff (Mr. Arnon in charge)

SOILS AND PLANT NUTRITION
(GIVEN AT RIVERSIDE)

Mr. Chapman

The Staff (Mr. Chapman in charge)

SPANISH AND PORTUGUESE

(Department Office, 4314 Dwinelle Hall)

Charles E. Kany, Ph.D., Professor of Spanish.
*Yakov Malkiel, Ph.D., Professor of Romance Philology.
Luis Monguio, Licenciado en Derecho, Professor of Spanish.
José F. Montesinos, Licenciado en Filosofía y Letras, Professor of Spanish.

* Not to be given, 1959-1960.
* In residence spring semester only, 1959-1960.
Letters and Science List.—All undergraduate courses are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Adviser.—Mr. Chapman.

Preparation for the Majors.—Majors in Plan A and Plan B (described below) have a common preparation, namely: four years of high school Spanish, or courses 1, 2, and 3 (if course 3 is passed with a grade of A; otherwise, include course 4C); course 25A-25B or 25; two years of high school Latin, or Latin 1 or Latin 1A-1B (to be completed before entering upon the senior year).

Students transferring from other institutions with advanced standing and intending to major in the department must present evidence (by examination or otherwise) that their preparation includes the equivalent of Spanish 25A-25B or 25.

The Majors.—Two majors are offered in the department: Plan A, The Literature and Language of Spain; Plan B, The Literature and Language of Latin America.

Requirements for Plan A: 24 units of upper division work in the department, including courses 107A-107B (6 units) and 112A-112B (4 units). The remaining units must be completed from courses 100, 103A-103B, 105, 109A-109B, 110A-110B, 111A-111B, 115, 116A-116B, 125, 131, Portuguese 120. Recommended electives: Spanish 102, 104A-104B; further study in French, Italian, Portuguese, and Latin, and History 160A-160B.

Requirements for Plan B: 24 units of upper division work in the department, including courses 104A-104B (6 units), 107A-107B (6 units), 113A-113B (4 units), 114A-114B (4 units). The remaining units must be completed from among the upper division courses in Spanish and may include Portuguese 123. Recommended electives: History 161A-161B, 165A-165B; French 112A-112B, 121A-121B.

Students who fail to maintain at least an average grade of C in the major will, upon approval of the Executive Committee of the College of Letters and Science, be excluded from the major.

Honor Students in the Upper Division.—For the honors program consult one of the major advisers.

Higher Degrees.—See the Announcement of the Graduate Division, Northern Section.

1 In residence fall semester only, 1959-1960.
SPANISH
LOWER DIVISION COURSES

Students whose native tongue is Spanish or Portuguese will not normally be admitted into any lower division courses in their respective language except that prospective major students may be admitted in Spanish 25A-25B or 25.

1. Elementary Spanish. (4) I and II.
   Mrs. Place in charge
   Sections meet five hours per week.

2. Elementary Spanish (continuation of 1). (4) I and II.
   Mr. Wing in charge
   Sections meet five hours per week. Prerequisite: course 1 or two years of high school Spanish, or the equivalent.

3. Intermediate Spanish (continuation of 2). (4) I and II.
   Mr. Murillo in charge
   Sections meet five hours per week. Prerequisite: course 2 or three years of high school Spanish, or the equivalent.

4. Intermediate Spanish.
   Mr. Del Piero in charge
   A student will be allowed to receive credit for both 4C and 4L.
   4C. Oral and Written Composition. (4) I and II.
      Prerequisite: course 3 or four years of high school Spanish, or the equivalent. Recommended as preparation for the major.
   4L. Introduction to Spanish Literature. (4) I and II.
      Prerequisite: course 3 or four years of high school Spanish, or the equivalent. Recommended especially for those who will not continue the study of Spanish.

5. Oral Spanish. (2) I and II.
   Mr. Murillo
   Prerequisite: course 4 (as formerly given), 4C or 4L or 25A or 25B or 25.
   Reading, discussion, and oral interpretation of modern Spanish and Spanish-American plays.

25A-25B. Advanced Spanish. (3-3) Yr. Beginning each semester.
   Mr. Morby in charge
   Prerequisite: course 3 (with a grade of A) or course 4C or course 4L (the latter with a grade of A or B), or the equivalent. Recommended: sophomore standing. Required as preparation for the major.

25. Advanced Spanish. (5) II.
   Prerequisite: same as for 25A.
   Alternative course to 25A-25B, designed for students entering in mid-year who wish to prepare themselves for entering the upper division the following fall.

39. Spanish and Spanish-American Literature in English Translation. (2)
   Open to students in all departments of the University. No knowledge of Spanish necessary.
   39A. Spain: Medieval Period, Renaissance, and Golden Age. (2) I.
       Mr. Polt
   39B. Spain: Neo-Classical Period to Present Day. (2) II.
       Mr. Wing
   39C. Spanish America: To the End of the Nineteenth Century. (2) I.
       Mr. Chapman
   39D. Spanish America: Modernism and the Contemporary Period. (2) II.
       Mr. Chapman
Spanish for Graduate Students. First Course. (No credit) I and II.  
(Formerly numbered 1G.) Mr. Wing
Preparation for the graduate reading examinations.

UPPER DIVISION COURSES

Prerequisite to all upper division courses: 16 units of lower division Spanish or the equivalent.

100. Introduction to Spanish Linguistics. (2) I. Mr. Kany
102. American-Spanish Divergencies from Standard Castilian. (2) II. Mr. Kany
103A. History of Spanish Literature (1680–1900). (3) I. Mr. Polt
103B. Study of a Prose Genre of the Nineteenth Century. (3) II. Mr. Murillo
104A–104B. Spanish-American Literature. (3–3) Yr. Beginning each semester. Mr. Alegria, Mr. Chapman, Mr. Monguio  
Required of majors in Plan B.
106. Modern Peninsular Drama: From the Romantic Movement to the Present. (3) I. Mrs. Shadi
107A–107B. History of Spanish Literature to 1680. (3–3) Yr. Mr. Morby, Mr. Montesinos
Prerequisite: senior standing in Spanish. Required of majors in Plan A and Plan B.
109A–109B. The Spanish Drama of the Sixteenth and Seventeenth Centuries. (2–2) Yr. Mr. Montesinos
110A–110B. Twentieth-Century Peninsular Prose. (2–2) Yr. Mr. Murillo
111A–111B. Cervantes. (3–3) Yr. Mr. Morby
112A–112B. A Survey of Spanish Culture. (2–2) Yr. Mr. Monguio
Required of majors in Plan A.
113A–113B. A Survey of Latin-American Culture. (2–2) Yr. Mr. Torres-Rioseco
Required of majors in Plan B.
114A–114B. The Contemporary Spanish-American Novel. (2–2) Yr. Mr. Alegria
Prerequisite: course 104A–104B. Required of majors in Plan B.
115. A Survey of Spanish Lyric Poetry. (3) II. Mrs. Shadi
116A–116B. Advanced Grammar and Composition. (3–3) Yr. Mr. Kany
Required of candidates for the Certificate of Completion, teacher-training curriculum, whose major or minor is Spanish.
125. Spanish Pronunciation. (2) I and II. Mr. Kany
Required of candidates for the Certificate of Completion, teacher-training curriculum, whose major is Spanish, and recommended for those whose minor is Spanish.
131. A History of the Spanish Lexicon. (2) II. Mr. Malkiel
A brief introductory survey of the lexical strata against the background of Hispanic cultural history.
199. Special Study for Advanced Undergraduates. (1-3) I and II.
Mr. Morby in charge
Restricted to senior honor students, by previous arrangement with members of the departmental staff.

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 18)

In the requirements for the master's degree this department follows Plan II.

200A–200B. Early Spanish Literature. (2–2) Yr.
Mr. Del Piero
200A: To the Fifteenth Century.
200B: The Fifteenth Century.
Analytical history of Spanish literature to the Renaissance: the development of the various genres; the provincial literatures; a thorough grounding in bibliography; the development of a critical attitude.

201A–201B. History of Hispanic Poetry. (2–2) Yr.
Mr. Monguíó
Studies of a period, movement, or type of Spanish language poetry. When appropriate the study will include both Spanish and Spanish American poetry.
Fall 1959—Neo-Classicism.
Spring 1960—Romanticism.

204A–204B. The Spanish-American Novel. (2–2) Yr.
Mr. Torres-Rioseco

205A–205B. Contemporary Spanish-American Poetry. (2–2) Yr.
A study of aesthetic principles and poetic movements.
Mr. Alegría

*208A–208B. The Ballad. (2–2) Yr.

212A–212B. Old Spanish. (2–2) Yr.
Mr. Spaulding, Mr. Malkiel
Required for candidates for the master's degree.
212A: Mr. Spaulding.
212B: Mr. Malkiel.

*214A–214B. Modernism in Hispano-America. (2–2) Yr.
Mr. Torres-Rioseco

216. Spanish Versification. (1) II.
Mrs. Shadi

226. Critical and Stylistic Studies of a Single Author or Genre.
(2) II.
The Staff
II: Azorín: Mr. Morby.

228A–228B. The Literature of a Single Spanish-American Country. (2–2) Yr.
Mr. Chapman

299. Special Advanced Study. (1–4) I and II.
Mr. Morby in charge
Restricted to candidates for higher degrees, by previous arrangement with members of the departmental staff.

Portuguese

Lower Division Courses

1. Elementary Portuguese. (4) I.
Sections meet five hours per week.

2. Elementary Portuguese. (4) II.
Sections meet five hours per week. Prerequisite: course 1 or the equivalent.

* Not to be given, 1959–1960.
21A–21B. Readings in Portuguese. (3–3) Yr. Mr. Woodbridge
For advanced students in Romance languages who have no previous preparation in Portuguese but wish to acquire a reading knowledge. Also open to students completing course 1 with a grade of A or B or course 2, or the equivalent.
Reading and translation.

22. Oral Portuguese. (1) I. Mr. Woodbridge
Prerequisite: course 21A, which may be taken concurrently.
Reading, discussion, and oral interpretation of modern plays.

UPPER DIVISION COURSES

Portuguese 120, 122, and 123 are open to upper division and graduate students in Romance languages with no previous knowledge of Portuguese. With the approval of the graduate adviser, upper division and graduate units in Portuguese may be applied toward the M.A. degree in Spanish.

*120. Gil Vicente and Camões. (3) I. Mr. Woodbridge
Major works in Spanish as well as in Portuguese.

122. Portuguese Literature. (3) I. Mr. Woodbridge
Survey of the literature of Portugal.

123. Brazilian Literature. (3) II. Mr. Woodbridge
Survey of the literature of Brazil.

199. Special Study for Advanced Undergraduates. (1–3) I and II.
Restricted to senior honor students. Mr. Woodbridge

GRADUATE COURSES

*201. The Brazilian Novel. (2) II. Mr. Woodbridge

299. Special Advanced Study. (1–4) I and II.
Restricted to candidates for higher degrees. Mr. Woodbridge

SPEECH

(Department Office, 3125 Dwinelle Hall)

Woodrow Borah, Ph.D., Professor of Speech (Acting Chairman of the Department).

Leo Lowenthal, Ph.D., Professor of Speech and Professor of Sociology and Social Institutions.

David Rynin, Ph.D., Professor of Speech.

†Jacobus ten Broek, J.S.D., Professor of Speech.

Garff B. Wilson, Ph.D., Professor of Speech.

Edward Z. Rowell, Ph.D., Associate Professor of Speech, Emeritus.

Edward N. Barnhart, Ph.D., Associate Professor of Speech and Lecturer in Psychology.

†Robert L. Beloof, Ph.D., Associate Professor of Speech.

Don Geiger, Ph.D., Associate Professor of Speech.

Richard Hagopian, M.F.A., Associate Professor of Speech.

Isabel C. Hungerland, Ph.D., Associate Professor of Speech.

Arnold Perstein, Ph.M., Associate Professor of Speech.

* Not to be given, 1959–1960.
* In residence spring semester only, 1959–1960.
Students must have passed Subject A before taking any course in speech.

The central concern of the Department of Speech is the study of discourse — the formal and orderly communication of thought in speech and writing — and of its character, forms, values, institutions, and social effects. Departmental courses are designed to give the student an understanding of the various forms of discourse in our society, such as public address, court decisions, and fictional works. The critical analysis of various forms of discourse and the application of logical, aesthetic, or moral standards relevant to their character and purpose are stressed. Further, departmental offerings seek to deepen the student's insight into the role of language in human affairs from a study of the effect of social circumstances, belief, and opinion, on the contents of radio, film, public debate and discussion, and their effect in turn on society and its institutions. Finally, the student is given firsthand experience with the creation, interpretation, and presentation of various forms of discourse.

Letters and Science List.—All undergraduate courses in speech are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

Departmental Major Advisers: Mr. Rynin, Mr. Barnhart, Mr. Geiger.

Preparation for the Major: Speech 1A–1B and 2A–2B or their equivalents are prerequisites to qualifying for the major.

The Major.—Departmental upper division courses are classified into five categories as follows:


The major shall consist of 24 units of upper division courses to consist of 6 units from each of four of the five categories.

Subject to the approval of the major adviser, up to 6 units of related courses in other departments may be substituted for one of the above groups.

Students enrolled in the honors program may depart from the above scheme to the extent permitted by the chairman of the honors program.

Honors.—Candidates for honors at graduation must have completed the major with an average grade not lower than B.

**LOWER DIVISION COURSES**

**1A–1B. Elements of Speech.** (3–3) Yr. Beginning each semester.

Mrs. Albert, Mr. Barnhart, Mr. Bay, Mr. Edwards, Mr. Geiger, Mr. Hagopian, Mrs. Hungerland, Mr. Lyman, Mr. Marsh, Mr. Matson, Mr. Morray, Mr. Nibley, Mr. Ostroff, Mr. Paglin, Mr. Perstein, Mr. Rieff, Mr. Rynin, Mr. Stripp, Mr. Tabler, Mr. Temko, Mr. Tennessen, Mr. Wolfson

In each semester there are sections of 1A and 1B intended primarily for prelegal students.

A forum of organized student discussion and speeches based on an intensive study of selected essays chosen from the writings of representative English and American authors; training in the principles of oral rhetoric, in summarizing and outlining, in the use of the library, and in the presentation from the platform of prepared speeches.


Mr. Hagopian, Mr. Wilson

Introduction to the oral reading of prose and poetry; practice in speaking and reading with training in the principles of effective delivery.

**10A. The Logic and Semantics of Argument.** (3) I and II. Mr. Rynin

An introduction to the theory of argument, with emphasis on the problems of meaning, inference, and evidence.

**10B. The Logic and Semantics of Argument.** (3) II. Mr. Rynin

Application of the principles developed in course 10A to the construction and criticism of arguments, especially those concerned with the rational discussion of social issues.

**12. Psychology of Argument.** (3) II. Mr. Barnhart

Primarily concerned with the function of communication in inducing belief and directing behavior; an introductory study of techniques used in political propaganda and other forms of persuasion.

**15A–15B. Masterpieces of Rhetoric.** (3–3) Yr. Mr. Geiger

Great works of rhetoric in western civilization, from Demosthenes to Churchill, read and analyzed in the context of their times.

**24. Elementary Oral English for Foreign Students.** (8) I and II. Miss Ervin, Mr. Sawyer, Mr. Pitkin, Mrs. Silver

This course is required of all foreign students who receive marks on the diagnostic examination indicating their need for thorough basic training in English in order that they may successfully pursue their University work.

**26. Intermediate Oral English for Foreign Students.** (4) I and II. Miss Ervin, Mr. Sawyer, Mrs. Silver

This course is required of all foreign students who receive marks on the diagnostic examination indicating their need for further instruction in English in order that they may effectively pursue their University work.
40. Advanced Oral English for Foreign Students. (3) I and II.
Mrs. Russell, Mr. Sawyer

This course is an elective course for the foreign student with advanced ability in English. The course is designed specifically to be of assistance to foreign students in handling the language problems which arise in their other University work.

UPPER DIVISION COURSES

103. General Phonetics. (3) II.

106. The Oral Reading of Poetry and Prose. (3) I and II.
Mr. Bacon, Mr. Ostroff
Prerequisite: primarily for candidates for teaching credentials whose major is English; others admitted with consent of the instructor. Not open to students who have taken course 2A or 2B.
The study of poetry and prose from the point of view of oral interpretation. The principles of effective oral reading of literature; much practice in platform reading.

107A-107B. Argumentative Discourse: Oral and Written. (3-3) Yr.
Beginning each semester.
Mrs. Albert, Mr. Edwards, Mrs. Hungerland, Mr. Shepard, Mr. Matson, Mr. Paglin, Mr. Tennesen
Prerequisite: course 1A-1B. Students completing this course may not receive more than 2 units of credit for course 152.
Principles of effective reasoning applied to discussion of sociopolitical and related problems. Training in research, systematic discernment and evaluation of issues, in preparation and organization of materials, outlines and briefs, for presentation in oral and written form.

110A-110B. The Art of Argument. (3-3) Yr. Mr. Marsh, Mr. Perstein
Principles of and intensive practice in oral argumentation, in group discussion and in cross-examination. Conducted so as to be of special value to those intending to teach speech.

111A-111B. The Reading of Prose and Poetry. (3-3) Yr. Beginning each semester.
Mr. Bacon, Mr. Hagopian, Mr. Ostroff
Prerequisite: course 2A-2B.
111A: The essay and the short story.
111B: The ballad, the lyric, the ode, etc.

111C. The Reading of Drama. (3) I.
Mr. Wilson
Prerequisite: course 2A-2B.
The oral interpretation of poetic and prose drama.

117A-117B. Semantics. (3-3) Yr. Mr. Edwards, Mr. Rynin
Prerequisite: junior standing.
117B: The language of action: non-designative meaning.
An examination of the nature and functions of language, with special emphasis on the problems of meaning.

118. Symbolism: A Study of the Expressive Functioning of Signs. (3) II.
Mrs. Hungerland
Prerequisite: course 12 or consent of the instructor.
The nature of symbols, with special emphasis on their function in poetry.
119. Analysis of Communication Content. (3) I. Mr. Lowenthal
Introduction to research techniques in communication, with special emphasis on content analysis and audience response; individual and group research projects will be carried out by students under supervision.

121A–121B. Speech and Society. (3–3) Yr. Mr. Lowenthal
A general survey of types of speech and discourse; their effects on interpersonal relations, personality development, and social integration; their influence on development and character of social institutions, mores and belief; and the reciprocal influence of social institutions on speech.

123. Freedom of Speech. (3) II. Mr. Morray
A critical and historical analysis of the main theories and justifications of freedom of expression developed in England and the United States, and of the factors and tests determining its scope and practical exercise.

135. British Public Address during the Eighteenth and Nineteenth Centuries. (3) II. Mr. Borah
Critical analysis of speeches of Burke, Pitt, Peel, Cobden, Bright, Gladstone, Disraeli, Newman, Huxley, Mill, and others. Attention given to issues with which they were identified and their relationship to the social movements of their time.

136. Latin-American Spokesmen. (3) I. Mr. Borah
Critical analysis of the speeches (in translation) of Bolivar, Mier, Sarmiento, and other Latin-American leaders of the nineteenth and twentieth centuries. Special attention will be given to major movements, controversies, issues, and problems.

137. American Public Address during the Eighteenth and Nineteenth Centuries. (3) I. Mr. ten Broek

138. Modern Public Address. (3) II. Mr. Morray
Critical analysis of speeches of Wilson, Roosevelt, Churchill, and other leaders from 1914 to the present time.

139. Modern Spokesmen. (3) II. Mr. Bay
An examination of the writings and speeches of leading spokesmen for major contemporary movements—political, social, and religious—with special reference to problems of ideology and ideological conflict, objectivity and evaluation, and the rationalization of conflict.

141A–141B. Classical Rhetoric. (3–3) Yr. Mr. Nibley
(Formerly numbered 132A–132B.)
A study of rhetoric based on the writings of Isocrates, Plato, Aristotle, Cicero, Quintilian, and other classical writers with reference to criticism, aesthetic theory, and speech in the Classical era.

144A–144B. Medieval and Renaissance Rhetoric. (3–3) Yr. Mr. Temko, Mr. Nibley
Rhetorical theory and practices from the decline of the Classical World through the Middle Ages to the new rhetoric of the humanities.

145. The Rhetoric of the Enlightenment. (3) II.
Rhetorical theory and practice in the period of the Enlightenment and the beginnings of the Industrial Revolution.

* Not to be given, 1959–1960.
147. Modern Rhetoric. (3) I.
(Formerly numbered 133.)
Contemporary rhetorical theory. Emphasis on modern views of symbolic
action. Specific analysis of selected literature.

149. Comparative Discourse. (3) I.
Rhetorical patterns of persuasion, reasoning and the expression of beliefs
and values of selected contemporary societies, civilized and primitive.

152. Debate. (2) I and II.
Designed for those who wish to participate in intercollegiate debate. May
be repeated for a maximum of 6 units. Students wishing to take this course
and 107A–107B may enroll in the latter only with the consent of the instruc­
tor and may not receive more than 8 units of credit in any combination of
the two courses.

162A–162B. Theory of Interpretation. (3–3) Yr.
Mr. Tennessen, Mr. Geiger
162A: Problems concerned with interpretation of scientific and descriptive
texts.
162B: Problems concerned with interpretation of literary texts, especially
as they concern the oral interpreter.

H195A–H195B. Honors Course. (3–3) Yr.
Mr. Borah, Mr. Matson, Mr. Morray
Prerequisite: speech majors, senior standing, and on the honors list.
A special program of study extending through the senior year for speech
majors who are on the honors list. The course may be substituted for 6 units
of the major requirement with the approval of the major adviser.

198. Directed Group Studies for Upper Division Students. (1–5) I and II.
The Staff (Mr. Borah in charge)

199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. Borah in charge)

STATISTICS
(Department Office, 501 Campbell Hall)

Edward W. Barankin, Ph.D., Professor of Statistics.
David Blackwell, Ph.D., Professor of Statistics (Chairman of the Depart­
ment).
Joseph L. Hodges, Jr., Ph.D., Professor of Statistics.
George M. Kuznets, Ph.D., Professor of Agricultural Economics, Statistics,
and Economics.
Erich L. Lehmann, Ph.D., Professor of Statistics.
Michel Loève, Docteur es Sciences, Professor of Statistics and Mathematics.
Jerzy Neyman, Ph.D., Professor of Statistics and Director of the Statistical
Laboratory.
Henry Scheffé, Ph.D., Professor of Statistics.
Evelyn A. Fix, Ph.D., Associate Professor of Statistics.
Lucien LeCam, Ph.D., Associate Professor of Statistics.
Roy Radner, Ph.D., Associate Professor of Economics and Statistics.
Elizabeth L. Scott, Ph.D., Associate Professor of Statistics.

1 In residence fall semester only, 1959–1960.
2 In residence spring semester only, 1959–1960.
THE MAJOR IN STATISTICS

Preparation for the Major in Statistics.—Before undertaking the upper division program in statistics, the student should take course 12 and acquire a thorough knowledge of elementary calculus and algebra, with an emphasis on the conceptual side of the material offered. The recommended sequence of courses in mathematics includes 3A, 3H, and 8 or 11 in the freshman year and Mathematics 4G, 4H, and Statistics 12 in the sophomore year.

The Major in Statistics.—In the 24-unit major the student should acquire substantial knowledge of statistics and probability, combined with a background in the theory of functions of real and of complex variables. To this end, the program should include courses 112, 113, 120A, Mathematics 111A, and at least one course from 120B, 132, 134, 152, 155, 166, 168. It is recommended that 120A–120B be combined with 120C–120D. In addition, the student should select one course from the following: Mathematics 119, 122, 125A–125B, 150A–150B, and 128.

In order to attain a rounded statistical education, the student should take one of the two basic cycles of courses. One cycle, emphasizing theory, includes courses 112, 113, 120A–120B, 120C–120D (or 202A–202B, 202C–202D), 260A–260B, 260C–260D, and 255A–255B, 255C–255D. The other cycle, emphasizing applications, is based on courses 130A–130B, 130C–130D, 251, 280A, 280B, 280C–280D, and 281. Courses 1, 2 and 3 do not belong to the basic cycles. Course 1 is a purely general education course. Courses 2 and 3 are intended as a prerequisite to applicational courses in other departments.

Those contemplating graduate studies leading to higher degrees in statistics should make an effort to include in the major the undergraduate courses which are prerequisite to the graduate ones. It is also recommended that students majoring in statistics acquire some familiarity with French, German, or Russian.

Attention of the student is drawn to the possibility of a group major in statistics combined with an empirical science. This major includes courses 130A–130B, 130C–130D, and 132.

LOWER DIVISION COURSES

1. Introduction to Probability and Statistics. (3) I and II.
   Mr. Hodges, Mr. Neyman, Mr. Lehmann, Miss Fix
   General education course. Deterministic and indeterministic approaches to natural phenomena. Probability as an idealization of relative frequencies. Role of statistics in scientific research. Illustrations from astronomy, engineering, genetics, medicine, physics, social sciences, and everyday life.

2. Introduction to Statistical Methods. (3) I and II.
   Prerequisite: two years of high school algebra or Mathematics D. Course intended for majors in the natural and social sciences using statistics as a tool.
of statistical hypotheses. Standard methods and their validity illustrated by sampling experiments.

3. Introduction to Probability Methods. (3) I. Mr. Blackwell
Prerequisite: one course in college mathematics or Statistics 1 or Statistics 2.
Course intended for majors in the natural and social sciences using probability as a tool. Combinatorial probability, Bayes’ rule, law of large numbers, entropy, Markov chains, random walks, Monte Carlo methods, central limit theorem, games.

12. Elements of Probability and Statistics. (3) I and II. Miss Scott
Prerequisite: Mathematics course 3A or the equivalent. For students with mathematical background who wish to acquire basic concepts for general education.
Relative frequency. Discrete probability. Testing statistical hypotheses. Illustrations from genetics, bacteriology, industrial sampling and public health.

UPPER DIVISION COURSES

112. Discrete Probability. (3) I. Mr. Barankin
Prerequisite: Mathematics 4A-4B. It is recommended that 112L be taken concurrently.
Combinatorial probability, Stirling’s formula, normal and Poisson approximations to binomial, random variables, expectation, law of large numbers, generating functions.

112L. Laboratory Course in Discrete Probability. (1) I. Mr. Barankin in charge
May be taken in conjunction with 112. Illustrative examples in probability theory and applications in various fields.

113. Introduction to Theory of Statistics. (3) II. Mr. Lehmann
Prerequisite: course 112 or 134. It is recommended that 113L be taken concurrently.

113L. Laboratory Course in Introduction to Theory of Statistics. (1) II. Mr. Lehmann in charge
May be taken in conjunction with 113. Illustrative examples in statistics and applications to various fields.

120A–120B. Theory of Statistics. (3–3) Yr. Mr. LeCam
Prerequisite: course 113 and Mathematics 111A. Also Mathematics 122 or 150A (may be taken concurrently). It is recommended that Statistics 120C–120D be taken concurrently.

120C–120D. Laboratory for Theory of Statistics. (1–1) Yr. Mr. LeCam in charge
May be taken in conjunction with course 120A–120B. Course 120C is not prerequisite to 120D.
130A–130B. Statistical Inference. (3–3) Yr.  
Mr. Taylor  
Prerequisite for 130A: two years of high school algebra or Mathematics D; prerequisite for 130B: 130A and Mathematics 3A or 16A. It is recommended that 130C–130D be taken concurrently.

First of a cycle of courses, including 280A and 280B, meant for "users" of statistics. Not open for credit to students who have completed courses 12 and 113. Not more than one of the courses 130A, 130E, and 130G may be taken for credit.

The basic concepts and principal tools of probability theory, hypothesis testing, and estimation, presented for students of natural and social sciences. While the conceptual and applicational aspects are treated carefully, the more difficult mathematical theorems are stated without proof.

130C–130D. Laboratory Course in Statistical Inference. (1–1) Yr.  
Mr. Taylor in charge

May be taken in conjunction with course 130A–130B. Course 130C is not prerequisite to 130D.

130E. Statistical Inference for Engineers. (3) I and II.  
Lectures and laboratory. Prerequisite: Mathematics 4A–4B or consent of the instructor. Not open for credit to students who have completed courses 12 and 113. Not more than one of the courses 130A, 130E, and 130G may be taken for credit.

Essential elements of course 130A–130B, with all of the applications and illustrations chosen from the field of engineering.

131. Statistical Inference for Social Scientists. (3) I and II.  
Prerequisite: Mathematics 11 or 16A or 190A. Mr. Radner, Miss Scott  
Probability and random variables. The basic ideas of estimation and hypothesis testing. Applications to sampling inspection and quality control. Linear estimation and normal regression theory. The chi-square test and contingency tables.

131L. Laboratory Course in Statistical Inference for Social Scientists.  
(1) I and II.  
Miss Scott in charge, Mr. Radner

Prerequisite: may be taken concurrently with Statistics 131.

132. Descriptive Statistics. (3) II.  
Miss Fix  
Lectures and laboratory. Prerequisite: course 12 or 112 or 130A; and Mathematics 4A–4B, or grade of at least B in Mathematics 3A–3B or 16A–16B.  

134. Methods of Probability Theory. (3) I.  
Mr. Thomassian  
Prerequisite: Mathematics 14A–14B or consent of the instructor.

A systematic development of the concepts and facts of probability theory needed for the technical treatment of statistical communications problems. Laws of large numbers, Markov chains, characteristic functions, central limit theorem, continuous time stochastic processes, spectral analysis.

*142A–142B. Life Contingencies. (3–3) Yr.  
Prerequisite: course 12 and 113 or 130A and 130C. It is recommended that 142C–142D be taken concurrently.

Mortality tables and related functions. Laws of mortality. Annuities and assurances for one and more than one life. Policy reserves. Return of pre-

*142C–142D. Laboratory Course in Life Contingencies. (1–1) Yr.
May be taken in conjunction with course 142A–142B.

*144. Population Statistics. (3) II.
Prerequisite: course 12 and Mathematics 3A, or course 130A.

152. Elementary Stochastic Processes. (3) II.
Prerequisite: course 112 or 134.
Random walks, branching processes, recurrent events, Markov chains, birth and death processes.

155. Introduction to Continuous Probability. (3) II. Mr. Loève
Prerequisite: course 112 and Mathematics 150A.

166. Sampling Surveys. (3) I. Miss Fix
Prerequisite: course 12 or 112 or 130A or consent of the instructor. Recommended: course 113.

168. Linear Programming and Game Theory. (3) II. Mr. Barankin
(Formerly numbered 168A.)
Prerequisite: Mathematics 3A (may be taken concurrently), Mathematics 11 or consent of the instructor. It is recommended that 168L be taken concurrently. Not open for credit to students who have taken 168A.

168L. Linear Programming and Game Theory Laboratory. (2) II.
(Formerly numbered 168B.) Mr. Barankin in charge
May be taken in conjunction with course 168. Not open for credit to students who have taken 168B.
Solution of linear programming and game theory problems, using methods developed in course 168.

H195. Special Study for Honors Candidates. (1–5) I and II. The Staff
199. Special Study for Advanced Undergraduates. (1–5) I and II.
Mr. Blackwell in charge
Investigation of special problems under the direction of members of the department.

Mr. Lehmer, Mr. De Vogelaere,

* Not to be given, 1959–1960.
Graduate Courses

Courses 255A–255B and 260A–260B constitute the basis of graduate instruction for students whose primary interest is in theory. Similarly, courses 280A–280B, 281, and 261 represent the core of the graduate program for students interested in statistics as a tool in empirical research, either experimental or observational.

With the approval of the instructor, students engaged in empirical research may register in appropriate courses without the indicated prerequisites.

In addition to supervised practical work during the laboratory courses, the students registered in these courses will be able to use the laboratory at other times.

Prerequisite: 12 units of upper division mathematics with honor grades. An advanced treatment of the material covered in courses 12, 113, 120A–120B, designed as a unique statistical prerequisite for course 260A–260B. It is recommended that course 202C–202D be taken concurrently.

202C–202D. Laboratory Course in Theory of Probability and Statistics. (1–1) Yr. Mr. Hodges in charge
It is recommended that course 202A–202B be taken concurrently. Course 202C is not prerequisite to 202D.

*252. Topics in the Theory of Stochastic Processes. (3) II.
Prerequisite: course 134 or 152 or 155, recommended 255A.

Prerequisite: Mathematics 150A–150B and 185. It is recommended that course 255C–255D be taken concurrently.

255C–255D. Laboratory Course in Probability Theory and Its Analytic Basis. (1–1) Yr. Mr. Barankin in charge
Prerequisite: Mathematics 150A–150B and 185. May be taken concurrently with 255A–255B.
Illustrative examples in probability theory and applications to probability problems in various fields such as statistical physics.

*256. Nonparametric Inference. (3) I.
Prerequisite: course 260A.

*258. Theory of Statistical Decision Functions. (3) II.
Prerequisite: course 260A–260B.

* Not to be given, 1959–1960.
259. Probability Models of Natural Phenomena. (3) I. Miss Scott
Prerequisite: course 260A-260B or 280A-280B.

260A-260B. Advanced Topics in Probability and Statistics. (3-3) Yr. Mr. Neyman
Prerequisite: Mathematics 111A, course 120A-120B, and Mathematics 150A-150B or 201A-201B, 185. Course 255A is prerequisite to 260B. It is recommended that 260C-260D be taken concurrently.

260C-260D. Laboratory Course in Advanced Topics in Probability and Statistics. (2-2) Yr. Mr. Neyman in charge
May be taken concurrently with course 260A-260B. 260C is not prerequisite to 260D.

261. Statistical Problems in Experimentation. (3) II. Mr. Scheffe
Lectures and laboratory. Prerequisite: some familiarity with analysis of variance and consent of the instructor.

263. Statistical Studies of Risks. (3) I. Miss Fix
Prerequisite: course 130A-130B or 113.

264. Advanced Statistical Inference for Engineers. (3) II.
Lectures and laboratory. Prerequisite: course 130E. Not open for credit to students who have completed course 280A.
Introduction to the following statistical methods, with illustrations from engineering: analysis of variance and covariance, variance components analysis, analysis of count data including acceptance sampling, control charts.

265A-265B. Advanced Probability. (3-3) Yr. Mr. Loève, Mr. LeCam
Prerequisite: course 255A-255B or consent of the instructor.

267. Large Sample Theory. (3) I. Mr. LeCam
Prerequisite: course 260A.
General convergence theorems. Classical properties of maximum likelihood estimates. Regularly best asymptotically normal estimates and related tests, including the \( z^2 \) test. Likelihood ratio and related tests.

269A*-269B. Recent Developments in the Theory of Statistics. (3-3) Yr.
Prerequisite: courses 255A and 260A. Mr. Scheffe
Recent developments in the theories of hypothesis testing, estimation, and multiple decisions.

* Not to be given, 1959-1960.
Statistics; Subject A

280A. Advanced Statistical Inference. (3) I. Mr. Scheffé
Prerequisite: course 130A-130B or consent of the instructor. It is recommended that course 280C be taken concurrently.

280B. Advanced Statistical Inference. (3) II. Miss Scott
Prerequisite: course 280A or consent of the instructor. It is recommended that course 280D be taken concurrently.
Nonparametric methods. Introduction to sequential analysis. Analysis of quantile response data. Illustrations adjusted to the interests of the audience in each year.

280C–280D. Laboratory Course in Advanced Statistical Inference. (1 or 2; 1 or 2) Yr. Mr. Scheffé, Miss Scott in charge
May be taken concurrently with courses 280A and 280B. 280C is not prerequisite to 280D.

281. Analysis of Discrete Observations. (3) I. Miss Scott
Prerequisite: course 130A-130B or course 120A-120B.

290S. Statistical Seminar. (2-6) I and II. Mr. Blackwell in charge

*290W. Seminar on Statistical Problems in Economics and Agricultural Economics. (2-4) I.
Prerequisite: consent of the instructor.
Statistical problems in the measurement of economic magnitudes and relations. Correlation and regression studies. Current research.

295S. Individual Research Leading to Higher Degrees. (2-6) I and II.

Statistics Colloquium. (No credit) I and II. The Staff
Meetings for the presentation of original work by members of the Staff and graduate students.

SUBJECT A: ENGLISH COMPOSITION
(Subject A Office, 210 California Hall)

Committee in charge:
Alvin A. Eustis, Jr., Ph.D., Associate Professor of French.
James J. Lynch, Ph.D., Associate Professor of English.
Robert A. Wiggins, Ph.D., Assistant Professor of English.

John L. Halverson, M.A., Supervisor of Subject A.

Subject A (No credit) I and II. Mr. Halverson and Associates
Three hours weekly. Required of all students who do not pass the examination in Subject A. Fee, $35. To those students who maintain an average grade of A during the first seven weeks of the semester half of the fee will be refunded, and they may discontinue attending the course. For the regulations governing this requirement, see the CIRCULAR OF INFORMATION.

* Not to be given, 1959–1960.
Training in correct writing, including drill in sentence and paragraph construction, diction, punctuation, grammar, and spelling. Weekly compositions and written tests on the text. The principles of English composition are presented, and typical student compositions are analyzed and discussed in sections limited to thirty students.

VIROLOGY

(Department Office, 438 Biochemistry and Virus Laboratory)

Heinz L. Fraenkel-Conrat, M.D., Ph.D., Professor of Virology.
C. Arthur Knight, Ph.D., Professor of Virology.
Howard K. Schachman, Ph.D., Professor of Virology and of Biochemistry (Vice-Chairman of the Department of Virology).
Wendell M. Stanley, Ph.D., Sc.D., LL.D., Docteur h.c. (Paris), Professor of Virology and of Biochemistry and Director of the Virus Laboratory (Chairman of the Department of Virology).
Gunther S. Stent, Ph.D., Professor of Virology and of Bacteriology.
Robley C. Williams, Ph.D., Professor of Virology and Associate Director of the Virus Laboratory.
Arthur B. Pardee, Ph.D., Associate Professor of Virology and of Biochemistry.
Harry Rubin, D.V.M., Associate Professor of Virology.

Letters and Science List.—All undergraduate courses in virology are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

UPPER DIVISION COURSES

100A–100B. General Virology. (3–3) Yr.
Mr. Fraenkel-Conrat, Mr. Rubin, Mr. Stent, Mr. Williams
100A: Mr. Stent, Mr. Rubin.
100B: Mr. Williams, Mr. Fraenkel-Conrat.
Prerequisite: Biology 11A–11B, or Zoology 1A, or Botany 1, or Bacteriology 1; Biochemistry 102 or 100A (may be taken concurrently); one year each of college mathematics and physics.
Lectures on the biological, physical and chemical properties of bacterial, animal, and plant viruses. 100A: Dynamics of growth, genetics, radiobiology, neutralization and interference. 100B: Morphology, chemical composition, molecular structure and metabolic effects.

177. A Survey of General Virology. (3) I.
Mr. Knight
Prerequisite: Biochemistry 100A or 102, or consent of the instructor. Not open for credit to students who have credit in course 100A–100B.
Lectures on the general nature of viruses and methods for their purification; and on chemical, physical, and biological properties of viruses.

199. Special Study for Advanced Undergraduates. (1–2) I and II.
The Staff (Mr. Pardee in charge)
Reading and conference for properly qualified students under the direction of a member of the staff.
GRADUATE COURSES

(Concerning conditions for admission to graduate courses, see page 18)

*201. General Virology Laboratory. (4) II.
Prerequisite: course 100A–100B, the latter may be taken concurrently.
Experimental techniques used in research on bacterial, animal and plant
viruses illustrating their assay, growth kinetics, genetics, neutralization, puri-
fication and structure.

280. Research. (1–9) I and II. The Staff (Mr. Williams in charge)

290. Seminar. (1) I and II. The Staff (Mr. Stanley in charge)
Advanced study in the various fields of virology.

299. Special Study for Graduate Students. (1–3) I and II.
The Staff (Mr. Schachman in charge)
Reading and conference for properly qualified graduate students under
the direction of a staff member.

ZOOLOGY

(Department Office, 4079 Life Sciences Building)

William Balamuth, Ph.D., Professor of Zoology.
Kenneth B. DeOme, Ph.D., Professor of Zoology and Director of the Cancer
Research Genetics Laboratory.
Richard M. Eakin, Ph.D., Professor of Zoology.
† Jonas E. Gullberg, A.B., Professor of Metrology.
Morgan Harris, Ph.D., Professor of Zoology (Chairman of the Department).
A. Starker Leopold, Ph.D., Professor of Zoology and Associate Director of
the Museum of Vertebrate Zoology.
Daniel Mazia, Ph.D., Professor of Zoology.
Alden H. Miller, Ph.D., Professor of Zoology and Director of the Museum
of Vertebrate Zoology.
Paul R. Needham, Ph.D., Professor of Zoology.
Frank A. Pitelka, Ph.D., Professor of Zoology and Curator of Birds, Mu-
seum of Vertebrate Zoology.
Ralph I. Smith, Ph.D., Professor of Zoology (Vice-Chairman of the Depart-
ment).
Robert C. Stebbins, Ph.D., Professor of Zoology and Curator in Herpetol-
ogy, Museum of Vertebrate Zoology.
Curt Stern, Ph.D., D.Sc., Professor of Zoology.
Samuel J. Holmes, Ph.D., LL.D., Professor of Zoology, Emeritus.
Max Alfert, Ph.D., Associate Professor of Zoology.
Seth B. Benson, Ph.D., Associate Professor of Zoology and Curator of Mam-
mals, Museum of Vertebrate Zoology.
William E. Berg, Ph.D., Associate Professor of Zoology.
Howard A. Bern, Ph.D., Associate Professor of Zoology.
†Cadet Hand, Ph.D., Associate Professor of Zoology.
William Z. Lidicker, Jr., Ph.D., Assistant Professor of Zoology and Assistant
Curator of Mammals, Museum of Vertebrate Zoology.
Peter Marler, Ph.D., Assistant Professor of Zoology.

* Not to be given, 1959–1960.
‡ In residence fall semester only, 1959–1960.
* In residence spring semester only, 1959–1960.
Wilbur B. Quay, Ph.D., Assistant Professor of Zoology.
Richard C. Strohman, Ph.D., Assistant Professor of Zoology.
William A. Newman, M.A., Associate in Zoology.

John Davis, Ph.D., Lecturer in Zoology and Assistant Research Zoologist, Museum of Vertebrate Zoology.
Ralph Emerson, Ph.D., Professor of Botany.
Oliver P. Pearson, Ph.D., Lecturer in Zoology and Research Associate, Museum of Vertebrate Zoology.

**Letters and Science List.**—All undergraduate courses in zoology except courses 116, 119A–119B, 120, and 145 are included in the Letters and Science List of Courses. For regulations governing this list, see page 11.

**Departmental Major Advisers:** Mr. Berg, Mr. Alfert, Mr. Quay, Mr. Marler.

**Preparation for the Major.**—Required: courses 1A, 1B, Botany 1 or Botany 12 or equivalent, Chemistry 1A and 8, Physics 2A–2B, 3A–3B. Recommended: German, French, Chemistry 1B, and elementary courses in other biological sciences.

**The Major.**—Required: (1) 24 units of upper division courses in zoology. For 6 of these units substitutions may be made, with the approval of the undergraduate adviser, from upper division courses in anatomy, bacteriology, biochemistry, botany, entomology, genetics, organic chemistry, paleontology, parasitology, physical chemistry, physics, physiological psychology, and physiology. (2) The following courses: (a) 100 or 106, (b) 101, (e) 108 or 112 or 113, (d) 114 or 115, (e) two additional upper division laboratory courses or course sequences with laboratory from within the department or in the related fields listed above. (3) A grade-point average of at least 2.0 and grades of C or higher in upper division courses included in the major. (4) Seniors with a B average or better in zoology are encouraged to avail themselves of the opportunity of course 199 work and of the proseminar, course 198.

**GENERAL BIOLOGY**

(3–3) Yr.
Mr. Eakin, Mr. Emerson

Lectures and laboratory. To receive credit toward the natural science requirement of the College of Letters and Science both semesters must be taken. Not open for credit to students who have taken Botany 1, 12, Zoology 1A, 1B, 10.

An introductory course in biology offered jointly by the departments of Botany and Zoology. Presents and illustrates the main facts and principles of organization, functions, heredity, and evolution of plants and animals, and introduces the student to the methods of the life sciences.

**ZOOLOGY**

**LOWER DIVISION COURSES**

1A. General Zoology. (4) I and II.
Mr. Harris, Mr. Alfert, Mr. Newman
I: Mr. Harris, Mr. Newman; II: Mr. Alfert, Mr. Newman.

Lectures and laboratory. Prerequisite: Chemistry 1A.
An introduction to the principles of biology, with special reference to structure, physiology, heredity, and evolution of animals.

1B. General Zoology. (4) II.
Mr. Marler, Mr. Bern.

Lectures and laboratory. Prerequisite: course 1A or Biology 11A–11B.
An introduction to vertebrate zoology. Structure, function, development, and history of the vertebrate body.
10. Animal Biology. (3) I. [Course details]
Lectures and demonstrations. Open without prerequisite to all students, but designed for those not specializing in zoology. Not open for credit to students who have had course 1A or Biology 11A–11B, but students who have taken course 10 may elect course 1A for credit.
An outline of the main facts and principles of biology, with special reference to the bearing of biology upon human life.

UPPER DIVISION COURSES

100. Vertebrate Embryology. (4) I. [Course details]
Lectures and laboratory. Prerequisite: course 1B.
Details of development of the vertebrate body, with emphasis in lectures on human embryology, and in laboratory on that of the chick and pig.

101. Introduction to Physicochemical Biology. (2) I. [Course details]
Mr. Mazia
Prerequisite: course 1A or Biology 11A–11B, and 4 additional units in biological sciences; a course in organic chemistry, general physics.
Survey of the physical and chemical mechanisms underlying the structure and function of the living cell.

101C. Physicochemical Biology Laboratory. (2) I and II. [Course details]
Mr. Strohman
Prerequisite: course 101 (may be taken concurrently).

102. Introduction to Physicochemical Biology. (2) II. [Course details]
Mr. Mazia
Continuation of course 101. The performance of work by the cell. Interactions of cell and environment.

103. Experimental Embryology. (2) II. [Course details]
(Formerly numbered 123.)
Mr. Berg
Prerequisite: course 100.
An introduction to the mechanisms of embryonic development of vertebrate and invertebrate animals as elucidated by experimental methods.

103C. Experimental Embryology Laboratory. (2) II. [Course details]
(Formerly numbered 123C.)
Mr. Berg
Prerequisite: course 103 (may be taken concurrently). Enrollment limited to 10 students.
An introduction to problems and experimental procedures in embryology using sea urchin and amphibian embryos.

104. Animal Behavior. (3) I. [Course details]
Mr. Marler
Prerequisite: course 1B.
An introduction to vertebrate and invertebrate ethology; perception of the external world; navigation; instinct and learning; motivation; behavior in simple and complex societies with emphasis on problems of communication.

104C. Laboratory in Animal Behavior. (2) I. [Course details]
Mr. Marler
Prerequisite: course 104 (may be taken concurrently) and permission of the instructor.
An introduction to the methods for study of the behavior of vertebrates and invertebrates, with emphasis on individual problems. Limited to ten students.

*105. Growth and Form. (2) II. [Course details]
Mr. Harris
Prerequisite: course 1B.
The mechanics and regulation of growth processes; dynamic aspects of body form as seen in senescence, regeneration, tissue culture, and the development of tumors.

* Not to be given, 1959–1960.
106. **Comparative Anatomy of the Vertebrates.** (4) II.  Mr. Quay
   Lectures and laboratory. Prerequisite: course 1B. Recommended: course 100.
   Evolution of organ systems and phylogeny of the major vertebrate groups.

107. **Cytology.** (2) I.  Mr. Alfert
   Prerequisite: course 1A, or Biology 11A–11B and Chemistry 1A.
   The structure and activities of the cell, especially in development, in sex determination, and in heredity.

107C. **Cytology Laboratory.** (2) I.  Mr. Alfert
   Prerequisite: course 107 (may be taken concurrently). Recommended: course 400 or former course 4.

108. **Invertebrate Zoology.** (4) II.  Mr. Smith
   (Formerly numbered 112.)
   Lectures, laboratory, and field trips. Prerequisite: course 1A or Biology 11A–11B.
   Morphology, development, and classification of invertebrate animals.

109. **Zoological Microtechnique.** (3) I.  Mr. Quay
   Lecture and laboratory. Prerequisite: upper division or graduate standing in a biological science. Enrollment limited to twenty students.
   Techniques for analysis of the microanatomy and histochemistry of multicellular animals. Emphasis will be placed on interpretation as well as method. Advanced students may be allowed to pursue more specialized laboratory programs.

110. **Biology of the Protozoa.** (5) I.  Mr. Balamuth
   Lectures and laboratory. Prerequisite: course 1A or Biology 11A–11B and senior or graduate standing. Enrollment limited to twelve students.
   Treatment of protozoa in relation to comparative aspects of morphology, physiology, and natural habitats. Emphasis in the laboratory upon experimental treatment of living forms, including techniques of cultivation and staining.

111. **General Animal Parasitology.** (4) II.  Mr. Balamuth, ———
   Lectures and laboratory. Prerequisite: course 1A or Biology 11A–11B and upper division standing. Recommended: course 119A.
   An introduction to general principles of parasitology, based upon studies of protozoa, helminths, and other invertebrates, excepting higher arthropods. Emphasis in the laboratory upon morphology, life histories and host-parasite interactions, including techniques of host examination and staining.

112. **Natural History of Marine Invertebrates.** (6) Mr. Hand, Mr. Smith
   Lectures, laboratory, field work, and special problems. Given at the seashore in Summer Session I. Prerequisite: course 1A or Biology 11A–11B.
   Anatomy, classification, and natural history of invertebrate animals, chiefly marine.

113. **Natural History of the Vertebrates.** (4) II.  Mr. Miller, Mr. Benson
   Lectures, field trips, and laboratory. Prerequisite: course 1B.
   The birds, mammals, reptiles, and amphibians, chiefly of California; identification of species; observational methods in study of behavior and habitat relations; systematics. Field work emphasized.

114. **Genetics.** (3) I.  Mr. Stern
   Prerequisite: course 1A, or Biology 11A–11B, or Botany 1, or course 10, and upper division standing. Not open for credit to students who take Genetics 100.
   The facts of heredity, basic and advanced.
*114C. Genetics Laboratory. (2) I. Mr. Stern
Prerequisite: course 114 (may be taken concurrently). Limited to twenty-four students.

115. Human Genetics. (3) II. Mr. Stern
Prerequisite: course 1A, or Biology 11A-11B, or Botany 1, or course 10, and upper division standing.
A study of the principles of inheritance as applied to the physical and mental characteristics of man, of the heredity-environment problem, and of the genetic constitutions of populations.

116. Introduction to Wildlife and Fisheries Management. (4) I. Mr. Leopold, Mr. Needham
Lectures and laboratory. Prerequisite: course 1A or 10 or Biology 11A-11B and upper division standing.
Theory and practice of wildlife and fisheries management; identification, distribution, and life histories of important species.

117. Comparative Microscopic Anatomy. (4) I. Mr. Quay, Mr. DeOme
Lectures and laboratory. Prerequisite: course 1B or the equivalent. Recommended: a course in comparative or mammalian gross anatomy.
Comparative microscopic anatomy of vertebrates including correlations with phylogeny and function, and training in identification and interpretation of tissues and organs.

118. Comparative Endocrinology. (3) I. Mr. Bern
Prerequisite: course 1B and Chemistry 8.
Lectures on the biology of hormonal mechanisms, with reference to the invertebrates and lower vertebrates, as well as mammals.

*118C. Comparative Endocrinology Laboratory. (2) I. Mr. Bern
Prerequisite: course 400 or former course 4, and 118 (course 118 and 400 may be taken concurrently). Enrollment limited to ten students.
Laboratory exercises and demonstrations illustrating hormonal mechanisms.

*119A-119B. Optics and Metrology in Biology. (2-2) Yr. Mr. Gullberg
119A. The theoretical principles and the critical use of the microscope, spectroscope, and other primary optical instruments. Open to students with upper division or graduate standing in biological or physical science.
119B. The theory and advanced technique of scientific photography, photomicrography, and special photometric methods.

*120. Electrical Measurements in Biology. (3) I. Mr. Gullberg
Lectures and laboratory. Enrollment limited and requires consent of the instructor.
An analytical study of direct- and alternating-current circuits and instruments used in biological research.

123. Physiological Embryology. (2) I. Mr. Berg
(Formerly numbered 103.)
Prerequisite: course 100. Recommended: course 103.
A survey of physiological and biochemical studies of developmental processes. Reading of research literature and term paper required.

124. Invertebrate Physiology. (4) I. Mr. Smith
Lectures, laboratory, and individual reports. Prerequisite: course 108 or a

* Not to be given, 1959-1960.
course of comparable level in physiology or entomology. Enrollment limited to ten students.
Comparative physiology of the invertebrates, with individual problems on nutrition, respiration, excretion, coordination, and other functions.

125. General Ecology. (2) II. Mr. Pitelka
Prerequisite: two semester of upper division work in biology, or graduate status in a related field.
Structure and dynamics of natural populations of animals; mechanisms of population control and regulation; community relations, stressing terrestrial habitats.

125C. Field Ecology. (2) II. Mr. Pitelka
Prerequisite: courses 108 or 113 or the equivalent; 125 (may be taken concurrently), and Botany 108. Enrollment limited to ten students.
Study of distribution, composition, and dynamic relations of terrestrial communities in central California; descriptive and quantitative methods.

128. Vertebrate Reproduction. (3) II. Mr. Lidicker
Lectures and laboratory. Prerequisite: course 100 or 106.
The reproductive biology of vertebrate animals, with a consideration of the factors influencing reproductive physiology in natural populations.

135. Systematic Mammalogy. (2) I. Mr. Benson
Lectures and laboratory. Prerequisite: courses 106 and 113.
Principles of classification and nomenclature; anatomy, relationships, and distribution of mammalian groups.

136. Ornithology. (2) I. Mr. Miller
Lectures and laboratory. Prerequisite: course 113. Enrollment limited to ten students.
Advanced study of classification, anatomy, and function in birds.

137. Herpetology. (2) II. Mr. Stebbins
Lectures and laboratory. Prerequisite: course 113.
Advanced study of classification, anatomy, and function in amphibians and reptiles.

*138. Ichthyology. (4) II. Mr. Needham
Lectures and laboratory. Prerequisite: course IB and two semesters of upper division work in zoology. Recommended: courses 106 and 116.
Structure, classification, and ecology of fishes, including the application of limnological methods to problems of fish culture and management.

145. Advanced Wildlife Management. (3) II. Mr. Leopold
Lectures and laboratory. Prerequisite: course 116.
Manipulation of environments in the control of bird and mammal populations. Characteristics of wild populations. Field and laboratory techniques.

146. Field Course in Wildlife and Fisheries. (4) Mr. Needham, Mr. Leopold
Lectures, laboratory and field work. Given in Summer Session I at Sage Hen Creek Experiment Station, California. Prerequisite: course 1B or equivalent and consent of the instructor.
Practice, techniques, and theories in wildlife and fisheries problems; field inspection of habitats and of research and management projects in eastern California and western Nevada.

* Not to be given, 1959–1960.
151. Comparative Ecology of Vertebrate Populations. (2) I. Mr. Pitelka
Prerequisite: an upper division course in animal ecology (courses 125 or 145 or Entomology 127 or an equivalent), or graduate status.
A comparative review of population and life-cycle characteristics of vertebrates; factors and mechanisms affecting densities, turnover, and fluctuations; types of population organization evolved among vertebrates.

197. Extra Session Work. (1-4) The Staff (Mr. Harris in charge)
Work on assigned topics carried on in the field, or in Berkeley when the University is not in session, under the direction of a member of the staff.

198. Proseminar in Zoology. (1) I. Mr. Berg
Prerequisite: senior standing with at least a B average in upper division courses in zoology.
Reading, reporting, and group discussion on selected topics in zoology. Although organized by designated faculty member, others will participate. Honor students are encouraged to take advantage of this opportunity of meeting together and with the faculty to discuss topics of common interest.

199. Special Study for Advanced Undergraduates. (1-4) I and II.
The Staff (Mr. Harris in charge)
Prerequisite: senior standing with at least a B average in upper division courses in zoology; background courses in chosen subjects.

GRADUATE COURSES

For admission to a graduate course, a student should have permission of the instructor (which may be given to graduate students and seniors with not less than a B average), and should have 12 units of basic upper division work.

201. Seminar in Physicochemical Biology. (2) II.
Mr. Mazia, Mr. Strohman
Prerequisite: courses 101 and 102 or consent of the instructor.
Seminar discussion of recent literature on the physicochemical organization of the cell and the physicochemical mechanisms underlying cell functions.

202. Comparative and Functional Neurology. (2) I. Mr. Quay
Prerequisite: consent of the instructor.
The organization and activities of the nervous systems of vertebrates and invertebrates, with emphasis on regulatory mechanisms.

204. Seminar in Animal Behavior. (1-2) II.
Mr. Marler
Prerequisite: course 104 or Psychology 150A, or consent of the instructor.
Relationships of animal behavior to ecology, physiology, and evolution.

207. Seminar in Cytology. (1-2) II.
Mr. Alfert
Prerequisite: course 107.
Critical discussion of basic problems and recent literature in descriptive cytology and cytochemistry.

208. Seminar in Invertebrate Zoology. (1-2) I.
Mr. Smith
Topics will vary from year to year. Topic for 1959-1960: Recent advances and special topics in invertebrate physiology.

209. Seminar on the Biology of Tumors. (1) I.
Mr. DeOme, Mr. Bern, Mr. Alfert
Admission with consent of the instructors. Recommended: courses 105 and 217.
Review and discussion of current information on the origin and properties of tumors.
212. **Advanced Marine Invertebrate Natural History. (4)**

Mr. Smith, Mr. Hand

Given at the seashore in Summer Session I. Prerequisite: course 108 or 112; or consent of the instructor.

Semi-independent investigations of marine invertebrates.

*213. **Advanced Invertebrate Zoology. (4)** II.

(Formerly numbered 142.)

Lectures and laboratory.

Prerequisite: course 108 or 112. May be repeated without duplication of credit.

The biology of major invertebrate groups.

217. **Comparative Histopathology. (3)** II. Mr. DeOme

Prerequisite: course 106, 117, Bacteriology 101, or equivalent experience.

A presentation of normal and pathological material to illustrate the reaction of normal tissue to various environmental agents. Special emphasis is placed upon the neoplastic changes.

218. **Seminar in Comparative Endocrinology. (1)** II. Mr. Bern

Prerequisite: course 118 or the equivalent.


219. **Seminar in Animal Ecology. (1)** I. Mr. Pitelka

Prerequisite: course 125 or consent of the instructor.

Review of special topics, with emphasis on current literature.

220. **Seminar on Speciation in Vertebrates. (2)** I. Mr. Benson

Prerequisite: course 113.

Problems of speciation and isolating mechanisms in vertebrates.

221. **Seminar in Optics and Metrology. (2)** II. Mr. Gullberg

Prerequisite: courses 119A and 119B, or consent of the instructor.

Critical evaluation of recent advances in instrumentation in biological research fields.

222. **Seminar in Wildlife Management and Population Dynamics. (2)** II.

Mr. Leopold

Prerequisite: courses 116 and 145, or consent of the instructor.

Review of current research by students; review of literature and special topics.

223. **Seminar in Fisheries Management. (2)** I. Mr. Needham

Prerequisite: courses 116 and 138.

Analysis of fish population problems, including review of recent research, special phases, and work of students.

224. **Research. (1–8)** I and II. The Staff (Mr. Harris in charge)

Original study on special topics in laboratory, field, and museum. The work may be carried on in the laboratories at Berkeley, or in the field, or at a marine station at any season of the year. Credit awarded according to work accomplished.

241. **Seminar in Protozoology and Parasitology. (2)** I. Mr. Balamuth

242. **Seminar in Experimental Morphogenesis. (2)** I. Mr. Berg

* Not to be given, 1959–1960.
243. **Vertebrate Review.** (1) II. Mr. Benson, Mr. Pitelka
Review of current literature on ecology and evolution of higher vertebrates.

*244. **Genetics Review.** (1) II. Mr. Stern
Prerequisite: graduate standing and one course in genetics. May be repeated without duplication of credit.
Review of current literature and of special topics.

245. **Seminar in Advanced Genetics.** (2) II. Mr. Stern
Prerequisite: one course in genetics.
Topics will vary from year to year.

299. **Special Study for Graduate Students.** (1–4) I and II. The Staff
Any properly qualified graduate student who wishes to pursue a problem through reading or other advanced study may do so if his proposed project is acceptable to a member of the staff.

Zoology Seminar. (No credit) I and II.
The Staff (Mr. Miller in charge, fall semester; Mr. Mazia in charge, spring semester)
Meetings for the presentation of original work by the faculty, visiting lecturers, and graduate students.

**MUSEUM OF VERTEBRATE ZOOLOGY**
This Museum, situated in the Life Sciences Building on the Berkeley campus, was founded and endowed by the late Miss Annie M. Alexander as a repository for specimens and information relative to the higher vertebrate animals and for research on them. The particular groups of animals with which it is concerned are the mammals, birds, reptiles, and amphibians; of these, it has a large and continually growing collection, as indicated (on January 30, 1959) by a total of 342,228 catalogue entries. The specimens, with the accompanying field notes, photographs, and maps, provide the basis for studies along systematic, evolutionary, ecologic, and economic lines. Persons interested in employing the facilities of the Museum may address the Director, 2593 Life Sciences Building.

**CANCER RESEARCH GENETICS LABORATORY**
The Department of Zoology's Cancer Research Genetics Laboratory, situated in Earl Warren Hall, was established to implement a program of graduate student and staff research in cancer genetics, especially in small mammals, and to develop, maintain, and produce strains of mice with predictable incidences of tumor. Persons interested in employing the facilities of the Laboratory may address the Director, 230 Earl Warren Hall.

* Not to be given, 1959–1960.
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