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: 25, Comparative World Agriculture; *110, Agricultural Finance; 112A–112B, Rural Sociology; 120, Agricultural Policy; 130, Agricultural Marketing; 140, Fundamentals of Farm Management; 156, Agricultural Economic Measurements; 175, Economics of Natural Resources.

Anatomy: 25, 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, 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.


* Not to be given, 1961–1962.

Dramatic Art: 120, Dramatic Theory; 125, Dramatic Literature of Western Civilization (125A, Greek and Roman Dramatic Literature; 125B, Dramatic Literature of Western Europe from the Middle Ages to 1600; 125C, Dramatic Literature of Western Europe from 1600 to 1700; 125D, Dramatic Literature of Western Europe and the United States from 1700 to 1900; 125E, Dramatic Literature of Western Europe and the United States from 1900 to the Present); 145, History of the American Theater; 150A, The Visual Theater.

Education: 100A, Learning and the Learner; 101, The History of Education—General Course; 105, Introduction to Comparative Education; 106, Contemporary Educational Thought; 130, The Elementary School Curriculum; 172, Junior High School Education; 182, Problems of Adulthood.

English: 110, The English Language; 114A, The English Drama to 1642; *114B, The English Drama from 1660 to 1850; 114C, British and American Drama from 1850 to the Present; 116, The English Bible as Literature; 117A—117B, 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 to 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; 160, British Literature from 1900 to the Present.

Entomology and Parasitology: 10, Natural History of the Insects; 100, General Entomology; 117, Helminthology; 126, Medical Entomology; 127, Insect Ecology; 133, Biology of Aquatic Insects.

Forestry: 103, Principles of Forest Ecology; 121, Forest Economics; 122, Forest Policy.

* Not to be given, 1961—1962.
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: 10, Heredity and Evolution; 100, Principles of Genetics; 103A–103B, Organic Evolution.

Geography: 119, The Arid Lands; 121A, Geography of Eastern North America; 121B, Geography of Western North America; 130, Geography of the Tropics; 131, Geography of California; 140, Transportation; *141, Economic Geography: Primary Production; 142, Economic Geography: Industrial Localization; 153, Natural Resources and Their Exploitation; 155, Urban Geography; 176, Relations Between Nature and Culture. And all of the foreign-area regional survey courses in the 120 and 130 series.

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: 132, Child Psychology; 137, Marriage and the Family; 139, Sociology of Child Development.


Journalism: 140, History of Journalism; 141, The Press and Society; 145, Great Figures in Journalism; 151, Literature of the Press; 165, The Press, the Law and the Constitution; 190A*–190B, Press and World Affairs: Comparative World Journalism; 196, Theories and Problems in the Conduct of International Information Programs.

Linguistics: 100, Principles of Descriptive and Historical Linguistics.


Music: 127A, Introduction to Opera; 127B, The Symphonies of Beethoven; 127C, Introduction to Contemporary Music; 127D, Bach and Handel; 127G, Masterpieces of Choral Literature; 141, Advanced University Symphony Orchestra; 142, University Chamber Band; 143, Advanced University Concert Band; 144, Advanced University Chorus; 145, Repertory Chorus; 146, Advanced Chamber Music Ensemble; 148, Advanced Piano Ensemble; *149, Collegium Musicum.

* Not to be given, 1961–1962.
Near Eastern Languages: *1A–1B, Languages and Cultures of the Near East; 12, Great Books of Hebrew Literature; *15B, Hebrew Civilization; 170, Religion and Cosmology of Ancient Mesopotamia; 180A–180B, Islamic Civilization; *280A–280B, Bibliography and Historiography of Islamic Studies.


Paleontology: 170, History of Paleontology.

Physical Education: 120, Sports in American Society; 140, Community Recreation.

Physics: 132, Modern Physics.

Physiology: 102, Physiology of Human Development; 103, Human Physical Growth; 107, Environmental Physiology.

Plant Pathology: 120, Plant Diseases.


Psychology: 136, Psychology of the Unconscious; 145A, Social Psychology; *160, Mental Deficiency; 185, Personnel and Industrial Psychology.


* Not to be given, 1961–1962.
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 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: 130A–130B, Survey of Russian Literature and Intellectual Trends; 131, Russian Literature (1880–1917); 132, Russian Literature since 1917; 133A, the Russian Novel to 1850 and Its Relations to West European Literature; 133B, The Russian Novel 1850–1880 and Its Relations to West European Literature; 133F, Chekhov; *134, Russian Folklore; 135, The Russian Drama from the Seventeenth Century to the Twentieth; 140, Survey of Western and Southern 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 Literatures; 161, Czech and Slovak Literatures of the Nineteenth Century; *170, Survey of Serbian and Croatian Literatures; *180A, Survey of Russian Culture to 1800; *180B, Survey of Russian Culture from 1800 to the Present; 182, History of Polish Culture; 185, History of Hungarian 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; 123, Freedom of Speech; 135, British Public Address during the Eighteenth and Nineteenth Centuries; 136, Latin-American Spokesman; 137, American Public Address during the Eighteenth and Nineteenth Centuries; 138, Modern Public Address; 139, Modern Spokesmen; 147, Modern Rhetoric; 149, Comparative Discourse.


Zoology: *114, Genetics; *115, Human Genetics; 116, Introduction to Wildlife and Fisheries Management.

* Not to be given, 1961–1962.
Courses of Instruction

Fall and Spring Semesters, 1961–1962

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 therefor; 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 one 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 one 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 honors courses (marked H) in reading and research, with credit to be determined by the instructors in charge, according to the performance of the individual students, and subject to such general restrictions as may be imposed by the department, the college, or school, or the Committee on Courses of Instruction of the Berkeley Division 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.

A student who proposes to take a University Extension course for credit toward the bachelor’s degree must first consult the Dean of his college or school.
AGRICULTURAL CHEMISTRY

(Office, 112 Agriculture Hall)

Committee in Charge:
Clinton O. Chichester, Ph.D., Associate Professor of Food Technology (Chairman of the Committee), Davis.
Harold T. Gordon, Ph.D., Lecturer in Entomology, Berkeley.
Walter G. Jennings, Ph.D., Associate Professor of Dairy Industry, Davis.
Richard E. Kepner, Ph.D., Associate Professor of Chemistry, Davis.
David V. Volman, Ph.D., Professor of Chemistry, Davis.

Graduate Course
(Concerning conditions for admission to graduate courses, see page 163.)

201A–201B. Research in Agricultural Chemistry. (1–6; 1–6) Yr.
The Staff (Mr. Gordon in charge, including all members of the Graduate Agricultural Chemistry Group)

AGRICULTURAL ECONOMICS

(Department Office, 207 Giannini Hall)

Raymond G. Bressler, Jr., Ph.D., Professor of Agricultural Economics.
David A. Clarke, 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.
*Ivan M. Lee, Ph.D., Professor of Agricultural Economics.
George L. Mehren, Ph.D., Professor of Agricultural Economics (Chairman of the Department).
Loy L. Sammet, Ph.D., Professor of Agricultural Economics.
Siegfried V. Wantrup, Dr.Agr., Professor of Agricultural Economics.
Harry R. Wellman, Ph.D., Professor of Agricultural Economics.
Murray R. Benedict, Ph.D., Professor of Agricultural Economics, Emeritus.
Henry E. Erdman, Ph.D., Professor of Agricultural Economics, Emeritus.
David Weeks, Ph.D., Professor of Agricultural Economics, Emeritus.
James N. Boles, Ph.D., Associate Professor of Agricultural Economics.
*Norman R. Collins, Ph.D., Associate Professor of Agricultural Economics.
David J. Allee, Ph.D., Assistant Professor of Agricultural Economics.

Michael F. Brewer, Ph.D., Assistant Professor of Agricultural Economics.
Irving F. Hoch, Ph.D., Assistant Professor of Agricultural Economics.

Kenneth R. Farrell, Ph.D., Lecturer in Agricultural Economics.
Davis McEntire, Ph.D., Lecturer in Agricultural Economics and Professor of Social Welfare.
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 95.

Departmental Major Advisers: Mr. Brewer, Mr. Clarke.

The Department of Agricultural Economics offers two curricula, one in Agricultural Business Management and another in Agricultural Economics.

The Major in Agricultural Business Management: To obtain a B.S. degree in this major, the following five items must be satisfied: 1. General University requirements. 2. College of Agriculture requirements (see page 63). 3. Agricultural Business Management Curriculum requirements: (a) General. Accounting, 3 units. Anthropology, geography, history, philosophy, political science, psychology, or sociology and social institutions, 12 units. Botany, agriculture, geology, physics, physiology, or zoology or additional laboratory work in agriculture, 12 units. (c) Electives (restricted). Additional upper division work in agricultural economics, economics or business administration, 24 units. 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 units. 5. Certain courses or their equivalents are required for the curriculum and, where applicable, may be used toward satisfaction of 3 above. For details, see the PROSPECTUS OF THE COLLEGE OF AGRICULTURE.

The Major in Agricultural Economics: To obtain a B.S. degree in this major, the following five items must be satisfied: 1. General University requirements. 2. College of Agriculture requirements (see page 63). 3. Agricultural Economics Curriculum requirements: (a) General. Accounting, 3 units. Analytic geometry and calculus and/or linear algebra, 6 units. Chemistry, 5 units. English and/or speech, 6 units. Physics, 3 units. Principles of economics, 6 units. Statistical methods, 3 units. (b) Agriculture. Agriculture, other than agricultural economics, 8 units. Upper division agricultural economics, 18 units. (c) Electives (restricted). Anthropology, geography, history, philosophy, political science, psychology, or sociology and social institutions, 12 units.

2 In residence spring semester only, 1961–1962.
AGRICULTURAL ECONOMICS

Bacteriology, botany, geology, physiology, zoology; or additional chemistry, mathematics, and physics (beyond that specified in 3 (a)), 10 units. 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), 44 units. 5. Certain courses are required for the major and, where applicable, may be used in partial satisfaction of 3 (b) above. For details, see the PROSPECTUS OF THE COLLEGE OF AGRICULTURE, available without charge.

All students must have at least a C average in all upper division courses taken in agricultural economics. Those who do not maintain such an average may be required to withdraw from the major at any time.

Honors. Information concerning honors may be obtained from the Dean’s Office, College of Agriculture.

Lower Division Courses

2. Introduction to Agriculture. (3) II.  
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.

25. Comparative World Agriculture. (3) II. Mr. Allee  
Survey of world agriculture, stressing principal agricultural regions and interrelations among physical environment, agricultural growth, and population. Tenure, credit, land reform problems, development of backward regions.

Upper Division Courses

100A. Economic Analysis in Agriculture. (3) I. Mr. Boles  
Prerequisite: Economics 1A–1B, 2, or the equivalent.  
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. Mr. Clarke  
Prerequisite: course 100A or the equivalent.  
Application of economic principles to problems of agriculture: 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.  
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.  
Prerequisite: Economics 1A or 1B.  
Farmers’ credit needs, methods of financing the agricultural industry, agencies supplying agricultural credit.

* Not to be given, 1961–1962.
112A–112B. Rural Sociology. (2–2) Yr. Mr. McEntire
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) I. Mr. Brewer
Prerequisite: Economics 1A–1B.

130. Agricultural Marketing. (3) I. Mr. Sammet
Prerequisite: Economics 1A or 1B.

140. Fundamentals of Farm Management. (4) II.
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.
Utilization of agricultural land, economic rent, land appraisal, political and economic problems of land development, land settlement, land policies, relation of population growth to 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. Hoch
Sources, collection of data, and analysis of selected measurements, including parity prices, parity income, employment, wages, production, and national income.

160. Economic Analysis in Agricultural Marketing. (3) II. Mr. Farrell
(Formerly numbered 160A.)
The marketing firm in its economic context; location of agricultural production, processing and trade; demand analysis; economic analysis of market organization; government in marketing; the marketing system and the general economy.

163. Cooperative Management. (3) I.
Organizational and operational problems and policies of agricultural cooperative associations.

175. Economics of Natural Resources. (3) I. Mr. Brewer
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.

198. Directed Group Study. (1–5) I and II.
The Staff (Mr. Brewer 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. Brewer 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 163.)

**200A-200B. Economics of Agricultural Production and Consumption.** (3-3) Yr.

Mr. Bressler, Mr. Hoos

(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) Yr.

Mr. Boles, Mr. Kuznets

(Formerly numbered 204A-204B.)

210A. II. Mr. Kuznets.

210B. I. Mr. Boles.

Prerequisite: Statistics 131 and 131L.

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. Hoch

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. Allee

(Formerly numbered 180.)

Political economy of agricultural policy; defining problems and policy objectives; economic analysis of policy objectives, program alternatives for their achievement, and program results.

**222. National and World Policies for Agriculture.** (2) II.

(Formerly numbered 202.)

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. Mehren

(Formerly numbered 210.)

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. Sammet, Mr. Clarke

(Formerly numbered 205 and 209.)

A seminar on the literature, current research problems, and methods of analysis in agricultural marketing.

**240A-240B. Farm Management Research.** (3-3) Yr.

(Formerly numbered 212.)

A seminar on the literature, current research problems, and methods of analysis in farm management.
270A–270B. Natural Resource Economics Research. (2–3; 2–3) Yr.
(Formerly numbered 207 and 208.) Mr. Wantrup
Degree candidates in agricultural economics who are specializing in natural resource economics are expected to take both courses for 3 units of credit. Also open to other qualified students in all departments, who may take one or both of these courses for either 2 or 3 units of credit.
270A. Seminar in the literature, current research, and methods of analysis in natural resource economics with emphasis on public policy.
270B. Seminar in the application of economics to special problems of public policy in natural resources.

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. Sammet in charge)

299. Special Study for Graduate Students. (1–4) I and II.
The Staff (Mr. Sammet 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.

The Giannini Foundation
The Giannini Foundation of Agricultural Economics was established in 1928 through a gift from the late A. P. Giannini “to study and make better known the economic facts and conditions upon which the continued solvency and prosperity of California’s agricultural industry must necessarily rest.”

The Foundation conducts research in such fields as natural resources, farm management and production, land economics and conservation, marketing, statistics prices, agricultural policy and commodity studies. It is an integral part of the Division of Agricultural Sciences and is housed in Giannini Hall at Berkeley.

Most members of the staff also hold academic appointments and conduct courses in agricultural economics, and the Director of the Foundation is Chairman of the Department of Agricultural Economics. Fourteen members of the staff also hold appointments in the Agricultural Extension Service and two are on the staff of the School of Forestry. Agricultural economics, under Foundation staff members, is taught on the Berkeley and Davis campuses.

AIR SCIENCE
(Department Office, 218 Building T-9)
Marion R. McCrackin, Colonel, U.S.A.F.; Professor of Air Science (Chairman of the Department).
Eugene J. Kraft, Lieutenant Colonel, U.S.A.F.; Associate Professor of Air Science.
Lower Division Courses

The lower division courses in air science, together with electives (see page 38), meet requirements established by the Regents for military training in the first and second undergraduate years. Lower division courses consist of two hours of instruction and one hour of laboratory weekly for two semesters, and one hour of laboratory weekly for two additional semesters. Enrollment is limited to students who are physically fit for military service and who are between 14 and 23 years of age at time of initial enrollment. Uniforms are provided by the government and must be returned in good condition.

†1A. Air Science 1. (½) I and II.
   The Staff (Mr. Kraft in charge)
   One section meeting per week. Application of leadership techniques through military drill and command.

1B. Air Science I. (2) II.
   The Staff (Mr. Kraft in charge)
   Elements and potentials of aero-space power including military instruments of national security. Leadership laboratory.

21A. Air Science 2. (2) I.
   The Staff (Mr. Kraft in charge)
   Prerequisite: course 1B, or equivalent.
   Advanced consideration of aero-space power, emphasizing employment of air forces and space operations. Leadership laboratory.

†21B. Air Science 2. (½) I and II.
   The Staff (Mr. Kraft in charge)
   One section meeting per week. Application of leadership techniques through military drill and command.

Upper Division Courses

Students who have successfully completed the basic courses or have received credit in lieu thereof may apply for the advanced course. Students selected are those who have shown potential for leadership and command, whose aptitude and interest in becoming Air Force officers has been demonstrated. The advanced course consists of four hours instruction and one hour laboratory weekly for the junior year. Senior students are required to complete satisfactorily Political Science 120A. In addition, senior students are required to complete one hour laboratory weekly and a seminar which meets during the latter portion of the fall and spring semesters. The student may expect that at least one additional hour weekly 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 enrolled in the advanced

† To be taken concurrently with an elective course. See page 38.
course may vary from year to year and is dependent upon selection by the chairman of the department and the quota allocated annually based upon officer requirements of the United States Air Force.

Prerequisite:
1. Upper division standing in the University.
2. United States citizenship.
3. Age at anticipated date of graduation and commissioning not to be more than 26½ years.
4. Agreement to accept a commission in the United States Air Force, if tendered.
5. Selection by chairman.
6. Successful completion of prescribed screening tests.
7. Execution of 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.

Students are required to attend summer training, of four weeks’ duration, between their junior and senior years. Students attending 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), each student is furnished an officer-type uniform, which becomes his personal property upon successful completion. During this two-year period, each student also receives a monetary allowance totaling approximately $548.

Successful completion of the advanced course and attainment of a bachelor’s degree qualify the student for appointment and commission as a Second Lieutenant, Air Force Reserve. A limited number of distinguished graduates are eligible for appointment as Second Lieutenants, Regular Air Force, and for graduate education in selected fields under Air Force auspices.

Qualified graduates may be appointed to flight training schools (pilot or navigator). Other graduates receive education and/or assignment in varied fields appropriate to their qualifications and Air Force requirements.

For further information about the Air Force Reserve Officers’ Training Corps, consult the Department of Air Science, Room 216, Building T-9.

131A. Air Science 3. (3) I. The Staff (Mr. Mitchell in charge)
Prerequisite: course 21A and 21B, or equivalent.
Organization theory, survey of management, communication, creative thinking, and federal budgeting with respect to aero-space power. Leadership laboratory.

131B. Air Science 3. (3) II. The Staff (Mr. Mitchell in charge)
Prerequisite: course 21A and 21B, or equivalent.
Basic psychology of leadership, formal sanctions available to the leader, application of creative thinking and leadership theory to simulated and real problems. Leadership laboratory.
AIR SCIENCE; ANATOMY AND PHYSIOLOGY

141A. Air Science 4. (½) I. The Staff (Mr. Kraft in charge)
Prerequisite: course 131A and 131B, or equivalent.
Leadership laboratory, orientation in meteorology and navigation, and seminar on commissioned service for graduating seniors.

141B. Air Science 4. (3) II. The Staff (Mr. Kraft in charge)
Prerequisite: course 131A and 131B, or equivalent.
Military aspects of world political geography; the Air Force officer; leadership laboratory.

ANATOMY AND PHYSIOLOGY

ANATOMY
(For courses in physiology, see page 481.)
(Office, 4551 Life Sciences Building)

C. Willet Asling, Ph.D., M.D., Professor of Anatomy (Co-Chairman for Anatomy).
Herbert McLean Evans, M.D., D.med. h.c., Docteur h.c., D.Sc., LL.D., Professor of Anatomy, Emeritus, Morris Herzstein Professor of Biology, Emeritus, and Director of the Institute of Experimental Biology, Emeritus.
Miriam E. Simpson, Ph.D., M.D., Docteur h.c., Professor of Anatomy, Emeritus.
Edward S. Evans, Ph.D., Assistant Professor of Anatomy.
Herbert H. Srebnik, Ph.D., Assistant Professor of Anatomy.

Marjorie M. Nelson, 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 95.

Departmental Adviser: Mr. Asling.

Lower Division Courses

25. General Human Anatomy. (3) II. Mr. Asling
(Formerly course 102.)
Lectures and laboratory. Prerequisite: Physiology 1, 1L (recommended) or Zoology 1A or Biology 11A–11B. May be taken to satisfy the anatomy requirement for entrance to professional curricula specifying Anatomy 102. Enrollment limited to two hundred students.
Prepared human dissections, models, and microscope slides.

Upper Division Courses

101A–101B. Histology and Microscopic Organology. (3–3) Yr. Mr. E. Evans
Lectures and laboratory. Prerequisite: Zoology 1A–1B, Chemistry 8, and Zoology 100 (may be taken concurrently) or other advanced work in mammalian biology.
Tissues and organs of the body, including histophysiologic and histochemical aspects with special attention devoted to human structure.
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
Lectures and laboratory. Prerequisite: Zoology 100 or other advanced work in mammalian biology; consent of the instructor.
Dissection, X-ray, and surface anatomy of the human body, with special reference to the functional capacities of the structures examined.

199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (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 163.)

210. Physiological Anatomy of Reproduction. (2) I and II.
Two hours per week.
Informal conferences and demonstrations. Outside reading required.

211. Haematology. I and II.
Credit to be arranged.
Informal conferences and demonstrations. Outside reading required.

213. Original Investigation. I and II. The Staff (Mr. Asling in charge)
Hours and credit to be arranged.

214. Anatomy for Advanced Students. I and II.
Hours and credit to be arranged. The Staff (Mr. Asling in charge)
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.

J. Desmond Clark, Ph.D., Professor of Anthropology.

*George M. Foster, Ph.D., Professor of Anthropology and Curator of Mexican Anthropology.

Robert F. Heizer, Ph.D., Professor of Anthropology and Curator of North American Archaeology (Vice-Chairman of the Department).

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.


* In residence spring semester only, 1961–1962.
Sherwood L. Washburn, Ph.D., Professor of Anthropology and Curator of Primatology (Chairman of the Department).
Ronald L. Olson, Ph.D., Professor of Anthropology, Emeritus.
Dell H. Hymes, Ph.D., Associate Professor of Anthropology and Linguistics.
Robert F. Murphy, Ph.D., Associate Professor of Anthropology.
Gerald D. Berreman, Ph.D., Assistant Professor of Anthropology.
Eugene A. Hammel, Ph.D., Assistant Professor of Anthropology.
Laura Nader, Ph.D., Assistant Professor of Anthropology.
Richard F. Salisbury, Ph.D., Assistant Professor of Anthropology.

May N. Diaz, A.B., Lecturer in Anthropology.
Anna Hadwick Gayton (Anna Hadwick Gayton Spier), Ph.D., Professor of Decorative Art and Curator of Textiles, Museum of Anthropology.
Jaspar C. Ingersoll, A.B., Lecturer.
George A. Pettitt, Ph.D., Lecturer in Anthropology.
David Plath, Lecturer in Anthropology.
William L. Rowe, Ph.D., Lecturer in Anthropology.
R. Lauriston Sharp, Ph.D., Visiting Professor of 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 95.

Departmental Major Advisers: Mr. Rowe, Mr. Berreman, Mr. Hymes, Mr. Hammel.

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, 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.
   I: Mr. McCown, Mr. Heizer, Mr. Washburn.

   Facts and problems of human evolution, fossil man, race and race differences.

2A–2B. General Anthropology: Cultural Factors. (3–3) Yr.

   Lectures and one section meeting per week.
   2A. Prehistory and cultural growth. Mr. Hammel.
   2B. Structure and dynamics of culture. Mr. Murphy.
   2A is not prerequisite to 2B.

2 In residence spring semester only, 1961–1962.
3. The Comparison of Cultures. (3) I.
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 for courses 1, 2A–2B.

101A–101B. Ethnography of the World. (3–3) Yr. Mrs. Diaz, Mr. Berreman
Survey of primitive, folk, and complex societies. Either half of the course may be taken independently.

103. Culture Growth. (3) I.
Archaeological theory and cultural process, illustrated by the origin and development of civilization in the Old World and the New.

105A–105B. The American Indians. (3–3) Yr. Mr. Heizer, Miss Nader
Native peoples and cultures of the New World.
105A. Central America, Mexico, and North America. Mr. Heizer.
105B. South America. Miss Nader.
Either half of the course may be taken independently.

106. Archaeology of North America. (3) I.
Prehistory of North American Indians; prehistoric culture areas; relations with historic Indians.

107. Archaeology and Society. (3) II.
Archaeological research methods and their uses in the study of man's past.

111. Prehistory. (3) I.
Prerequisite: course 2A.
Origin, development, and distribution in space and time of the prehistoric cultures of the Old World.

115. Peoples of Southeast Asia. (3) I.
Races, languages, and cultures of Indonesia, the Philippines, and the adjacent mainland.

118. The Nature of Culture. (3) I and II.
Mrs. Diaz, Mr. Sharp, Mr. Hammel, Mr. Ingersoll
Advanced level introduction to cultural anthropology. Not open for credit to students who have taken 2B.

119. Problems in Culture and Personality. (3) II.
Mr. W. L. Rowe
Relationships of cultural, social, and personality factors in human behavior; personality in representative societies; techniques for studying culture-personality relations.

20. Language and Culture. (3) I.
Mr. Hymes
Language and thought; classification of languages; linguistic aspects of culture; language, nation, and state.

21. 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.

22. Economic Anthropology. (3) I.
Mr. Plath
Economic behavior in non-industrial societies; its social and cultural setting, and its modern changes.

Not to be given, 1961–1962.
123. Politics and Law in Non-Industrial Societies. (3) I. Miss Nader
Comparative survey of the ethnography of law and politics and anthropological concepts relevant to their analysis.

124. Primitive Religion. (3) II. Mr. Salisbury
Comparative survey of religion and magic.

125. Comparative Society. (3) I. Miss Nader
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. Clark
Origin, history, and spread of fundamental inventions; 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. Murphy
Tribes, culture types, and culture history of aboriginal peoples west of the Rocky Mountains.

139. Africa. (3) I. Mr. Murphy
Races, languages, and cultures of Africa.

141. Mexico and Central America. (3) II. Mrs. Diaz
Achievements of the Aztecs, Mayas, and their predecessors.

142. Peoples of the Andes. (3) II. Mr. J. H. Rowe
Inca culture and its antecedents; a survey from the earliest times to the present.

143A–143B. Peoples of India. (3–3) Yr. Mr. W. L. Rowe, ——
143A. Development of Indian cultural traditions.
143B. Social organization and social trends.

147. Peoples and Cultures of the Pacific Islands. (3) I. ——
The peopling of the Pacific; Oceanian races and cultures.

149. Cultures of the Near East. (3) II. Miss Nader
 Cultures of the contemporary Near East, with special emphasis upon Arab populations.

152. Human Evolution and Fossil Man. (3) I. Mr. Washburn
Prerequisite: course 1 or the equivalent.
Evolution of monkeys, apes, and man.

152L. Human Evolution and Fossil Man. Laboratory. (2) I. Mr. Washburn
Lecture and laboratory.
Prerequisite: course 152 (may be taken concurrently). Enrollment limited to 12 students; primarily for majors in anthropology and the life sciences.

153. Living Races of Man. (3) II. Mr. McCown
Physical characters, distribution, and relationships of the living races of mankind.

* Not to be given, 1961–1962.
153L. Living Races of Man. Laboratory. (2) II. 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.

154. Primate Social Behavior. (3) I.
Survey of the social behavior and organization of monkeys and apes; their relevance to the evolution of human behavior and social groups.

156. Contemporary Civilization. (3) II.
An application of anthropological principles of analysis and interpretation to contemporary civilization.

161. European Peasant Societies. (3) II. Mr. Hammel
Representative groups considered in modern and historical perspective, stressing especially rural-urban relationships and the dynamics of change.

162. Anthropology in Modern Life. (3) I and II. Mr. Berreman
Anthropological theory and data applied to problems in such fields as medicine, agriculture, education, and international technical aid programs.

163. Culture Change. (3) I. Mr. Ingersoll
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 socialization processes of the individual.

186. Ethnology of Japan. (3) I. Mr. Berreman
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. Mrs. Diaz
Emphasis on Iberian-Indian assimilation, African influences, development of folk-peasant societies, and the concept of "national" cultures.

195. Field Course in Archaeological Method. (2) I. Mr. Heizer
Lectures 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.
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. Advanced field investigation, and guidance in preparation of materials for publication.

197. Advanced Survey of Anthropology. (3) I. Mr. Plath
Prerequisite: senior standing or consent of the instructor. Historical survey of anthropological theories, methods, and findings. Intended primarily for major students.

* Not to be given, 1961–1962.
H198. Preceptorial and Reading Course. (3) II. Mr. J. Rowe
Open to seniors. With consent of the instructor, may be repeated without duplication of credit.
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. Hammel (in charge), Mr. Hymes, Mr. J. Rowe

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 163.)

204A–204B. Fundamentals of Anthropological Theory. (3–3) Yr.
Mr. Clark, Mr. Hammel, Mr. McCown,
Mr. Murphy, Mr. Salisbury,

204A. Physical anthropology, human evolution, and prehistory and archaeology: Mr. McCown, Mr. Clark, Mr. Hammel.
204B. Cultural anthropology and ethnography: Mr. Murphy, Mr. Salisbury.

205. Recent Developments in Anthropology. (2) I. Mr. Mandelbaum

206. Proseminar. (2) I.
Introduction to research. For new graduate students in anthropology.

207A–207B. History and Theory of Anthropology. (2–2) Yr. Mr. Hymes
Prerequisite: consent of the instructor.

210A–210B. Aspects of Culture Structure. (2–2) Yr.
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) I. Mr. Berreman
Prerequisite: consent of the instructor.
Techniques of interviewing and data collecting; preparation for field expeditions; practice in work with informants.

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. Mr. Sharp
Prerequisite: consent of the instructor.
Problems in culture change and stability.

218H. Culture and Personality: the Psychological Approaches. (2) II.

220. Concepts and Problems in Linguistic Anthropology. (2) II. Mr. Hymes
Prerequisite: consent of the instructor.
Continuing and new problems in the study of language and speech as this concerns anthropology. One or more topics such as language taxonomy, lexicostatistics, semantics, verbal art, structural method, functions of speech.

* Not to be given, 1961–1962.
225. Kinship and Social Structure. (2) I.
Prerequisite: consent of the instructor.
Systematic treatment of ethnological data and concepts concerned with kinship and
the social structuring of human societies.

235. Problems in the Culture History of South America. (2) I.
Mr. J. H. Rowe

237. Culture Problems of Western North America. (2) II.
Work on problems of tribal distribution and cultures.

239. Problems in African Society and Culture. (2) I.
Prerequisite: consent of the instructor.

240. Problems in Southeast Asian Society and Culture. (2) II.
Mr. Sharp

242. Problems in African Prehistory. (2) II.
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. McCown
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.
Processes and results of culture change originating in the contact of distinct ethnic
groups.

265. Concepts and Problems in Applied Anthropology. (2) II. Mr. Foster
Prerequisite: consent of the instructor.
The use of anthropological theory, technique, and data in professional fields such as
public health, social welfare, education, and international developmental programs.

279. Factors in Material Culture. (2) II.
Miss Cayton
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.

291. Seminar on Contemporary Latin America. (2) II.
Problems in the culture and society of modern Latin-American countries.

298. Special Study. (3) I and II.
The Staff (Mr. McCown, Mr. Murphy in charge)
Prerequisite: advanced graduate status; consult graduate adviser for details.

299. Directed Research. (2-6) I and II.
The Staff (Mr. McCown, Mr. Murphy in charge)

Anthropology Seminar. (No credit) I and II.
The Staff
Weekly meetings for the presentation of original work by faculty, graduate students,
and visiting anthropologists. Graduate students are expected to attend.

* Not to be given, 1961-1962.
§ To be offered one semester only, 1961-1962.
Related Course in Another Department

Introduction to Social Science (Social Science 1A-1B).

Museum of Anthropology

The Robert H. Lowie Museum is a major research facility which functions as an integrated component of the Department of Anthropology, and it serves a number of other departments as well. Members of several departments serve as curators, and the Museum’s collections are used for teaching and research over a wide range of scholarly disciplines. Founded in 1901 as the Museum of Anthropology, it was renamed in 1959 when it was moved to its new quarters in Kroeber Hall.

The 400,000 catalogued items include 200,000 archaeological and ethnological specimens from California, 85,000 from other parts of the America’s, 40,000 from Oceania, 35,000 from Europe, Asia, and Africa, and 10,000 entries of human skeletal material.

The Museum’s collections and research facilities are available for study in archaeology, ethnography, physical anthropology, and related subjects by graduate and undergraduate students and by visiting scholars. Qualified students in anthropology and other departments are encouraged to use its resources under faculty supervision for independent, original research. The Museum’s exhibition hall is utilized for instructional and educational purposes, particularly in connection with class work. The exhibits are open to the public without charge daily, except Monday, from 1:00 to 5:00 p.m.

Those interested in the Museum facilities may address the Director, Robert H. Lowie Museum of Anthropology, 103 Kroeber Hall.

The Archaeological Research Facility

The Archaeological Research Facility replaces the University of California Archaeological Survey and constitutes a subunit of the Department of Anthropology. Its purpose is to provide means and facilities for research in archaeology, with no restriction as to area, for advanced students and staff. The files of the former Archaeological Survey are now under the supervision of the Archaeological Research Facility.

ARCHITECTURE

(Department Office, 1 Architecture Building)

*E. Michael Czaja, M.Arch., Professor of Architecture.
Vernon A. DeMars, A.B., Professor of Architecture (Chairman of the Department).

* In residence spring semester only, 1961-1962.
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Joseph Esherick, B.Arch., Professor of Architecture.
Michael A. Goodman, M.A., Professor of Architecture.
Corwin R. Mocine, A.B., Professor of City Planning and of Architecture.
Jesse Reichek, Professor of Design.
George P. Simonds, M.A., Professor of Architecture.
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 of Architecture.
Sami Y. 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 E. Olsen, M.Arch., Associate Professor of Architecture.
Donald P. Reay, M.Sc., Associate Professor of Architecture.
Claude Stoller, B.Arch., Associate Professor of Architecture.
Harold A. Stump, A.B., Associate Professor of Architecture.
Ezra D. Ehrenkrantz, M.Arch., Assistant Professor of Architecture.
John M. Jacobus, Ph.D., Assistant Professor of Architecture and Art.
Carl G. Kolbeck, A.B., Assistant Professor of Architecture.
Richard C. Peters, B.Arch., M.F.A., Assistant Professor of Architecture.
Patrick J. Quinn, M.Arch., Assistant Professor of Architecture.

Letters and Science List. Courses 110, 121, 122, 126, 127, 128 are included

* In residence spring semester only, 1961–1962.
in the Letters and Science List of Courses. For regulations governing this list see page 95.

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 each be allowed in any one of these courses.

**Lower Division Courses**

1. **Design. (3) I and II.**
   Mr. Koberg, Mr. Lyndon, Mr. Prestini, Mr. Quinn, Mr. Reichek, ---
   (Formerly numbered 1N.)
   Six hours per week.
   Tools and materials: line, plane, color, texture, tone. Visual and physical structures in two and three dimensions.

2. **Design. (3) I and II.**
   Mr. Prestini, Mr. Reichek
   (Formerly numbered 2N.)
   Six hours per week. Prerequisite: course 1 or the equivalent.
   Continuation of course 1; space, scale, form, environment, motion, light. Basic needs of man relative to architecture.

3. **Design. (3) I and II.**
   Mr. Koberg, Mr. Lyndon, Mr. Peters
   (Formerly numbered 3N.)
   Six hours per week. Prerequisite: course 2.
   Elementary design of buildings.

4. **Design. (4) I and II.**
   Mrs. Langhorst, Mr. Olsen
   (Formerly numbered 4N.)
   Eight hours per week. Prerequisite: course 3 or 23.
   Design of buildings. Continuation of course 3 with increasing scope of problems.

5. **Introduction to the Professions of Architecture, City and Regional Planning, and Landscape Architecture. (2) I.**
   Mr. Wurster, Mr. Kent, Mr. Cardwell, Mr. Vaughan
   (Formerly numbered 5N.)
   Lectures in charge of each department chairman introductory to each professional field.

6. **Descriptive Geometry. (2) I and II.**
   Mr. Cardwell, ---
   (Formerly numbered 6N.)
   Four hours per week. Prerequisite: solid geometry.

7. **Shades, Shadows, and Perspective. (2) I and II.**
   Mr. Kolbeck
   Four hours per week. Prerequisite: course 6.

11. **Graphics. (1) I and II.**
    Mr. Koberg, Mr. Reay, ---, ---, ---
    Three hours per week.
    Freehand drawing and rendering in pencil, crayon, charcoal.

12. **Graphics. (1) I and II.**
    Mrs. Langhorst, ---, ---
    Three hours per week.
    Painting and rendering in color.
13. **Graphics.** (1) I and II.  
Mr. Goodman, Mrs. Langhorst, Mr. Stump  
Three hours per week.  
Freehand drawing and rendering in black and white.

23. **Design.** (5) I and II.  
Mr. Kolbeck  
Twelve hours per week. Prerequisite: courses equivalent to 1 and 2. Open only to transfer students.  
Courses 2 and 3 combined to prevent delay in graduation.

### Upper Division Courses

The general prerequisite for upper division courses is third-year standing.

101. **Advanced Design.** (5) I and II.  
Mr. Lagorio, Mr. Ehrenkrantz, Mr. Quinn, ———  
Eight hours per week. Prerequisite: course 4, 7; Engineering 18A–18B. Engineering 18B may be taken concurrently.  
Architectural design and theory: building structure as it relates to visual design.

102. **Advanced Design.** (5) I and II.  
Mr. Bernardi, ———  
Eight hours per week. Prerequisite: course 101.  
Architectural design problems of increasing complexity.

103. **Advanced Design.** (6) I and II.  
Mr. Goodman, Mr. Hassid, ———  
Eight hours per week. Prerequisite: course 102; City and Regional Planning 100.  
Architectural design problems of large scope.

104. **Architectural Design.** (7) I and II.  
Mr. McCue, Mr. Simonds, Mr. Cardwell, Mr. Reay  
Prerequisite: fifth-year standing; courses 103, 151, 152, Civil Engineering 126 and 127. Required concurrently: courses 105, 106, and 153.  
Design (exterior and interior) of a large fire-resistant building and preparation of working drawings. Students work in teams of two.

105. **Detail and Color Study.** (1) I and II.  
Mr. McCue, Mr. Cardwell, Mr. Simonds  
Prerequisite: fifth-year standing, Required concurrently: courses 104, 106, and 153.  
Studies of the building designed in course 104. Students work in teams of two.

106. **Structural Design.** (5) I and II.  
Mr. Steinbrugge, ———, ———  
Prerequisite: fifth-year standing, courses 103, 151, 152, Civil Engineering 126 and 127. Required concurrently: courses 104, 105, and 153.  
Structural design and calculations for the building designed in course 104, and preparation of working drawings. Students work in teams of two.

107. **Fifth-Year Design Preparation.** (2) I and II.  
Mr. Goodman, Mr. DeMars, Mr. Reay,  
Mr. Quinn, Mr. Hassid, Mr. Stoller  
Prerequisite: completion of all required courses through the fourth year, or faculty approval.  
Preliminary study, conferences, and research necessary to provide a program for course 108 in the following semester.

108. **Fifth-Year Design.** (8) I and II.  
Mr. Olsen, Mr. Peters, Mr. Stoller  
Prerequisite: course 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  
Development, planning, and esthetic qualities of the single-family dwelling.

121. Architectural History. (3) I.  
Mr. Jacobus, Mr. Lyndon  
Prerequisite: course 4 for architecture students. No prerequisite for others.  
Ancient and Medieval periods.

122. Architectural History. (3) II.  
Mr. Jacobus  
Prerequisite: course 4 for architecture students. No prerequisite for others.  
Renaissance and Modern periods.

126. Architectural History—American. (3) I.  
Mr. Jacobus  
Prerequisite: courses 121 and 122 or the equivalent. Open to other students with consent of the instructor.  
Architecture of the North American continent from colonial times to the present day.

127. Architectural History—Nineteenth and Twentieth Centuries. (3) II.  
Mr. Jacobus  
Prerequisite: courses 121 and 122 or the equivalent. Open to other students with consent of the instructor.  
Architecture, principally European, from the French Revolution to the present day.

128. Architectural History—Oriental. (3) II.  
Mr. Moore  
Prerequisite: course 121 and 122 (or equivalent) for architecture students. Open to other students with consent of the instructor.  
Detailed investigation of selected architecture of the Near and Far East.

131. Building Materials. (2) I and II.  
Mr. Stoller  
Prerequisite: consent of the instructor. Enrollment limited.  
Materials and their relation to architectural design. Seminar and field trips.

132. Professional Practice and Specification. (3) I and II.  
Mr. Simonds  
Prerequisite: courses 104, 105, 106, and 153.  
Architectural business relations, contracts, legal aspects of practice, and specification writing.

133. Proseminar in Architecture. (2) I and II.  
Mr. Wurster  
Prerequisite: fifth-year standing or consent of the instructor.  
Papers on subjects relating to architecture presented and discussed in seminar meetings. For candidates for the degree Bachelor of Architecture only.

*134. Architectural Research. (2) I.  
Prerequisite: fourth-year standing and consent of the instructor. Open to qualified students from other departments.  
Approach to research bearing on architectural design problems.

151. Architectural Mechanics. (3) I.  
Mr. Beamer (in charge), Mr. Soroka, Mr. Ayer  
Prerequisite: Physics 2B, 3B, and course 101.  
Heating, ventilating, air conditioning, and plumbing of buildings.

152. Architectural Mechanics. (3) II.  
Prerequisite: Physics 2B, 3B, and course 101. 151 not prerequisite to 152.  
Lighting, electrical work, acoustics and sound control of buildings.

* Not to be given, 1961–1962.
153. Architectural Mechanics. (1) I and II.
Prerequisite: fifth-year standing and courses 151 and 152. Required concurrently with courses 104, 105 and 106.
Heating, ventilating, air conditioning, lighting, and acoustic problems relative to the building being designed in course 104.

198A–198B. Directed Group Study. (1–3; 1–3) Yr.
The Staff (Mr. DeMars in charge)

199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. DeMars 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 163.

201. Seminar in Architectural Research. (2) I. Mr. Hassid, Mr. Foley
Required for all graduate students.
Research methods and problems. Appraisal of research endeavors. Presentations by instructors and guests, discussion of student reports.

202. Major Problems of Architecture. (6) I. Mr. Moore
Required for all graduate students.
Identification of major problems of architecture; development of approaches to solutions. Problems proposed by the instructor, or the student.

203. Architectural Design and Research. (2) II.
Required of all candidates for the Degree of Master of Architecture.
Review of development of theses; exchange of content of theses.

204. Seminar in Architecture. (2) II. Mr. Hassid
Prerequisite: graduate standing.
Topics related to theory and practice. Presentation by instructors and guests, discussion of student reports.

298. Special Study for Graduate Students. (1–6) I and II.
The Staff (Mr. DeMars in charge)

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 First-Year Reading, Writing, and Speaking (Speech 1A, 1B).
General Physics Lectures (Physics 2A–2B).
General Physics Laboratory (Physics 3A–3B).
Introduction to Mathematical Analysis (Mathematics 3A, 3B).
elements of Framed Structures (Civil Engineering 124, 126, 127).
Plane Surveying (Engineering 21).
Principles of Landscape Architecture (Landscape Architecture 100).
Sculpture (Art 14A, 142).
ART

(Department Office, 238 Kroeber Hall)

Darrell A. Amyx, Ph.D., Professor of Art and Curator of Ancient Mediterranean Art, Museum of Anthropology.

John C. Haley, Professor of Art.

Walter W. Horn, Ph.D., Professor of Art.

Erle Loran, Professor of Art.

James McCray, M.A., Professor of Art (Chairman of the Department).

Felix Ruvolo, Professor of Art.

Jacques Schnier, M.A., Professor of Art.

Glenn A. Wessels, M.A., Professor of Art.

J. Ward Lockwood, Professor of Art, Emeritus.

Otto J. Maenchen, Ph.D., Professor of Art, Emeritus.

Eugen Neuhaus, Ph.D. (hon.c.), Professor of Art, Emeritus.

Stephen C. Pepper, Ph.D., L.H.D., LL.D., Mills Professor of Intellectual and Moral Philosophy and Civil Polity, Emeritus.

Chiura Obata, Associate Professor of Art, Emeritus.

Herschel B. Chipp, Ph.D., Associate Professor of Art.

Sidney Gordin, Associate Professor of Art.

Karl Kasten, M.A., Associate Professor of Art.

Richard O’Hanlon, Associate Professor of Art.

René-Yvon Lefebvre d’Argencé, Licencié ès Lettres, Assistant Professor of Art for the spring semester.

Robert Hartman, M.A., Assistant Professor of Art.

John M. Jacobus, Ph.D., Assistant Professor of Art and of Architecture.

Juergen Schulz, Ph.D., Assistant Professor of Art.

Karl M. Birkmeyer, Ph.D., Visiting Associate Professor of Art for the fall semester.

Alfred Frankenstein, Ph.D., Lecturer in Art.

Michael Goldberg, Lecturer in Art for the fall semester.

Angelo Ippolito, Lecturer in Art.

Horst Janson, Ph.D., Visiting Professor of Art for the spring semester.

Ludwig Sander, A.B., Lecturer in Art for the spring semester.

Julius Schmidt, M.F.A., Lecturer in Art.

Wilfrid Zogbaum, Lecturer in 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 95.


§ Recalled to active service, fall semester, 1961–1962.

2 In residence spring semester only, 1961–1962.
Departmental Major Advisers: Painting: Mr. Ruvolo, Mr. Wessels; History of Art: Mr. Schulz; Sculpture: Mr. O'Hanlon.

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.

Required for all art majors: 6 units chosen from courses IA, IB, IC, ID; and courses 2A, 2B and 14A. In addition, the painting major requires Art 3 and Art 4; the sculpture major requires Art 3 and Art 14B. Recommended for majors in history of art: History 4A–4B.

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 2 units of any course in Group C.

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 4 additional units of any courses in Groups A, B, C, and D. With approval, substitutions may be made within these 4 units of certain courses offered in other departments. Students planning 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 of the regular staff, Art 176A–176B (6 units), Art 132 (2 units), 2 units of any course in Group A, and 2 units of any course in Group C.

Advance Enrollment and Assignment to Sections. Inasmuch as space and facilities for technical courses are limited, students are advised to enroll in all Group A and Group D courses during Registration Week on the day to be announced. Preference is given to first applicants, but the department reserves the right to deny admission to applicants who enroll in courses for which they lack adequate preparation.

Transfer Students. Freshman and sophomore transfer students are required to take Art 2A. Junior, senior, and graduate transfer students with sufficient background are required to take Art 195.

Lower Division Courses

1A. History of Ancient Mediterranean Art. (3) I. Mr. Amyx
Lectures and weekly section meetings to be arranged.
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) II. Mr. Horn
Lectures and weekly section meetings to be arranged.
1D. History of Oriental Art. (3) I.
Lectures and weekly section meetings to be arranged.
The art of India, China, and Japan.
Mr. Maenchen

2A. Form in Drawing. (2) I and II.
Mr. Haley, Mr. Hartman, Mr. Kasten, Mr. Loran,
Mr. McCray, Mr. Ruvolo, Mr. Wessels

2B. Form in Color. (2) I and II.
Mr. Hartman, Mr. Ruvolo,

3. Composition in Life Drawing. (2) I and II.
Mr. Hartman, Mr. Kasten, Mr. Loran, Mr. McCray

4. Materials of Painting. (2) I and II.
Mr. Wessels, Mr. Kasten

10. An Introduction to Art. (2) I.
Lectures, illustrated with lantern slides. Open to nonmajors.
Mr. McCray

14A–14B. Elements of Sculpture. (2–2) Yr. Beginning each semester.
Mr. O’Hanlon, Mr. Gordin, Mr. Schmidt, Mr. Zogbaum,
Six hours per week.
14A. Introduction to basic elements of volume design, using nonobjective and repre-
sentational subject matter in three dimensions and relief.
14B. An introduction to space design and materials, with construction in wood, metal,
and plaster.

Upper Division Courses

Group A: Painting
Prerequisite: courses 2A–2B, 3, 4.
The various courses in Group A differ in content, use of materials and type of subject
matter, 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 for credit.

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: I.
105A is not prerequisite to 105B.

106A–106B. Advanced Drawing and Painting. (2–2) Yr. Mr. McCray
106A: II.
106A is not prerequisite to 106B.

107A–107B. Advanced Drawing and Painting. (2–2) Yr. Mr. Hartman
107A is not prerequisite to 107B.

*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.

* Not to be given, 1961–1962.
111A-111B. Advanced Drawing and Painting. (2-2) Yr.
111A. I, II. Mr. Goldberg, Mr. Sander.
111B. I, II. Mr. Goldberg, Mr. Sander.
111A is not prerequisite to 111B.

112A-112B. Advanced Drawing and Painting. (2-2) Yr.
112A is not prerequisite to 112B.

113A-113B. Advanced Drawing and Painting. (2-2) Yr.
113A is not prerequisite to 113B.

128. Mural Composition. (2) I and II.
For graduates and advanced undergraduates who have had at least 6 units of upper division painting courses. Limited to ten students.
Creative mural composition in fresco, mosaic, and other techniques.

129A-129B. Practice in the Graphic Arts. (2-2) Yr.
129A is not prerequisite to 129B.

Group B: Theory and Criticism

132. Picture Analysis. (2) II.
Prerequisite: course 2A–2B, 14A, and one upper division art history course, or consent of the instructor.
Theory concerning value in painting and other visual arts, and its relation to studio practice. Given primarily for art majors.

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.
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) II.
Prerequisite: course 1A.
The art of Crete and Greece in the Bronze Age, with attention to connections with neighboring cultures.

154A–154B. Greek Art. (3-3) Yr.
Prerequisite: course 1A.
From the Geometric Period to the beginning of the Roman Empire.
154A is not prerequisite to 154B.
154A. From 1100 to 450 B.C.
154B. From 450 to 30 B.C.

*159. Roman Art. (3) II.
Prerequisite: course 1A.
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.
From Shang to T'ang.

* Not to be given, 1961–1962.
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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. II. Mr. Baranszky-Job.
       Carolingian renaissance to the end of the thirteenth century.

176A–176B. Italian Renaissance Art. (3–3) Yr.
   Mr. Schulz
   176A is not prerequisite to 176B.
   176A. Italian art of the fourteenth and fifteenth centuries.
   176B. Italian art of the sixteenth century.

§176S. Italian Sculpture of the Fifteenth Century. (3) II.
   Mr. Janson

177A–177B. The Renaissance in Northern Europe. (3–3) Yr.
   Mr. Birkmeyer
   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.

178. Baroque Art. (3) II.
   Mr. Janson
   European art in the seventeenth and eighteenth centuries.

179. Italian Renaissance Architecture. (3) I.
   Mr. Schulz
   Architectural planning and architectural theory in Italy from 1400 to 1600.

   Mr. Chipp
   183A is not prerequisite to 183B.
   183A. Art of the nineteenth century.
   183B. Art of the twentieth century. II.

188. History of American Art. (3) II.
   Mr. Frankenstein

Group D: Sculpture

General prerequisite for Group D studio courses (140, 141, 142, 143, 144, 148, 149): Art 14A–14B or Art 14A and 3 art or design courses. Courses 140, 141, 142, 143, 144, 148, and 149 may be repeated for credit.

140. Sculptural Design: The Statue. (2) I and II.
   Mr. Schmidt
   Advanced design in permanent materials, featuring three-dimensional sculptural composition.

* Not to be given, 1961–1962.
§ To be offered one semester only, 1961–1962.
141. Sculptural Design: The Relief. (2) I and II.
Mr. Zogbaum
Advanced design in permanent materials, featuring relief sculpture in confined and free-outline space.

142. The Human Figure in Sculpture. (2) I and II.
Mr. Gordin, Mr. Schmidt, Mr. Zogbaum
Six hours per week.
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.
Sculptural composition featuring the human figure, in various materials such as terra cotta, gypsum, magnesite, cast stone, and metal.

144. Metal Sculpture. (2) I and II.
Mr. Gordin
Sculpture created directly with metal using soldering, brazing, welding, cutting, bending, forging, and other metal-forming, joining, and surfacing techniques.

*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. Wessels, Mr. Haley
Required of transfer students with advanced or graduate standing in the practice major in art.

199. Special Study for Advanced Undergraduates. (1-4) I and II.
The Staff (Mr. Haley in charge)
Restricted to honor seniors for selected projects. Staff approval required.

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

201. Advanced Practice in Selected Painting and Drawing Techniques.
(3) I and II.
Mr. Goldberg, Mr. Hartman, Mr. Sander, Mr. Ippolito
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.

* Not to be given, 1961–1962.
220. Seminar in Art. (3) I and II.  
Mr. Kasten, Mr. Loran, 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. Gordin  
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. Gordin, 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) II.  
Mr. Amyx  
May be repeated for credit.

260. Seminar in the History of Oriental Art. (3) II.  
May be repeated for credit.

275. Seminar in the History of Early Christian and Medieval Art. (3) I.  
Mr. Horn  
May be repeated for credit.

276. Seminar in the History of Renaissance Art. (3) II.  
Mr. Schulz  
May be repeated for credit.

277. Seminar in the History of Northern European Art. (3) I.  
Mr. Birkmeyer  
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. Jacobus  
May be repeated for credit.

298. Special Study for Graduate Students. (1–4) I and II.  
The Staff (Mr. Haley in charge)  
Restricted to exceptional projects. Staff approval required.

299. Special Study for Graduate Students in the History of Art. (1–4)  
I and II.  
The Staff (Mr. Amyx in charge)

Related Courses in Other Departments
Architectural History (Architecture 121, 122).
Architectural History—American (Architecture 126).
Architectural History—Nineteenth and Twentieth Centuries (Architecture 127).

* Not to be given, 1961–1962.
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).
Aesthetics (Philosophy 136A).

University Art Gallery

The University Art Gallery was established in 1933 with funds contributed for the purpose by the Class of 1933, the Regents of the University, 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 collections in storage, or borrowed from other institutions and organizations, or from private individuals. Those interested in the gallery's activities may address Mr. Herwin Schaefer, Curator of the University Art Collections, Department of Decorative Art.

ASTRONOMY

(Department Office, 601 Campbell Hall)

Louis G. Henyey, Ph.D., Professor of Astronomy and Director of the Lick Observatory (Chairman of the Department).
John G. Phillips, Ph.D., Professor of Astronomy.
Harold F. Weaver, Ph.D., Professor of Astronomy and Director of the Radio Astronomy Laboratory.
Sturla Einarsson, Ph.D., Professor of Astronomy, Emeritus, and Director of the Lick Observatory, Emeritus.
Otto Struve, Ph.D., Sc.D., Professor of Astronomy, Emeritus.
Leland E. Cunningham, Ph.D., Associate Professor of Astronomy.
John C. Brandt, Jr., Ph.D., Assistant Professor of Astronomy.
Richard W. Michie, Ph.D., Assistant Professor of Astronomy.
George Wallerstein, Ph.D., Assistant Professor of 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 95.

Departmental Major Advisers: Mr. Henyey, Mr. Weaver.

* Not to be given, 1961–1962.
The Major. Physics 4A–4B–4C, or the equivalents; Mathematics 3A–3B, 4A–4B, or the equivalents, and a course in statistics; a reading knowledge of French, German, or Russian.

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 107A–107B, and 117A–117B.

Honors Program. A student wishing to take part in the honors program in the Department of Astronomy may do so by enrolling for at least 3 units of Astronomy 199 during his senior year, and in this course he shall prepare an acceptable research paper on some subject which he shall choose in consultation with a staff member.

Lower Division Course

1. Introduction to General Astronomy. (3) I and II.
   Mr. Henyey, Mr. Michie, Mr. Phillips
   Three lectures and one discussion section per week.
   General facts and principles of the science of astronomy. Not intended for advanced physical science majors.

Upper Division Courses

101. Current Problems in Astronomy. (3) I and II. Mr. Phillips, Mr. Henyey
   Prerequisite: Physics 4A, 4B, 4C, Mathematics 3A, 3B, 4A, 4B.
   Introduction to the principal fields of modern astrophysical research. Differs from former course 7A–7B in that selected topics are discussed from a more advanced viewpoint. Intended primarily for majors in the physical sciences and engineering.

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.

107A–107B. General Astronomy. (3–3) Yr. Mr. Brandt
   Prerequisite: Physics 4A, 4B, 4C; Mathematics 3A–3B, 4A–4B or 1A–1B and 2A–2B.
   The facts and principles underlying all branches of astronomy. Laboratory and observing problems are included.

117A–117B. Introduction to Astrophysics. (3–3) Yr. Mr. Wallerstein
   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

* Not to be given, 1961–1962.
Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

204. Spherical and Positional Astronomy. (3) I. Mr. Wallerstein
Prerequisite: course 107 or its equivalent.
Spherical coordinate systems, precise determination of latitude and longitude, fundamental and relative star positions, proper motion, parallax. Laboratory exercises are included.

205. Utilization of Modern Computing Machinery in Modern Astronomy. (3) II. Mr. Henyey
Prerequisite: course 215A–215B, or consent of the instructor.

*206. Astronomical Dynamics. (3) I. Mr. Cunningham
Prerequisite: Physics 105A–105B; Mathematics 122.
Basic applications of the theory of gravitation to the solar system, double and multiple stars, clusters, and the Galaxy.

207A–207B. Physical Foundations of Astrophysics. (4–4) Yr. Mr. Michie
Prerequisite: Mathematics 14B or 119, Physics 121 or the equivalent.

*208. Interstellar Matter. (3) I. Mr. Michie
Prerequisite: Physics 112, 115.
The observational data and physical theories of neutral and ionized interstellar gas and dust. H I and H II regions, interstellar lines, extinctions, reddening and polarization. Distribution of interstellar matter.

*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. The Physics of Stellar Atmospheres. (3–3) Yr. Mr. Brandt
Prerequisite: course 117A–117B.

*217C. Physics of Stellar Atmospheres. (3) I. Mr. Brandt
Three hours of lecture per week. Prerequisite: course 217A–217B.
A continuation of 217A–217B with special emphasis on topics dealing with the sun's chromosphere, corona, and with granulation, flares, and prominences.

218A–218B. Galactic Structures and Statistics. (3–3) Yr. Mr. Weaver

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 evolution, and pulsation.

237A–237B. Astronomical Spectroscopy. (3–3) Yr. Mr. Phillips, Mr. Wallerstein
Prerequisite: Physics 211 or the equivalent.
Application of atomic and molecular spectroscopy to the spectra of astronomical sources.

*245. Satellite Theory. (3) II. Mr. Cunningham
Prerequisite: courses 205 and 215B, or consent of the instructor.
The motion of natural and artificial satellites. Practical determination of their orbits and perturbations.

* Not to be given, 1961–1962.

Mr. Phillips, Mr. Wallerstein

Prerequisite: Physics 211 or the equivalent.

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. Seminar. (1–3) I and II. The Staff (Mr. Henyey in charge)

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. Henyey in charge)

Leuschner Observatory

The Leuschner Observatory is equipped with a 20-inch parabolic reflecting telescope, two transit instruments and several small refractors. Most of the instruments are intended for the instruction of advanced students in connection with courses given by the Astronomy Department. The 20-inch reflector can be used either with a photoelectric photometer, a small stellar spectograph or a double slide photographic plateholder. The photoelectric photometer has been regularly used by graduate students and members of the staff for the measurement of the brightnesses of variable stars. The Observatory is also well equipped with various laboratory instruments needed to analyze the observational material obtained at the telescopes.

Lick Observatory

The Lick Observatory at Mount Hamilton is a separate research facility of the University and provides opportunity 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.

Radio Astronomy Laboratory

The Radio Astronomy Laboratory, a unit under the Department of Astronomy, operates an off-campus observing station at which astronomical observations are made in the radio wavelength range. No courses are offered by the Laboratory; it is not a teaching organization. The research facilities are available to properly qualified students and faculty members of the Univer-

* Not to be given, 1961–1962.
† To be given if a sufficient number of students enroll.
sity of California. At present two parabolic reflectors, one of diameter 33 feet, the other of diameter 85 feet, are under construction. Available receivers will permit observations in the frequency ranges 8000 mc/s and 1420 mc/s. Present research plans call for use of the equipment primarily for the study of stellar evolution and kinematics of the galaxy.

The personnel of the Laboratory are in both the academic and nonacademic categories. The Laboratory is, in large part, supported by contract research.

**BACTERIOLOGY**

(Department Office, 3573 Life Sciences Building)

†Michael Doudoroff, Ph.D., Professor of Bacteriology.
Sanford S. Elberg, Ph.D., Professor of Bacteriology.
Jacob Fong, Ph.D., Professor of Bacteriology.
Roger Y. Stanier, Ph.D., Professor of Bacteriology (Chairman of the Department).

Gunther S. Stent, Ph.D., Professor of Bacteriology and of Virology.
Albert P. Krueger, A.B., M.D., Professor of Bacteriology, Emeritus.
John H. Northrop, Ph.D., Sc.D., LL.D., Professor of Bacteriology, Emeritus, and Professor of Biophysics, Division of Medical Physics, Emeritus.

David W. Weiss, Ph.D., D.Phil., Associate Professor of Bacteriology.
John H. Phillips, Ph.D., Assistant Professor of Bacteriology.
Mary Human, M.A., Associate in Bacteriology.
Adelien Larson, A.B., Associate in Bacteriology.

* Horace A. Barker, Ph.D., Professor of Biochemistry.
Kenneth B. Deome, Ph.D., Professor of Zoology.
Helge Larsen, Ph.D., Visiting Professor of Bacteriology.
Stewart H. Madin, D.V.M., Ph.D., 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 95.

Departmental Major Advisers: Mr. Stanier, Mr. Elberg.

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 institu-

‡ In residence fall semester only, 1961–1962.
tions 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; Bacteriology 198; Biochemistry 102 or 100A–100B; Biochemistry 102L or 101A; and at least two 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; Genetics 104; Soil Science 111; Plant Pathology 126.

The following courses are strongly recommended as electives, particularly for those students who contemplate graduate work: Botany 101; Zoology 101, 102, 107, 107C; Zoology 114 or 115 or Genetics 100; Chemistry 112, 128, 129; 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.

Honors Program. All honor students majoring in bacteriology are eligible to enroll in the honors program. Students enrolled in the program must take at least four units of honors courses (H195 and/or H197), and must pass an oral examination at the end of their last semester. Graduation with honors may be recommended for those who maintain their standing as honor students throughout their last four semesters, who satisfactorily complete the honors courses, and who pass the comprehensive examination. The honors program adviser will help plan each honor student’s Honors Program individually, and his approval of their programs will be required. The honors program adviser is authorized to exempt such students from requirements concerning specific courses or sequences of courses in the major program. Students interested in enrolling in the program should consult the honors program adviser, Mr. Phillips.

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.
   Morphology, physiology, biochemistry, and ecology of bacteria, with emphasis on non-pathogenic types.
   Primarily for students majoring in biological science.

2. A Survey of Bacteriology. (2) II.
   Mr. Elberg, Mr. Larsen
   Two lectures per week. Prerequisite: Chemistry 1A. Course 4 must be taken concurrently.
   Primarily for students not majoring in biological science.

4. Laboratory Course in General Bacteriology. (2) II.
   Mr. Phillips
   Two three-hour laboratory periods per week. Prerequisite: Chemistry 1A. Either course 1 or 2 must be taken concurrently.
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. Larsen
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.
Pathogenesis of bacterial and other microbial infections of man.
Evidence of immunization against tetanus, diphtheria, and typhoid fever is required at registration.

102. Immunology. (2) II. Mr. Elberg
Prerequisite: course 101.
Specific and nonspecific reactions in immunity; basis of individuality in terms of antigen-antibody reactions, transplantation immunity, and hypersensitivity.

*102C. Immunology Laboratory. (3) II. Mr. Elberg
Three three-hour laboratory periods per week. Prerequisite: course 102 (may be taken concurrently).

103. Immunochemistry. (4) I. Mr. Phillips
Two lectures and two three-hour laboratory periods per week. Prerequisite: Chemistry 8 or 12.

104. The Biology of Nonpathogenic Bacteria. (5) II. Mr. Stanier
Two lectures and three three-hour laboratory periods per week. Prerequisite: 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 representatives 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.
Dynamic aspects of relationships of living organisms which result in infectious diseases.

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 laboratory course in animal virology, with emphasis on studies of the biological activities of viruses.

107. Bacterial Genetics. (2) I. Mr. Stent
Prerequisite: an elementary bacteriology course, or consent of the instructor. An elementary course in genetics is recommended.

* Not to be given, 1961–1962.
H195. Independent Study. (2-4) I and II.  
The Staff (Mr. Phillips in charge)  
Open to students in their senior year who are enrolled in the Department of Bacteriology honors program.

H197. Research. (2-4) I and II.  
The Staff (Mr. Phillips in charge)  
Open to students in their senior year who are enrolled in the Department of Bacteriology honors program.  
Laboratory research.

198. Review of Selected Research Topics. (2) II.  
The Staff (Mr. Phillips in charge)  
Preparation of a term paper. Group instruction is given in bibliographical procedures and organization of a review article. Normally taken at the end of the senior year.

Graduate Courses  
(Concerning conditions for admission to graduate courses, see page 163.)

*203. Microbial Metabolism. (2) I.  
Mr. Barker, Mr. Doudoroff  
Prerequisite: Biochemistry 100B, or consent of the instructor. Recommended: 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, Mr. DeOme  
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.

212. Seminar in Current Research. (1) I.  
Mr. Weiss  
Prerequisite: consent of the instructor.  
Presentation of current research projects.

213. Seminar in Microbial Genetics. (1) II.  
Mr. Stent  
Prerequisite: course 107.

214. Seminar in Medical Microbiology. (1) I.  
Mr. Elberg

*215. Seminar in Immunology. (1) II.  
Mr. Elberg

280. Research. (1–9) I and II.  
The Staff (Mr. Fong in charge)

299. Special Study for Graduate Students. (2–4) I and II.  
The Staff (Mr. Fong 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.

* Not to be given, 1961–1962.
Choh H. Li, Ph.D., Professor of Biochemistry and Experimental Endocrinology.
John B. Neilands, Ph.D., Professor of Biochemistry.
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., Professor of Biochemistry and Virology and Director of the Virus Laboratory.
*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.
David P. Hackett, 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.
*W. Terry Jenkins, Ph.D., Assistant Professor of Biochemistry.

Miyoshi Ikawa, Ph.D., Lecturer 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 95.

Departmental Major Advisers. Mr. Carpenter, Mr. Dekker.

Description of 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.

In preparing for the upper division courses, attention should be given to the interlocking prerequisites: that is, Mathematics 3A–3B are prerequisites for Physics 4A–4B, which are in turn required for Chemistry 110A.

The Major: Plan I. All courses with lower division numbers should be completed before the beginning of the junior year. These are as follows: Chemistry 4A–4B (or 1A–1B and 5), 12; Mathematics 3A–3B, 4A or 1A–1B; Physics 4A–4B; Biology 11A–11B, or Botany 1, or Physiology 1, 1L or Zoology 1A. Recommended: an additional course in biological sciences selected from Bacteriology 1 and 4, or 2 and 4, or Zoology 1B; Physics 4C in addition to Physics 4A–4B; a course in statistics and a reading knowledge of German and one other foreign language.

The 24-unit upper division requirement in the major must include courses 100A–100B, 101A–101B, 112, Chemistry 110A–110B, and 112C (Chemistry 112 is recommended in place of 112C). Upper division credit may be allowed

for chemistry courses taken in excess of 13 units. 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 204). 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.

*The Major: Plan II.* All courses with lower division numbers should be completed before the beginning of the junior year. These are as follows: Chemistry 4A–4B (or 1A–1B and 5), 8, 9; Mathematics 3A–3B or 16A–16B; Physics 2A–2B, 3A–3B; Biology 11A–11B, or Botany 1, or Physiology 1, 1L or Zoology 1A and one of the following: Bacteriology 1 and 4, or 2 and 4, or Zoology 1B.

The 24-unit upper division requirement in the major must include courses 100A–100B, 101A–101B, 112 and Chemistry 109. Upper division credit may be allowed for chemistry courses taken in excess of 13 units. 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 Course List on page 204).

**Upper Division Courses**

100A–100B. *General Biochemistry.* (3–3) Yr. Mr. Pardee, Mr. Snell
100A. Mr. Pardee, Mr. Snell.
100B. Mr. Snell.
Prerequisite: Chemistry 8 and 9 or 12 with a grade of C or higher; Chemistry 109 or 110A, a course in biology (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.
101A. Mr. Cole.
101B. Mr. Neillands.
One lecture and two three-hour laboratory periods per week. Prerequisite: Chemistry 5, course 100A (may be taken concurrently), or consent of the instructor. 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.
I. Mr. Hackett; II. Mr. Rabinowitz, Mr. Hackett. Mr. Hackett, Mr. Rabinowitz
Prerequisite: Chemistry 8. Recommended: Chemistry 9, 109 and an introductory course in biology. 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. Dekker, Mr. Hassid
I. Mr. Hassid; II. Mr. Dekker.
One lecture and two three-hour laboratory periods per week. Prerequisite: Chemistry 5 (or Nutrition 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. Hackett
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. Dekker in charge)
Reading and conference for properly qualified students under the direction of a member of the staff. Open only to senior students in biochemistry with honor standing.

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

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.

*203. Biochemistry of the Hormones. (2) II. Mr. Li
Survey of the biochemistry of the hormones.

204. Biochemistry of Proteins. (3) II. Mr. Cole
Prerequisite: course 100A–100B.
The chemistry and metabolism of the amino acids, peptides, and proteins.

205. Biochemistry of Nucleic Acids. (2) I. Mr. Dekker
Prerequisite: course 100A–100B, or consent of the instructor.
The chemistry and biochemistry of the nucleic acids and their constituents.

* Not to be given, 1961–1962.
206. Physical Biochemistry. (3) I.  Mr. Schachman
Prerequisite: Chemistry 12 and 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.  Mr. Carpenter
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) II.  Mr. Jenkins
Prerequisite: course 100A–100B, or consent of the instructor.
Chemical constitution and biochemical relationships of fats, phospholipids, steroids, and related compounds.

211. Enzyme Chemistry. (3) I.  Mr. Neilands
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.  Mr. Rabinowitz
One lecture and two three-hour laboratory periods per week. 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.  Mr. Hackett
(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 1961–1962 will include four sections each semester, each emphasizing a somewhat different area: I, Mr. Carpenter, Mr. Rabinowitz, Mr. Schachman, and Mr. Hassid; II, Mr. Cole, Mr. Snell, Mr. Dekker, and Mr. Pardee.

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 in biochemistry under the direction of a member of the staff.

Related Courses in Other Departments
Bacteriology 100 (5), 101 (6), 102 (2), *102C (3), 103 (4), 104 (5), 106 (2), 106C (2), 107 (2).
Botany 140 (4), 130 (4), 242 (2), 242L (2), *244 (2), *244L (2).
Chemistry. All upper division courses.

* Not to be given, 1961–1962.
Entomology 110 (3).
Food Technology 113 (3), 118 (3), 120 (2).
Genetics 100 (3), 100C (1), 104 (3).
Soils and Plant Nutrition 111 (3), 114 (3), 115 (2), 117 (2).
Virology 100A–100B (3–3), 177 (3).

**BIOLOGICAL CONTROL**

(For courses in biological control, see Entomology and Parasitology.)

**BOTANY**

(Department Office, 2017 Life Sciences Building)

Herbert G. Baker, Ph.D., Professor of Botany and Director of the Botanical Garden.
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.
Leonard Machlis, Ph.D., Professor of Botany (Chairman of the Department).
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. (hon.c.), LL.D., Professor of Plant Physiology, Emeritus.
Thomas H. Goodspeed, Ph.D., Doctor (hon.c.) Sc.D. (hon.c.), Professor of Botany and Director of the Botanical Garden, Emeritus.
†William A. Jensen, Ph.D., Associate Professor of Botany.
†Johannes M. Frohskaufer, Ph.D., Associate Professor of Botany.

* Not to be given, 1961–1962.
Robert E. Cleland, Ph.D., Assistant Professor of Botany.
Roderic B. Park, Ph.D., Assistant Professor of Botany.
Philip J. Snider, Ph.D., Assistant Professor of Botany.

Daniel I. Arnon, Ph.D., Professor of Cell Physiology.
Kenneth L. Babcock, Ph.D., Assistant Professor of Soil Chemistry.
Wayne L. Fry, Ph.D., Associate Professor of Paleontology.
David P. Hackett, Ph.D., Associate Professor of Biochemistry.
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.
Frank A. Pitelka, Ph.D., Professor of Zoology.
Otto L. Stein, Ph.D., Visiting Assistant Professor of Botany.
Edward C. Stone, Ph.D., Associate Professor of Forestry.
Richard C. Strohman, Ph.D., Assistant Professor of Zoology.
William H. Weston, Ph.D., Visiting Professor of Botany for the spring semester.
Frederick R. Whatley, Ph.D., Lecturer in Cell Physiology.

*Letters and Science List.* All undergraduate courses in botany are included in the Letters and Science List of Courses. For regulations governing this list, see page 95.

*Departmental Major Adviser:* Mr. Foster.

*The Major.* General Requirements: (a) Botany 1; Chemistry 1A, and 8; Physics 2A–2B, and 3A–3B; Zoology 1A. Recommended: Elementary courses in other biological sciences; German or French under the foreign language requirement. (b) Botany 100, 110, 120 and 140, and an upper division course in genetics. (c) Completion of field of emphasis I or II, listed below.

I. *Morphological Botany:* Additional upper division courses in botany or approved courses in related departments, to complete a minimum of 24 upper division units.

II. *Physiological Botany:* (a) Chemistry 1B, and 5; Biochemistry 102. Recommended: Mathematics 3A–3B; Biochemistry 102L. (b) Additional upper division courses in botany or approved courses in related departments, to complete a minimum of 24 upper division units.

*Honors in Botany:* Qualified students may arrange an individual program of special study in consultation with the major adviser, to begin not later than the first semester of their senior year. All candidates for honors in botany must pass an oral comprehensive examination.
**GENERAL BIOLOGY**

**Biology 11A–11B. Introduction to the Science of Living Organisms. (3–3) Yr.**

Mr. Emerson, Mr. Strohman

Lectures and laboratory. To receive credit toward the natural science requirement of the College of Letters and Science, students must take both semesters. Not open for credit to students who have taken Botany 1, 10, 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, function, heredity, and evolution of plants and animals, and introduces the student to methods of the life sciences.

**Biology 150. General Ecology. (3) I.**

Mr. Baker, Mr. Pitelka

Prerequisite: Biology 11A–11B; or introductory course in both botany and zoology.

An introduction to the principles of ecology, stressing the structure and dynamics of natural communities on both regional and local bases, and the historical and contemporary influences of man.

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**BOTANY**

**Lower Division Courses**

**1. General Botany. (5) I.**

Mr. Papenfuss

Prerequisite: 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 principles of biology as illustrated by plants, with emphasis on the structure, activities, and reproduction of the green plants.

**10. Plant Biology. (3) I and II.**

Mr. Cleland, Mr. Stein

(Formerly numbered 12.)

I: Mr. Cleland; II: Mr. Stein.

Lectures and demonstrations. Open without prerequisite to all students and designed for those not specializing in the biological sciences. Not open to students who have completed course 1 or Biology 11A–11B. Students who have taken course 10 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 I. Biology 11A–11B may fulfill this requirement with the consent of the instructor.

**100. Comparative Morphology of Thallophytes and Bryophytes. (4) II.**

Mr. Weston

Lectures and laboratory.

**110. Comparative Morphology of Vascular Plants. (4) I.**

Mr. Foster

(Formerly numbered 103.)

Lectures and laboratory.

**112. Plant Anatomy. (4) II.**

Mr. Foster

(Formerly numbered 105.)

Lectures and laboratory. Prerequisite: course 110 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.
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.

115L. Plants in Relation to Man. (1) II. Mr. Baker
(Formerly numbered 115C.)
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.

120. Taxonomy of Seed Plants. (4) II. Mr. Constance
(Formerly numbered 108.)
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.

130. Plant Cytology. (4) I. Mr. Stein
Lectures and laboratory.
A synthesis of morphological, biochemical, and genetical information on cell function, reproduction, and development.

140. Elementary Plant Physiology. (4) I and II. Mr. Machlis, Mr. Cleland
(Formerly numbered 111.)
I: Mr. Machlis; II: Mr. Cleland.
Lectures and laboratory. Prerequisite: Chemistry 1A and 8.

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.

H195. Special Study for Honors Candidates. (1–4) I and II.
Restricted to junior and senior botany majors. The Staff (Mr. Foster in charge)

199. Special Study for Advanced Undergraduates. (1–4) I and II.
Restricted to junior and senior botany majors. The Staff (Mr. Foster in charge)

Graduate Courses
(Open to graduate students and qualified undergraduate students.)

201. Biology of Lower Fungi. (4) II. Mr. Emerson
(Formerly numbered 101.)
Lectures and laboratory. Prerequisite: course 100.
Comparative studies of the development and significance of Myxomycetes, Phycomyctes, and Ascomycetes.

*202. Biology of Higher Fungi. (4) I. Mr. Snider
(Formerly numbered 102.)
Lectures and laboratory. Prerequisite: course 100. Course 101 recommended but not required. Offered every other year.
Comparative morphology, development, and activities of Basidionycetes and Fungi Imperfecti. The experimental approach is emphasized in the laboratory.

* Not to be given, 1961–1962.
**204. Algology. (4) II.**
(Formerly numbered 107.)
Lectures and laboratory. Prerequisite: course 100. Offered every other year.
A general treatment of the morphology and relationships of the algae.

Mr. Papenfuss

**206. Bryology. (4) I.**
(Formerly numbered 104.)
Lectures and laboratory. Prerequisite: course 100 and 110. Offered every other year.
A general treatment of the morphology and relationships of the bryophytes.

Mr. Proskauer

**221. Phylogenetic Taxonomy: Systematics. (3) I.**
(Formerly numbered 110A.)
Lectures and laboratory. Prerequisite: course 112 and 120.
Analysis of morphological and logical problems fundamental to the systems of classification, with laboratory work on selected problems in morphology.

Mr. Mason

**222. Phylogenetic Taxonomy: Biosystematics. (3) II.**
(Formerly numbered 110B.)
Lectures and laboratory. Prerequisite: course 120 and Genetics 100.
An introduction to population studies and experimental and other research methods significant to an explanation of the taxonomic system.

Mr. Mason

**238. Molecular Cytology. (4) I.**
Prerequisite: consent of the instructor.
Course 130 or 140 or Biochemistry 102 is recommended as background for this course. Offered every other year.
Lectures and laboratories emphasizing the molecular basis of cytology with particular reference to plant material. Electron microscopic and biochemical techniques are combined to localize metabolic reactions in cells.

Mr. Park

**242. Physiology of Lower Plants. (2) II.**
(Formerly numbered 160A.)
Prerequisite: course 140. Course 100 and Biochemistry 102 recommended. Offered every other year.
An intensive treatment of selected topics on algal, fungal, or lower archegonia t physiology.

Mr. Snider

**242L. Physiology of Lower Plants. (2) II.**
(Formerly numbered 161A.)
Prerequisite: course 140, 242 (must be taken concurrently), Chemistry 5. Offered every other year.
To accompany course 242.

Mr. Snider

**244. Hormonal Control of Growth and Development. (2) I.**
(Formerly numbered 160B.)
Prerequisite: course 140. Biochemistry 102 recommended. Offered every other year.
The effect of plant growth hormones on the growth and development of higher plants.

Mr. Cleland

**244L. Hormonal Control of Growth and Development. (2) I.**
(Formerly numbered 161B.)
Prerequisite: course 140, 244 (may be taken concurrently). Offered every other year.
Laboratory to accompany course 244. Techniques for the isolation, assay and use of plant growth hormones.

Mr. Cleland

**280. Seminar in Cryptogamic Botany. (1) II.**
Mr. Weston (in charge), Mr. Emerson, Mr. Papenfuss, Mr. Snider
(Formerly numbered 203.)

* Not to be given, 1961–1962.
282. Seminar in Morphology and Taxonomy of Vascular Plants. (1) I.
   Mr. Mason (in charge), Mr. Baker, Mr. Constance, Mr. Foster, Mr. Fry
   (Formerly numbered 205.)

284. Seminar in Plant Cytology. (1) II.
   Mr. Stein (in charge), Mr. Baker
   (Formerly numbered 204.)

286. Seminar in Plant Physiology. (1) II.
   Mr. Whatley (in charge), Mr. Arnon, Mr. Babcock, Mr. Broyer,
   Mr. Cleland, Mr. Hackett, Mr. Jacobson, Mr. Machlis, Mr.
   Mackinney, Mr. Overstreet, Mr. Park, Mr. Stone
   (Formerly numbered 206.)
   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.

299. Research. I and II.
   The Staff (Mr. Papenfuss in charge)
   Credit awarded according to the work completed.
   Original investigations of special problems.

**BUSINESS ADMINISTRATION**

(Department Office, 113 South Hall)

David A. Alhadeff, Ph.D., Professor of Business Administration.
Frederick E. Balderston, Ph.D., Professor of Business Administration.
*John P. Carter, Ph.D., Professor of Business Administration.
C. West Churchman, Ph.D., Professor of Business Administration.
John W. Cowee, LL.B., Ph.D., Professor of Insurance (Chairman of the
   Department).
Leonard A. Doyle, C.P.A., Ph.D., Professor of Business Administration.
Delbert J. Duncan, Ph.D., Professor of Marketing.
Walter Calenson, C.P.A., Ph.D., Professor of Industrial Relations.
Joseph W. Garbarino, Ph.D., Professor of Business Administration.
Robert A. Gordon, Ph.D., Professor of Economics.
*Ewald T. Grether, Ph.D., LL.D., Flood Professor of Economics.
*Richard H. Holton, Ph.D., Professor of Business Administration.
Sidney S. Hoos, Ph.D., Professor of Business Administration, of Agricultural
   Economics, and of 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.
*Choh-Ming Li, Ph.D., Professor of Business Administration.
Sherman J. Maisel, Ph.D., Professor of Business Administration.
*Julius Margolis, Ph.D., Professor of Business Administration.
*Maurice Moonitz, C.P.A., Ph.D., Professor of Accounting.

1 In residence fall semester only, 1961–1962.
†David A. Revzan, Ph.D., Professor of Business Administration.
Arthur M. Ross, Ph.D., Professor of Industrial Relations.
Lloyd Ulman, Ph.D., Professor of Economics and Industrial Relations.
Lawrence L. Vance, C.P.A., Ph.D., Professor of Accounting.
William J. Vatter, C.P.A., Ph.D., Professor of Business Administration.
*Dow Votaw, M.B.A., LL.B., Professor of Business Administration.
†Paul F. Wendent, Ph.D., Professor of Finance.
John T. Wheeler, Ph.D., Professor of Business Administration.
Thomson M. Whitin, Ph.D., Professor of Business Administration.
Ira B. Cross, Ph.D., LL.D., Flood Professor of Economics, Emeritus.
Charles C. Stachling, C.P.A., M.S., Professor of Accounting, Emeritus.
Catherine De Motte Quire, Ph.D., Assistant Professor of Accounting, Emeritus.
†Hector R. Anton, Ph.D., Associate Professor of Accounting.
†Alan R. Cerf, C.P.A., Ph.D., Associate Professor of Business Administration.
Earl F. Cheit, Ph.D., Associate Professor of Business Administration.
Michael Conant, J.D., Ph.D., Associate Professor of Business Law.
Austin C. Hoggatt, Ph.D., Associate Professor of Business Administration.
Charles B. McGuire, M.A., Associate Professor of Business Administration.
F. Theodore Malm, 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.
Robert T. Sprouse, Ph.D., Associate Professor of Business Administration.
George J. Staubus, C.P.A., Ph.D., Associate Professor of Accounting.
D. Gordon Tyndall, Ph.D., Associate Professor of Business Administration.
Donald K. Abe, M.B.A., Acting Assistant Professor of Business Administration.
†Harry E. Allison, Ph.D., Assistant Professor of Business Administration.
Louis P. Bucklin, M.B.A., Assistant Professor of Business Administration.
Thomas R. Dyckman, M.B.A., Acting Assistant Professor of Business Administration.
Edward A. Feigenbaum, Ph.D., Assistant Professor of Business Administration.
Julian Feldman, Ph.D., Assistant Professor of Business Administration.
*Roy J. Hensley, Ph.D., Assistant Professor of Business Administration.
Tillo E. Kuhn, Ph.D., Assistant Professor of Business Administration.
Richard K. Lynn, M.B.A., Acting Assistant Professor of Business Administration.

* In residence spring semester only, 1961–1962.
Thomas A. Marschak, Ph.D., Assistant Professor of Business Administration.
Jacob B. Michaelsen, M.B.A., Acting Assistant Professor of Business Administration.
Arnold B. Moore, M.B.A., Acting Assistant Professor of Business Administration.
Francesco M. Nicosia, Dottore in Economia e Commercio, Acting Assistant Professor of Business Administration.
Patrick J. Parker, M.B.A., Acting Assistant Professor of Business Administration.
Lee Egan Preston, Jr., Ph.D., Assistant Professor of Business Administration.
* Albert H. Schaaf, Ph.D., Assistant Professor of Business Administration.
Harry J. Solberg, Ph.D., Assistant Professor of Business Administration.
Herman O. Stekler, Ph.D., Assistant Professor of Business Administration.
John A. Tracy, M.B.A., Acting Assistant Professor of Business Administration.
Samuel R. Arnold, B.S., Associate in Business Administration.
Wayne S. Boutell, M.B.A., Associate in Accounting.
Edwin H. Caplan, M.B.A., Associate in Business Administration.
Loyd D. Heath, M.B.A., Associate in Business Administration.
Robert Olsen, M.B.A., Associate in Business Administration.
George C. Steinike, B.S., Associate in Business Administration.
Donald L. Thompson, M.S., Associate in Business Administration.

Eugene W. Burgess, Ph.D., Lecturer in Industrial Relations.
Leslie Darbyshire, D.B.A., Lecturer in Business Administration.
D. Douglas Davies, LL.B., Lecturer in Business Law.
Malcolm M. Davisson, J.D., Ph.D., Professor of Economics.
John Henry Denton, LL.B., Lecturer in Business Administration.
Albert A. Ehrenzweig, Dr.Jur., LL.M., J.S.D., Professor of Law.
William Goldner, Ph.D., Lecturer in Business Administration.
Malcolm H. Gotterer, D.B.A., Lecturer in Business Administration.
George W. Hilton, Ph.D., Lecturer in Business Administration.
Stanley C. Hollander, Ph.D., Visiting Professor of Business Administration.
Leland Howell, Ph.D., Lecturer in Business Administration.
Richard E. Jay, Ph.D., Lecturer in Business Administration.
Alan F. Kelsey, B.S., Lecturer in Business Administration.
Raymond W. Kettler, M.A., Lecturer in Business Administration.
Philburn Ratoosh, Ph.D., Visiting Associate Professor of Business Administration.
Samuel G. Trull, Ph.D., Lecturer in Business Administration.
Harry S. Schwartz, Ph.D., Lecturer in Finance.
Wallace F. Smith, Ph.D., Lecturer in Business Administration.
Franklin C. Stark, J.D., Lecturer in Business Law.

2 In residence spring semester only, 1961–1962.
The requirements for the curriculum in the School of Business Administration are listed on page 97.

*Letters and Science List.* Courses 1A, 1B, 10, 18, 100, and 150 are included in the Letters and Science List of Courses. For regulations concerning this list, see page 95.

**Lower Division Courses**

1A–1B. *Principles of Accounting.* (3–3) Yr. Beginning each semester.

- Mr. Arnold, Mr. Boutell, Mr. Caplan, Mr. Cerf,
- Mr. Doyle, Mr. Dyckman, Mr. Staubus, Mr. Vance

Two lectures and one two-hour laboratory section per week to be arranged. Prerequisite: at least sophomore standing.

10. *General Accounting.* (3) I and II. 

- 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.


- Mr. Boutell

Prerequisite: at least sophomore standing.

Introduction to law; contracts; sales; and agency. Not open to students in business administration.

**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. Artle, Mr. Bucklin, Mr. Howell, Mr. Jay,
- Mr. Moore, Mr. Nicosia, Mr. Stekler

Prerequisite: Economics 1A–1B, 2. Not open to students who have taken Economics 100B.

Economic analysis applicable to the problems of business enterprises in the areas of price, output, and utilization of resources; effects of business practices and policy on industry structure, consumers, labor and government.

101. *Business Fluctuations and Forecasting.* (3) I and II.

- Mr. Bucklin, Mr. Jay, Mr. Moore, Mr. Parker, Mr. Preston, Mr. Stekler

Prerequisite: course 100. Not open to students who have taken Economics 100A.

Factors responsible for economic instability: forecasting and other management problems thereby created for the business firm.

102. *Advanced Managerial Economics.* (3) II.

- Mr. Maisel

Prerequisite: course 100 and 101.

Advanced analysis of the theory and practice of decision-making in business firms, utilizing the concepts and techniques of managerial economics.

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.

109. *Legal Aspects of Business Transactions.* (3) I and II.

- Mr. Smith, Mr. Davies

Prerequisite: course 118.
118. Legal Environment of Business. (3) I and II.
Mr. Smith, Mr. Conant, Mr. Cheit

The legal system within which business operates. An analysis of the legal process and
of the techniques of legal reasoning as applied in a business context.

119. Social and Political Environment of Business. (3) I and II. Mr. Cheit
Prerequisite: 118 and senior standing.
Evolution of American business and the changing framework of its operation, responsi­
bilities, and social control. Analysis of current problems in the light of different philos­
phies of business and changing political and social goals.

§120. Industrial Accounting-Measurement, Analysis and Planning. (2) I.
Mr. Doyle
Prerequisite: senior standing and a satisfactory background in mathematics, statistics
and production. Not open to students enrolled in Schools of Business Administration.
Accounting as a system of measurement and its use in analyzing, planning and control­
ing the operations of industrial enterprises.

§120L. Industrial Accounting-Measurement, Analysis and Planning. (1) I.
Mr. Doyle
Prerequisite: may be taken with course 120 or subsequently.
Systematic work in accounting data processing and analysis. Comparison of manual and
machine accounting, including electronic data processing. Supervised problem work or
field trip.

121A–121B. Advanced Accounting. (3–3) Yr. Beginning each semester.
Mr. Cerf, Mr. Dyckman, Mr. Staubus, Mr. Sprouse
A two-hour laboratory period per week to be arranged. Prerequisite: course 1A–1B.
Required for those specializing in accounting.
Advanced theory of accounts and its application. Selected problems and reading.

122. Cost Accounting. (3) I and II.
Mr. Doyle, Mr. Tracy
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 cost control
devices and managerial use and analysis of cost accounting data; primary emphasis on
industrial applications.

123. Auditing. (3) I and II.
Mr. Boutell
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, ethical, legal, and other aspects of the public accountant’s work.

124. Budgetary Control and Accounting Systems. (3) II.
Mr. Tracy
Prerequisite: course 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.

126. Problems of Financial Reporting. (3) I.
Mr. Tracy
Prerequisite: course 121A–121B.
Consolidated statements, funds statements, index numbers in accounting, special prob­
lems.

131. Corporation Finance. (3) I and II. Mr. Abe, Mr. Lynn, Mr. Michaelsen
Prerequisite: course 1A–1B.
Financial aspects of promotion and organization, operation as a going concern, expand­
ion and consolidation, failure and reorganization; the capital market, financial instru­
ments and institutions; public regulation of security issues and security exchanges.

§ To be offered 1961–1962, only.
132. Interpretation of Financial Statements. (3) I and II. Mr. Cerf
Prerequisite: course 1A–1B, 131, and consent of instructor. Not open to students who have taken course 121C or 126. Should not be elected by students specializing in accounting.

133. Investments. (3) I and II. Mr. Heath, Mr. Michaelsen
Prerequisite: course 131.
Sources of, and demand for, investment capital, operations of security markets, determination of investment policy, and current procedures for analysis of securities.

135. Risk Management for Business Firms. (3) I and II.
Prerequisite: course 137. Mr. Cowee, Mr. Solberg
Economic risk and business management's alternatives in dealing with it.

136. Life Insurance. (3) I and II. Mr. Solberg
Prerequisite: course 135.
A nontechnical study of theory and practice.

137. Economics of Insurance. (3) I and II. Mr. Cowee, Mr. Solberg
(Formerly numbered 135.)
Prerequisite: Economics 1A–1B, 2, and junior standing.
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.

140. Production Organization and Management. (3) I and II. Mr. Abe, Mr. Gotterer, Mr. Rogers, Mr. Trull, Mr. Whitin
Primarily for juniors.
Theory and practice of production management; internal organization; physical facilities; product development; materials control; production control; production standards; managerial controls.

141. Facilities Planning. (3) I and II. Mr. Gotterer
Prerequisite: Economics 1A–1B, 2; course 140.
Economic and administrative aspects of the conception and establishment of industrial facilities.

142. Production Planning and Control. (3) I and II. Mr. Whitin
Prerequisite: course 140. Recommended: course 145.
Production planning and budgeting; development of the production control system; control of production quantity; quantity control; measurement of production efficiency.

145. Industrial Procurement. (3) II. Mr. Duncan
Prerequisite: course 160.
The problems met in purchasing by industrial organizations. Major buying policies, sources of material, quantity and quality, and the relation to price and production cost.

150. Industrial Relations. (3) I and II.
Mr. Galenson, Mr. Garbarino, Mr. Kennedy, Mr. Ross, Mr. Ulman
Students will not receive credit for both Economics 150 and course 150.
Labor-management issues, 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
Prerequisite: course 150 or Economics 150, or consent of instructor.
Personnel policies and procedures, with special attention to the structure of personal relationships within the enterprise; development and administration of the wage structure of a firm.
152. Collective Bargaining System. (3) I and II. Mr. Galenson, Mr. Kennedy
Prerequisite: course 150 or Economics 150.

153. Labor Law. (3) I and II. Mr. Davison
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.

160. Marketing. (3) I and II.
Mr. Bucklin, Mr. Duncan, Mr. Howell, Mr. Nicosia, Mr. Olsen
The evolution of markets and marketing; market structure, organization and behavior; marketing functions; pricing and price policy; marketing costs and efficiency; public and private regulations.

161. Foreign Marketing. (3) I and II. Mr. Li, Mr. Thompson
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. Howell
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; the internal structure and problems of store management trends; government regulation.

163. Advertising. (3) I and II. Mr. Nicosia
Prerequisite: course 160.
Basic concepts of advertising. Study of the English used. The evaluation of types of media used. Study of underlying psychology.

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; supervising sales force; territorial analysis; cost analysis, business and economic appraisal.

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. Bucklin
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.

Prerequisite: Economics 1A–1B, 2, and junior standing.
National transportation policy evaluated in the light of the demand for and cost of the service, the structure of government agencies, the construction market pattern, and the problems induced by technological innovation.
175. Public Utilities. (3) I. 
Mr. Kuhn
The basis of control, administration and judicial machinery employed, problems of service, price, competition, and monopoly.

179. Contemporary Problems in Transportation. (3) II. 
Mr. Kuhn
Prerequisite: course 170A–170B (170B may be taken concurrently).
Selected topics of current interest in transportation: new developments in transportation legislation and policy; the shifting demand for transportation; innovation in analysis and technology; urban transport problems.

180. Introduction to Real Estate and Urban Land Economics. (3) I and II. 
Mr. W. Smith, Mr. Steinike
The nature of real property; urban land utilization; classification of property rights; urban development; real property valuation; the real estate market; the real estate business; government regulation.

181. Valuation of Real Property. (3) I and II. 
Mr. Denton
Land valuation; factors influencing real estate values and income; trends in real property values and appraisal procedures in the urban real estate market.

183. The Management of Real Estate Resources. (3). 
Mr. Smith
Prerequisite: course 118.
Advanced analysis of real estate markets with emphasis on finance, investment, urban growth, and public policy. Allocation of financial resources; investment criteria; locational decisions; public policies in housing and urban development.

185. Foreign Exchange. (3) I. 
Mr. Li
Prerequisite: Economics 135.
Comparison of foreign and domestic exchange operations and problems; import-export banking; structure and operation of exchange markets; exchange rate policies and problems; payments arrangements; monetary areas; gold markets.

190. Organization and Administration. (3) I and II. 
Mr. Feldman, Mr. McGuire, Mr. Marschak
Organizational environment and other influences; objectives. Formal organization structures; planning and control. Informal organizations; groups, leaders, and behavior standards; communication.

191. Management Problems and Policies, (3) I and II. 
Mr. Balderston, Mr. Churchman
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.

193. Introduction to Operations Research. (3) I and II. 
Mr. Churchman, Mr. McGuire
Prerequisite: Mathematics 3A–3B, Statistics 130A–130B, or equivalent and junior standing.
Introduction to the history, practice, and nature of operations research; formulation of the problem; measuring costs; forecasting by probabilities. Models; sampling; recommendations; implementation and control; organization of operations research groups.

198A–198B. Directed Group Study. (1–3; 1–3) Yr. 
The Staff (Mr. Morrissey in charge)

199A–199B. Special Study for Advanced Undergraduates. (1–3; 1–3) Yr. 
The Staff (Mr. Morrissey in charge)

Designed for senior students with at least a B average.
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 GRADUATE SCHOOL OF BUSINESS ADMINISTRATION.

100G. Quantitative Methods and Their Use in Business Operation. (6) I. Mr. Parker, Mr. Vatter

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. Maisel

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. Goldner, Mr. Dyckman

Prerequisite: two years of high school algebra or the equivalent.
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 Administrative. (3) I and II. Mr. M. Smith, Mr. Conant

Legal problems of organizing, operating, and terminating a business.

120G. Managerial Accounting. (3) I and II. Mr. Parker, Mr. Vatter, Mr. Doyle

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.

121G. Advanced Accounting. (3) II. Mr. Sprouse

Prerequisite: 1A–1B or 120G or equivalent. Not open to students who have taken course 121A–121B.
Intensive study of the theory of accounts and its application; valuation of assets and liabilities, income determination, selected problems and readings in various phases of accounting procedure; financial accounting problems of corporations.

131G. Financial Policies of Business. (3) I and II. Mr. Lynn, Mr. Morrissey

Prerequisite: course 100G or equivalent.
Business finance, with emphasis upon financial problems and policies of corporations; 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. Parker, Mr. Vatter, Mr. Rogers

Prerequisite: course 100G or equivalent.
Principles of organization and production management; emphasis 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.
150G. Industrial and Personnel Relations. (3) I and II.
Prerequisite: course 100G or equivalent.
Mr. Kennedy, Mr. Garbarino
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.
Prerequisite: course 100G or equivalent.
Mr. Preston, Mr. Hollander, Mr. Olsen
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 163.)

210. Seminar in Application of Digital Computers to Problems in the Social Sciences. (3) I and II. Mr. Feigenbaum, Mr. Feldman, Mr. Hoggatt
Prerequisite: consent of instructor.
Problems and projects in the computer simulation of economic and industrial processes, thinking and learning processes, and neural processes. Consideration of problems of artificial intelligence, mechanical linguistics and information retrieval.

222A. Seminar in Controllership. (3) I.
Mr. Doyle
Prerequisite: course 121A-121B, 122.
Cost accounting practice from the viewpoint of the theory and objectives of cost analysis. The regulations between cost accounting, statistics, economic theory and management philosophy.

222B. Seminar in Controllership. (3) II.
Mr. Doyle
Prerequisite: course 121A-121B, 122.
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.

233A. Public Accounting Practice and Problems. (3) II.
Mr. Vance
Prerequisite: course 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.

233B. Public Accounting Practice and Problems. (3) I.
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.

28A. 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.

28B. Income Taxation. (3) I and II.
Mr. M. Smith
Prerequisite: courses 121A-121B, 228A.
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.  
229A. 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. 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) I and II.  
Prerequisite: Economics 135.  
Mr. Alhadeff  
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.  
Prerequisite: course 131 and Economics 135.  
Mr. Schwartz  
The organization and functions of, and the important influences upon, money and capital markets in the United States—primarily private institutions. The influence of government financing operations and regulations.

233A. Securities Markets and Investment Policies. (3) I and II.  
Prerequisite: course 133 or consent of the instructor.  
Mr. Wendt, Mr. Darbysire  

233B. Security Analysis and Selected Investment Problems. (3) II.  
Prerequisite: 233A or consent of the instructor.  
Mr. Cottle  
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. Morrissey  
Application of principles of finance to the financial management of corporate enterprises; special emphasis upon the financing of expansion.

239. Seminar in Insurance. (3) I and II.  
Mr. Cowee, Mr. Ehrenzweig  

241. Facilities Planning and Production Control. (3) I.  
Prerequisite: course 140 or 140G, and graduate standing.  
Mr. Kelsey, Mr. Trull  
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.
255. Seminar in Industrial Relations. (3) I.  
Mr. Garbarino  
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. Kennedy, 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. Duncan, Mr. Hollander  
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.

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  
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. Mr. Duncan  
Prerequisite: course 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. Mr. Revzan  
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.

* Not to be given, 1961-1962.
268. Marketing Investigation. (3) II.
Prerequisite: graduate standing.
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. Balderston
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. Hilton
Management attitudes toward restrictive and promotional legislation. Restriction and promotion contrasted: entry and price control; forms of subsidies. 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. Hilton

280. Real Estate and Urban Land Economics. (3) I and II. Mr. Maisel
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 development, 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. McGuire, Mr. Wheeler
The determination of business objectives, policy formulation, planning, executive staffing, organization, direction, and management controls. Special emphasis on 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 functions and for enterprises as a whole.

292. Development of a Scientific Approach to Management. (3) I. Mr. McGuire

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. Marschak  
Prerequisite: course 193 or equivalent.  
Analysis of inventory and scheduling problems, including formulation of management approaches to solutions, attention to the techniques of formal analysis, and comparison of applications in various industries.

297. Business Research Methods. (3) I and II.  
Mr. Artle, Mr. Churchman, Mr. Feldman,  
Mr. Hoggatt, Mr. Jastram, Mr. Ratoosh  
Prerequisite: graduate standing.  
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. Wheeler in charge)

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.  
Charles W. Tobias, Ph.D., Professor of Chemical Engineering.  
Theodore Vermeulen, Ph.D., Professor of Chemical Engineering.  
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.  
†John M. Praunzitch, Ph.D., Associate Professor of Chemical Engineering.  
Alan S. Foss, Ph.D., Assistant Professor of Chemical Engineering.

E. Morse Blue, M.S., Lecturer in Chemical Engineering.  
Edward A. Grens, M.S., Lecturer in Chemical Engineering.  
David N. Lyon, Ph.D., Lecturer in Chemical Engineering.  
Charles F. Oldershaw, M.S., Lecturer in Chemical Engineering.

Degree Requirement. For curriculum for the Bachelor of Science degree in chemical engineering, see under College of Chemistry, page 67.

Higher Degrees. See the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION.

† In residence fall semester only, 1961–1962.
Upper Division Courses

143. Introduction to Chemical Engineering. (3) I and II.  
Mr. Grens, Mr. Wilke  
Prerequisite: Chemistry 109 or 110A or Mechanical Engineering 105A (may be taken concurrently).  
Material and energy balances, introduction to thermodynamic concepts. Application to industrial problems.

144. Chemical Engineering Thermodynamics. (3) I and II.  
Mr. Bromley, Mr. Acrivos  
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. Bromley, Mr. Foss  
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.

145B. Unit Operations Laboratory. (1) I and II.  
Mr. Prausnitz, Mr. Bromley, Mr. Foss  
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.  
Mr. Prausnitz, Mr. Bromley, Mr. Foss  
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. Acrivos, Mr. Foss, Mr. Wilke, Mr. Tobias, Mr. Vermeulen  
Prerequisite: Chemistry 110B (may be taken concurrently); course 143 (with a grade of C or higher), or consent of the instructor.  
Fluid mechanics and heat transfer and their application to chemical engineering problems. Introduction to mass transfer.

146B. Chemical Engineering Unit Operations. (4) I and II.  
Mr. Hanson, Mr. Grens  
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, stagewise, counter-current, and fixed bed. Distillation, absorption, extraction, adsorption, etc.

147. Chemical Kinetics of Industrial Processes. (2) I and II. Mr. Vermeulen  
Prerequisite: Chemistry 110B; 112 or 112C; course 143; course 144 or Chemistry 114H (may be taken concurrently).  
Analysis and prediction of rates of chemical conversion in flow and nonflow processes, including catalytic systems.
148. Industrial Kinetics Laboratory. (2) I and II. Mr. Vermeulen
Prerequisite: course 147 (with a grade of C or better), 146A; or consent of the instructor. Planning and conduct of bench-scale experiments relating chemical conversion to processing conditions.

149–149H. Design of Chemical Process Plants. (2–3) I and II. Mr. Blue, Mr. Bromley, Mr. Tobias, Mr. Oldershaw
Prerequisite: courses 144 and 146A, 146B. Sources of data and design principles. Individual and team study of selected plant design and process evaluation problems. 149H students will complete a comprehensive design project.

152. Principles of Inorganic and Electrochemical Processes. (3) I and II. Mr. Tobias, Mr. Lyon, Mr. Bromley
Prerequisite: courses 143 and 144 with a grade of C or better. Equilibrium considerations in industrial inorganic processes. Estimation of thermodynamic data. Electrode processes and their application in inorganic and metallurgical industries.

180H. Research in Chemical Engineering. (2–6) I and II. The Staff (Mr. Connick 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. Tobias in charge)
Independent study on theoretical or computational problems.

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) II. Mr. Wilke
Modes of mass transfer, diffusion in gases and liquids, material transfer in static and low systems, momentum-mass transfer analogies, prediction of mass transfer coefficients or packed column separations, plate efficiency, diffusion and chemical reaction, equipment-design methods.

246. Phase Equilibria. (2) I. Mr. Prausnitz
Prerequisite: course 144 and 146B or equivalent. Thermodynamics and intermolecular forces of multicomponent systems. Application to separation operations such as extraction, high-pressure absorption, and extractive 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. Acivos in charge)
Independent study on theoretical or computational problems.

250. Research in Chemical Engineering. (1–6) I and II.
The Staff (Mr. Wilke in charge)

252. Principles of Electrochemical Engineering. (2) II. Mr. Tobias
Prerequisite: courses 144, 146B, Chemistry 104 or course 152.
Electrode processes in electrolysis and in galvanic cells. Theory of potential, ionic mass transport, and electrode kinetics.

255. Nuclear Chemical Engineering. (2) II. Mr. Hanson
Prerequisite: open to undergraduates with consent of the instructor.
Chemical processing methods for nuclear materials, including solvent extraction and high temperature techniques; isotope separation by gaseous diffusion and other special processes.

256. Cryogenic Engineering. (2) I. Mr. Lyon
Prerequisite: course 144, 146A and 146B or equivalent.
Gas liquefaction and separation; magnetic cooling; transport properties of substances at low temperatures; cryogenic techniques in chemical processes.

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. (1–4) 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 Another Department
Mechanical Engineering 163. Flow Problems of the Process Industries. (3) II.
Mechanical Engineering 266. Heat Convection. (3) II.
* Not to be given, 1961–1962.
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.
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.
Donald S. Noyce, Ph.D., Professor of Chemistry.
Chester T. O’Konski, Ph.D., Professor of Chemistry.
Edwin Orleman, 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 (Chairman of the Department).

Henry Rapoport, Ph.D., Professor of Chemistry.
*Glenn T. Seaborg, Ph.D., Sc.D., LL.D., Professor of Chemistry.
Kenneth Street, Jr., Ph.D., Professor of Chemistry.
David H. Templeton, Ph.D., Professor of Chemistry.
Joel H. Hildebrand, Ph.D., Sc.D., LL.D., Professor of Chemistry, Emeritus.
Charles W. Porter, Ph.D., Professor of Chemistry, Emeritus.
Dudley R. Herschbach, Ph.D., Associate Professor of Chemistry.
*Frederick R. Jensen, Ph.D., Associate Professor of Chemistry.
William L. Jolly, Ph.D., Associate Professor of Chemistry.
Bruce H. Mahan, Ph.D., Associate Professor of Chemistry.
Rollie J. Myers, Ph.D., Associate Professor of Chemistry.
Norman E. Phillips, Ph.D., Associate Professor of Chemistry.
*John O. Rasmussen, Ph.D., Associate Professor of Chemistry.
Andrew Streitwieser, Jr., Ph.D., Associate Professor of Chemistry.
Ignacio Tinoco, Jr., Ph.D., Associate Professor of Chemistry.
Gottfried Brieger, Ph.D., Assistant Professor of Chemistry.
Joseph Cerny, Ph.D., Assistant Professor of Chemistry.
Philip E. Eaton, Ph.D., Assistant Professor of Chemistry.

§ In residence fall semester only, 1961–1962.
Letters and Science List. All undergraduate courses in chemistry are included in the Letters and Science List except Chemistry 125 and 125L. For regulations governing this list, see page 95.

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 or in the College of Letters and Science with a major in chemistry (see pages 65, 85). In order to decide between the two alternatives, the student may note that the College of Letters and Science has certain general requirements outside the major, while the curriculum of the College of Chemistry has somewhat different requirements and allows the election of professional courses in the upper division.

The Major in the College of Chemistry. For the requirements of the Major in the College of Chemistry, see page 66.

Letters and Science Major Advisers: Mr. Giauque and Mr. Phillips.

The Major in the College of Letters and Science. The major consists of preparation in mathematics and physics, the basic lower division courses in chemistry, and from 24 to 30 units of upper division courses in chemistry and allied subjects, taken in accordance with a plan approved by the departmental adviser. The major must include the following: Chemistry 1A, 1B, 5 (or 4A, 4B in place of the preceding three), 12, 112, 110A, 110B, and one of courses 105, 106, 111 and 120; Mathematics 3A, 3B, 4A (or 1A–1B); and Physics 4A, 4B, 4C. If one year of quantitative analysis has been completed elsewhere, Chemistry 104 may be substituted for course 105. A reading knowledge of
German is recommended. Students wishing to prepare for graduate work in chemistry or who wish to be certified to the American Chemical Society as having taken an accredited program in chemistry, will need Mathematics 4B (or 2A), additional courses in chemistry, and a reading knowledge of German.

All units in chemistry in excess of 13 are counted as upper division units.

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.

**Honors Program in the College of Letters and Science.** Honor students may with the consent of their adviser enter the honors program, usually in the senior year. 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 will not ordinarily be recommended for honors in chemistry at graduation unless their work includes Chemistry 114H and other advanced courses approved by the Committee on Honors. These students will include in their programs undergraduate research, Chemistry 180H, and will submit to their research director a thesis based on this work.

**Higher Degree.** See the Announcement of the Graduate Division, Northern Section.

### Lower Division Courses

**1A. General Chemistry.** (5) I and II.

Mr. Brewer, Mr. Herschbach, Mr. Howe, Mr. Johnston, Mr. Markowitz, Mr. O’Konski, Mr. Strauss, Mr. Templeton, Mr. Powell, Mr. Sederholm, Mr. Shirley, Mr. Street, Mr. Tinoco, Mr. Fackler, Mr. Cerny

Lectures and laboratory (I: Mr. Powell, Mr. Markowitz; II: Mr. Sederholm).

**Prerequisite:** high school chemistry or high grades in high school physics and mathematics. Admission will be determined by the student’s score on the mathematics part of the College Entrance Examination Board Scholastic Aptitude Test.

**1B. General Chemistry, Qualitative Analysis.** (5) I and II.

Mr. Brewer, Mr. Herschbach, Mr. Howe, Mr. Johnston, Mr. Markowitz, Mr. Powell, Mr. Sederholm, Mr. Shirley, Mr. Street, Mr. Tinoco, Mr. O’Konski, Mr. Strauss, Mr. Templeton, Mr. Fackler, Mr. Cerny

Lectures (I: Mr. Sederholm; II: Mr. Powell, Mr. Markowitz).

**Prerequisite:** course 1A.

**1A-4B. General Chemistry.** (5-5) Yr.

Mr. Mahan, Mr. Jura

**Prerequisite:** high school chemistry, Mathematics 3A or 1A, which may be taken concurrently, and superior performance on an examination to be given during the week of enrollment.

Lectures and laboratory for students of superior facility and preparation in chemistry. Covers fundamental principles of chemistry with emphasis in the laboratory on quantitative work, and is equivalent to course 5 as a prerequisite for further courses in chemistry.
5. Quantitative Analysis. (3) I and II.
Mr. Cunningham, Mr. Koch, Mr. Orlemann, Mr. Jolly

Lectures and laboratory. Prerequisite: course 1B with a grade of C or higher.
In the fall semester a special section (lecture section I) will be organized for chemistry majors.

8. A Short Survey of Organic Chemistry. (3) I and II.
Mr. Calvin, Mr. Rickborn, Mr. Eaton

Three lectures and one discussion section per week.
Prerequisite: course 1A or 4A. Primarily for students not majoring in chemistry.

9. Organic Chemistry—Laboratory. (3) I and II. Mr. Eaton, Mr. Rickborn

Lectures and laboratory. Prerequisite: course 1B or 4B with a grade of C or higher
and course 8 (may be taken concurrently).

Mr. Knight, Mr. Phillips

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 com-
pleted other courses in the Departments of Chemistry and Physics; sponsored jointly by
Chemistry and Physics.
Elementary quantitative study of matter, radiation, gravitation, electromagnetism,
quantum theory, chemical binding, thermodynamics, kinetic theory, relativity, nuclear
structure. Necessary mathematical foundations will be introduced.

12. Organic Chemistry. (5) I and II.
Mr. Streitwieser, Mr. Johnson, Mr. Brieger

Lectures (I: Mr. Streitwieser; II: Mr. Johnson).
Lectures and laboratory work designed for students whose major is chemistry. Pre-
requisite: course 1B or 4B 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. Connick

Prerequisite: course 5 or 4B.
The interpretation and correlation of inorganic reactions.

105. Advanced Quantitative Analysis. (3) I and II.
Mr. Orlemann, Mr. Cunningham

Lectures and laboratory. Prerequisite: course 5 or 4B.

106. Synthetic Inorganic Chemistry. (3) II.
Lecture and laboratory. Prerequisite: course 5 or 4B.

109. Physical Chemistry—Brief Course. (3) I.
Prerequisite: course 5 or 4B and one year of college physics. Primarily for nonchemistry
majors.

110A–110B. Physical Chemistry. (3–3) Yr. Beginning each semester.
Mr. Johnston, Mr. Jura, Mr. Myers, Mr. O'Konski,
Mr. Phillips, Mr. Street, Mr. Templeton, Mr. Tinoco

Lectures 110A: I: Mr. O'Konski, Mr. Street, Mr. Tinoco; II: Mr. Myers, Mr. Johnston,
Mr. Phillips.
Lectures 110B. I: Mr. Myers; II: Mr. Jura, Mr. Street, Mr. Templeton. 
Prerequisite: Mathematics 4A or 1B, Physics 4B, and course 5 or 4B, or junior standing in a curriculum in physical science or engineering.

111. Physical Chemistry—Laboratory. (3) I and II. 
Mr. Tinoco, Mr. Jura, Mr. O’Konski, Mr. Phillips 
Prerequisite: courses 5 or 4B and 110A (with a grade of C or higher), and 110B (which may be taken concurrently), or 109 with consent of the instructor; also calculus.

112. Organic Chemistry. (5) I and II. 
Mr. Cason, Mr. Rapoport, Mr. Streitwieser 
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. Cason, Mr. Streitwieser 
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 College 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. Brewer, Mr. Shirley 
Prerequisite: courses 5 or 4B, 110A–110B; Physics 4C or the equivalent; familiarity with differential and integral calculus; and honors standing.

115. Microchemistry. (3) II. 
Mr. Koch 
Prerequisite: beginning courses in quantitative analysis, organic chemistry and physical chemistry. 
Principles of chemical experimentation on the milligram and microgram scale. Students may select laboratory exercises to emphasize either bioorganic or inorganic chemistry.

117H. Quantum Theory I. (3) II. 
Mr. Gwinn 
Prerequisite: course 110A–110B; also recommended: differential equations or advanced calculus, atomic physics. 
Introduction to quantum theory. Elementary application to atoms and molecules.

120. Advanced Inorganic Chemistry. (3) I and II. 
Mr. Templeton, Mr. Connick 
Lecture and laboratory. Prerequisite: courses 5 or 4B, 104 or 105, and 109 or 110B.

121. Molecular Structure and Chemical Bonds. (3) II. 
Mr. Pimentel 
Prerequisite: course 110B. 
The study of chemical bonding and structure by physical methods: rotational, vibrational and electronic spectra; nuclear magnetic resonance; quadruple coupling; and X-ray diffraction.

123. Nuclear Chemistry. (2) I. 
Prerequisite: senior standing. 

125. Chemical Instrumentation. (1) II. 
Lectures. 
Prerequisite: course 111.

125L. Chemical Instrumentation Laboratory. (1-3) II. 
Mr. O’Konski 
Prerequisite: course 111 and consent of the instructor. Course 125 must be taken concurrently. 
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.

* Not to be given, 1961–1962.
127. Advanced Organic Chemistry. (3) I.  
Mr. Noyce  
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. Wenkert  
Lecture and laboratory. Prerequisite: courses 5 or 4B and 122.

129. Organic Chemistry—Synthetic Methods. (3) I.  
Mr. Rapoport  
Lecture and laboratory. Prerequisite: a reading knowledge of German; course 128 and consent of the instructor.

180H. Research. (2–15) I and II.  
The Staff (Mr. Connick 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. Connick in charge)  
Prerequisite: course 111, and one of the following courses: 105, 106, 120, 129; consent of the adviser and consent of the instructor.  
Special laboratory work for advanced undergraduates.

190. Special Topics. (2) I and II.  
The Staff (Mr. Connick in charge)  
Prerequisite: consent of the instructor.  
Special topics will be offered from time to time. Examples are: heterogeneous equilibria, chemistry of surfaces and colloids, X-ray crystallography.

199. Special Study for Advanced Undergraduates. (1–3) I and II.  
The Staff (Mr. Connick 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 163.)

206. Organic Chemistry. (3) II.  
Mr. Cason  
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.  
The chemistry of heterocyclic compounds, with emphasis on those of natural origin.

207C. Organic Chemistry. (3) I.  
Mr. Dauben  
Prerequisite: course 206.  
The chemistry of polycyclic compounds of biological interest, with emphasis on sterols and related compounds.

* Not to be given, 1961–1962.
*208. Organic Chemistry. (3) II.
   Prerequisite: course 206.
   Kinetics and mechanism of organic reactions; mechanism of rearrangements.

216. Physical Chemistry—Advanced. (3) II.
   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 II. (3) I.
   Prerequisite: course 117H or Physics 115.
   Matrix mechanics, symmetry effects, vibration-rotation spectra of polyatomic molecules, electronic spectra and crystal field theory, electron and nuclear spin resonance, quadrupole coupling, collision theory.

219. Chemical Kinetics. (3) I.
   Prerequisite: open to senior honor students with consent of instructor. Also recommended: elementary quantum theory.
   Theory of elementary reactions: activated complex theory and collision theory. Treatment of data and deduction of mechanisms of complex reactions.

223. Advanced Nuclear Chemistry. (2) II.
   Prerequisite: course 123. Primarily for chemistry students.
   Advanced survey of nuclear theory and experimentation.

280. Research. (1–9) I and II.
   The Staff (Mr. Powell in charge)
   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. Powell in charge)
   Open to properly qualified graduate students.
   Seminars are offered each semester on topics of general interest in organic, physical, and nuclear chemistry. As a rule additional seminars on specific subjects are offered; 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: statistical mechanics, nuclear reactions, spectroscopy, free radicals, bioenergetics, nuclear quadrupole resonance, and molecular orbital theory.

299. Special Study for Graduate Students. (1–4) I and II.
   The Staff (Mr. Powell 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.

Research Conference. (No credit)
   Members of the instructing staff and students engaged in graduate research meet once a week to discuss the various investigations in progress in the laboratory.

Facilities

Administrative offices of the College of Chemistry, and the departments of Chemistry and Chemical Engineering, are housed in Gilman Hall. Also in

* Not to be given, 1961–1962.
Gilman Hall are laboratories for chemical engineering, and the Chemistry Library of commonly used periodicals and reference texts relating to chemistry and chemical engineering. The organic chemistry laboratories are located in the Chemistry Building. Laboratories for analytical chemistry, advanced inorganic chemistry, and microchemistry are housed in Lewis Hall. The research laboratories are well-equipped for research in a variety of areas. In addition to laboratories for graduate research in chemical engineering, physical and inorganic chemistry, and organic chemistry, located in Gilman Hall, Lewis Hall, and Chemistry Building, there are available facilities elsewhere for research in specialized fields; among these are the Low-Temperature Laboratory for investigations at liquid hydrogen and liquid helium temperatures, the Lawrence Radiation Laboratory for studies in nuclear chemistry and inorganic materials, and the Bio-Organic Laboratory.

\section*{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. For information concerning these majors see pages 92 and 442.

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 these degrees are given in the \textit{Announcement of the Graduate Division, Northern Section}.

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.

\section*{CITY AND REGIONAL PLANNING}

(Department Office, 100 City and Regional Planning Building)

\footnote{T. J. Kent, Jr., A.B., M.C.P., Professor of City Planning (Chairman of the Department).

Corwin R. Mocine, A.B., Professor of City Planning and of Architecture.

Jesse Reichek, Professor of Design.

Francis Violich, B.S., Professor of City Planning and of Landscape Architecture.

\footnote{In residence fall semester only, 1961–1962.}
Donald L. Foley, Ph.D., Associate Professor of City Planning and of Architecture.

Melvin M. Webber, M.A., M.C.P., Associate Professor of City Planning.

Catherine Bauer (Catherine Bauer Wurster), A.B., Lecturer in City and Regional Planning.

Mellier G. Scott, Jr., A.B., 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 95.

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. Kent, Mr. Foley.

Prerequisite: Architecture 102, advanced standing in landscape architecture, or consent of the instructor. (Not open to students who have taken course 110.)

Physical, social, economic, and governmental considerations involved in the planning of cities; development of the city planning profession; role 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 the United States since 1800 in response to physical, social, and economic problems; major concepts and procedures used by 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.

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.

Open to majors in all fields.

Perception 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.

Prerequisite: consent of the instructor. The Staff (Miss Bauer in charge)
Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

222. Housing and Urban Redevelopment Policy. (2) II. Miss Bauer
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.
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. Foley
The social organization and spatial patterning of the large metropolitan area. Physical development problems and policies.

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.
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 theory and practice; functions of the planning agency and its principal policy instruments; analytic and design methods; relationships to engineering.

251. Introduction to City Planning Theory and Practice. (3) I. Mr. Violich
Historical background of contemporary city planning; its theory and practice; principles, standards, and procedures of physical urban planning. Laboratory problems.

252. Seminar in City Planning Function and Organization. (3) II.
The general physical planning function in city and county governments; general problems of agency organization; metropolitan regional planning.

253. City Planning Analysis. First Course. (3) I. Mr. Foley
The urban community context within which city planning operates. Community structure, values, and decision-making. Laboratory problems.

254. City Planning Analysis. Second Course. (3) II. Mr. Foley
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 and technical functions of the urban general plan; general-plan characteristics; organization of general-plan documents.

256. The Urban General Plan—Laboratory. (4) I. Mr. Webber
Field problems in major phases 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. Mr. Violich
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
Three-dimensional design of urban areas within general-plan policy. The process of collaboration among the several professions involved in large-scale site planning and urban design. Laboratory problems.

297. Field Study. (No credit) Summer course. Mr. Webber
Required for city planning students who have not had practical city planning office experience.

299. Individual Study or Research. (1-5) I and II.
Prerequisite: consent of the instructor. The Staff (Miss Bauer in charge)

CLASSICS
(Department Office, 5224 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 (Vice-Chairman of the Department).
Arthur E. Gordon, Ph.D., Professor of Latin.
William M. Green, Ph.D., Professor of Latin.
William C. Helmold, Ph.D., Professor of Classics.
Louis Alexander MacKay, M.A., Professor of Latin.
William Kendrick Pritchett, Ph.D., Professor of Greek and Curator of Classical Epigraphy, Museum of Anthropology.
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.
John K. Anderson, M.A., Associate Professor of Classical Archaeology.
Elroy L. Bundy, Ph.D., Associate Professor of Classics.
*W. Gerson Rabinowitz, Ph.D., Associate Professor of Greek.
William S. Anderson, Ph.D., Assistant Professor of Latin.
Anne R. Amory, Ph.D., Lecturer in Classics.

Arnauld Dante Momigliano, D.Litt., Hon.M.A., Hon.D.Litt., Sather Professor of Classical Literature for the spring 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 95.

Departmental Major Adviser: (Classics, Greek, Latin): Mr. Fontenrose.

The Major in Classics. Greek 1 or 1A–1B, 100, 101, 102, 103; Latin 1 or 1A–1B, 2, 3, 104, 105, 106, 107; Latin 9A–9B or Greek 40A–40B.

The Major in Greek. Greek 1 or 1A–1B, 40A–40B, 100, 101, 102, 103, and at least 6 units in advanced upper division courses in Greek; at least 6 additional units must 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. Recommended: Latin 1 or 1A–1B, 2, 3.

The Major in Latin. Latin 1 or 1A–1B, 2, 3, 9A–9B, 104, 105, 106, 107, and at least 6 units in advanced upper division courses in Latin; at least 6 additional units must 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 111B. Recommended: Greek 1 or 1A–1B. The 6 additional units in the Greek and Latin majors may, with the adviser’s consent, be satisfied by suitable courses other than those indicated.

Honors Programs. Classics: (a) the major program; (b) two courses chosen from Greek 115, 120, Latin 145, 150; (c) either Greek 150A–150B or Latin 109A–109B; (d) two semesters of either Greek H195 or Latin H195 taken during the senior year. Greek: (a) the major program, including Greek 115 (A, B, or C), 120 (A, B, or C), 150A–150B; (b) two semesters of Greek H195 taken during the senior year. Latin: (a) the major program, including Latin 109A–109B, 145 (A, B, or C), 150 (A, B, or C); (b) two semesters of Latin H195 taken during the senior year.

Students in the honors programs must have a grade-point average of at least 3.0 in all courses undertaken in the Classics department, and of at least 3.5 in all courses undertaken in the department during the junior year.

CLASSICS

Courses Which Do Not Require a Knowledge of Greek, Latin, or Sanskrit

(Courses in this group are designated Classics 10A, Classics 10B, etc.)

Lower Division Courses

10A–10B. Ancient Greek and Roman Civilization. (3–3) Yr.

10A. Greek. Mrs. Amory, Mr. Gordon

10B. Roman.

Against a background of Greek and Roman history the reading of several literary masterpieces, in whole or in part, in translation. Course 10A is not prerequisite to 10B.

17A–17B. Elementary Course in Classical Archaeology. (3–3) Yr.

Mr. J. K. Anderson

17A. 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.
17B. Monuments of Western civilization from the Hellenistic Age to the Age of the Antonines, with particular reference to urban development and provincial organization. Course 17A is not prerequisite to 17B.

28. The Classic Myths. (3) I.

34. Epic Poetry: Homer and Vergil. (2) II.

35. Greek Tragedy. (2) II.

*36. Plato: Selected Dialogues. (2) II.

Upper Division Courses

100A-100B. Greek and Latin Literature in Translation. (3-3) Yr.

Enrollment limited to fifteen students. Course 100A is not prerequisite to 100B.

*138. The Greek and Roman Historians. (2) I.

The five historians, Herodotus, Thucydides, Polybius, Livy, and Tacitus, in English translation; their intellectual background, documentary sources, and philosophy of history.

§139. Ancient Historiography. (2) II.

Mr. Fontenrose

151. Ancient Greek Religion. (3) I.

The worship of the gods in ancient Greece; cults and religious ideas.

Mr. Fontenrose

170. Classical Archaeology. (2)

*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.

*175. Pausanias, Book I. (2) II.

An ancient description of the topography of Athens as illustrated by modern archaeological discoveries.

Mr. J. K. 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.

Greek ideas about society and the State, from Homer to Aristotle.

Mr. Fontenrose

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. Helmbold

* Not to be given, 1961-1962.

§ To be given, 1961-1962 only.
1A–1B. Greek for Beginners. (3–3) Yr. Mr. Pritchett, Mr. Bundy

40A–40B. Greek Prose Composition, first course. (2–2) Yr. Mr. Helmbold
Prerequisite: Greek 1 or 1A–1B.

Upper Division Courses
Greek 100, 101, 102, 103 should be completed before the other courses are undertaken.

100. Xenophon, *Anabasis*. (3) I. Mr. J. K. Anderson

101. Homer. (3) II. Mr. Pritchett

102. Plato: *Apology* and *Crito*. (3) I. Mr. Helmbold

103. Drama. (3) II. Mr. Pritchett

115. Senior Course in Greek Drama. (3) I. Mr. Pritchett
115A. Aristophanes.
115B. Sophocles.
115C. Aeschylus.

120. Senior Course in Greek Prose Authors. (3) II. Mr. Fontenrose
120A. Demosthenes.
120B. Thucydides.
120C. Herodotus.

150A–150B. Advanced Greek Prose Composition. (2–2) Yr. Mr. Fontenrose, Mr. J. K. Anderson
Prerequisite: Greek 40A–40B.

H195. Honors Course. (3) I and II. Mr. Fontenrose in charge
Advanced and independent study for honor students in Greek. Special study (over two semesters), of a philosophical, an historical, and a literary text. Conferences and thesis.

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. Green (in charge),

1A–1B. Elementary Latin. Beginners’ Course. (3–3) Yr. Mr. Gordon (in charge), Mr. W. S. Anderson,

2. Elementary Latin (continuation of 1A–1B). (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, 1961–1962.
3. Latin Prose Readings. (3) I and II.  
Prerequisite: Latin 2 or the equivalent.  
Mrs. Amory, Mr. Green

9A–9B. Latin Composition. (2–2) Yr.  
Prerequisite: at least completion of Latin 2. Recommended to accompany Latin 3.  
Mr. Green

**Upper Division Courses**

Prerequisite: Latin 3. Latin 104, 105, 106, 107 should be completed before the other courses (except 109A–109B) are undertaken.

104. Vergil. (3) I.  
Mr. W. S. Anderson

105. Livy. (3) I.  
Mr. Gordon

106. Horace: *Odes and Epodes*. (3) II.  
Mr. Gordon

107. Cicero. (3) II.  
Mr. W. S. Anderson

109A–109B. Composition and Sight Reading. (2–2) Yr.  
Mr. MacKay

§139. Ancient Historiography: *Historia Augusta*. (1) II.  
Mr. Momigliano

145. Senior Course in Latin Poetry. (3) I.  
145A. Roman Comedy.  
145B. Lucretius.  
145C. Elegiac Poets.  
Mr. Green

150. Senior Course in Latin Prose Authors. (3) II.  
150A. Sallust.  
150B. Seneca.  
150C. Tacitus.  
Mr. MacKay

166. Latin Verse Composition. (1) I.  
Mr. MacKay

H195. Honors Course. (3) I and II.  
Mr. W. S. Anderson in charge

Advanced and independent study for honor students in Latin. Special study (over two semesters), of a philosophical, an historical, and a literary text. Conferences and thesis.

199. Special Study for Advanced Undergraduates. (1–5) I and II.  
Mr. Gordon 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, 1961–1962.
‡ To be given, 1961–1962 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 163.)

200. Proseminar. (3) I.
Mr. Helmbold
An introduction to the general literature of classical philology, to methods of research, and to textual criticism.

212A–212B. Greek Lyric Poetry: Pindar and Bacchylides. (3–3) Yr.
Mr. Bundy
212A. Proseminar. (3) I.
212B. Greek Lyric Poetry: Pindar and Bacchylides. (3–3) Yr.

215. Seminar in Greek History: Thucydides. (3) I.
Mr. Pritchett

216. Greek Philosophy: Aristotle, Politics. (3) II.
Mr. Fontenrose

232. Cicero: Republic. (3) II.
Mr. Green

234A–234B. Augustan Poets. (3–3) Yr. Mr. W. S. Anderson, Mr. Helmbold
234A. Ovid, Metamorphoses. Mr. W. S. Anderson.
234B. Propertius. Mr. Helmbold.

238. Silver Latin Prose: Apuleius. (3) I.
Mr. MacKay

270A–270B. Seminar in Classical Archaeology. (2–2) Yr.
Mr. J. K. 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
Latin for Graduate Students, first course. (No credit) I and II.
Mr. Green in charge
Latin for Graduate Students, second course. (No credit) I and II.
Mr. Green in charge

Mr. Jones

*Linguistic History of the Roman Empire. (Romance Philology 200).
(2) I.
Mr. Malkiel

Late Latin Language and Literature. (Romance Philology 201). (2) I.
Mr. Sandmann

*Not to be given, 1961–1962.
COMPARATIVE LITERATURE

Committee in Charge:
Marianne Bonwit, Ph.D., Associate Professor of German.
Bertrand H. Bronson, Ph.D., Professor of English.
Elroy L. Bundy, Ph.D., Associate Professor of Classics.
Shih-Hsiang Chen, B.Litt., Professor of Chinese.
Eric O. Johannesson, Ph.D., Assistant Professor of Scandinavian.
Warren Ramsey, Ph.D., Professor of French and Comparative Literature (Chairman of the Committee).
David W. Reed, Ph.D., Professor of English.
Alain Renoir, Ph.D., Associate Professor of English.
Aldo Scaglione, Dottore in Lettere, Associate Professor of Italian.
Gleb Struve, A.B., Professor of Slavic Languages and Literatures.
Arturo Torres-Riosseco, Ph.D., Professor of Latin American Literature.

Letters and Science List. All undergraduate courses are included in the Letters and Science List of Courses. For regulations governing this list, see page 95.

Group Major Adviser: Mr. Renoir.

The Group Major. First and second years—Recommended: (1) courses in modern foreign languages and in Greek or Latin (a modern foreign language and either Greek or Latin are required for the Secondary Credential); an introductory or survey course in one literature (e.g., Classics 10A—10B, English 46A—46B, French 39A—39B—39C).

Third and fourth Years—Required: a minimum of thirty approved upper division units in literature, including (1) at least twelve units in one literature (e.g., Russian, English, Latin) studied in the original language, with emphasis on classic works of that literature, (2) not less than six units in another literature, studied in the original language, and (3) Comparative Literature 100 and 190A or 190B. Degree candidates who have not elected Classics 10A—10B and do not plan to complete Greek 102 or Latin 104 must elect six units of Greek and Latin literature in translation. In addition, each candidate must, either through course work or through independent reading, acquire a sense of the historical development of one of his chosen literatures.

Elementary Credential, Secondary Credential, Program Preparatory to Graduate Study: consult group major adviser.

Graduate Program: Advisers: Mr. Struve, Mr. Ramsey.

Twenty units of upper division and graduate courses (of which at least 8
must be graduate courses in the major and a thesis, in accordance with Plan I of the requirements for the degree of Master of Arts, see the Announcement of the Graduate Division, Northern Section.

Lower Division Course

1A–1B. English Composition in Connection with the Reading of World Literature. (3–3) Yr.  
Mr. Renoir  
Prerequisite: Subject A examination or course.  
Expository writing based on analysis of selected masterpieces of ancient and modern literature.

Upper Division Courses

100. Introduction to Comparative Literature. (3) I and II.  
Mr. Bundy, Mr. Renoir  
Prerequisite: at least 12 units in one foreign language, and at least two semesters of lower division or upper division literature.  
Selected critical and literary texts from classical antiquity to the present, read in English and one foreign language. Emphasis on principles of literary comparison and analysis.

*141. Cultural Background of the Renaissance in Western Europe. (2) II.  
Mr. Scaglione  
Not open to students who have received credit for course 151A–151B.  
Discussion of phases of the movement and the contribution of great writers with special reference to Italy.

151A–151B. The Literature of the Renaissance in Western Europe. (2–2) Yr.  
Mr. Scaglione  
Ramifications of the Renaissance movement in the West 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 open to students who have received credit for course 141.

*190A. Comparison of Authors: English, French, German. (3) I.  
Mr. Renoir  
Prerequisite: course 100 or English 100, and at least 12 units in upper division literature courses including at least 3 in French or German.  
Comparison of 3 important authors, English, French, German; one foreign author must be read in original language; examination and substantial comparative paper required.

*190B. Comparison of Authors: English, French, Latin. (3) II.  
Prerequisite: course 100 or English 100, and at least 12 units in upper division literature courses including at least 3 units of French or Latin.  
Comparison of 3 important authors, English, French, Latin; one foreign author must be read in original language; examination and substantial comparative paper required.

199. Special Study for Advanced Undergraduates. (1–4) I and II.  
Mr. Renoir

Graduate Courses

200. Methods of Study in Comparative Literature. (2) I.  
Mr. Ramsey

201A*–201B. The Symbolist Movement in European Literature. (2–2) Yr.  
Especially in French, German, English, and Spanish literatures.  
Mr. Ramsey

* Not to be given, 1961–1962.
COMPARATIVE LITERATURE; CRIMINOLOGY / 245

020A–202B. The French Heritage in Spanish-American Literature. (2–2) Yr. Mr. Torres-Rioseco

Studies in the Parnassian, Symbolist, and Modernist movements.

205. Arthurian Literature. Theme: The Grail. (2) I. Mr. Spahr
Prerequisite: knowledge of Old French, Middle English or Middle High German.
Comparative study of a theme from Arthurian literature of the Middle Ages.

221. 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.

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 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: two years of high school Latin or 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 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.
Arthur H. Sherry, A.B., LL.B., Professor of Criminology and of Law.
Austin H. MacCormick, M.A., Professor of Criminology, Emeritus.
Orlando W. Wilson, A.B., Professor of Criminology, Emeritus.
M. Edwin O'Neil, M.S., Associate Professor of Criminalistics.

Herbert S. Breyfogle, M.D., Lecturer in Criminology for the fall semester.
Edward V. Comber, M.A., Lecturer in Criminology.
John D. Holstrom, A.B., Lecturer in Criminology.
John A. Lindquist, A.B., Lecturer in Criminology.
Robert D. Shaner, A.B., Lecturer in Criminology.
A. LaMont Smith, D.P.A., Lecturer in Criminology.
David H. Wilson, M.D., LL.B., Lecturer in Criminology.

The requirements for the curricula in the School of Criminology are listed on page 103.

* Not to be given, 1961–1962.
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. Introduction to Criminology. (3-3) Yr. Mr. Smith

100A not prerequisite to 100B.

A survey of criminological theory and practice, causes of delinquency and criminal behavior, institutions and processes of law enforcement, the administration of criminal justice, theories and current practices in correctional treatment and crime prevention.

101A-101B. Principles of Criminal Investigation. (2-2) Yr. Mr. O'Neill

Basic considerations in the investigation of crimes, the identification of persons, collection and preservation of evidence, examination of questioned documents, elements of legal proof in the submission of evidence, utilization of criminalistic skills and services.

102. The Etiology of Crime: Sociological. (3) I.

Prerequisite: Psychology 1A.

Social factors and processes in criminal and delinquent behavior, regional, cultural, institutional and group variables, personal and group alienation, social-psychological conditions of criminal careers and organized crime.

103A-103B. The Etiology of Crime: Psychological and Psychiatric. (3-3) Yr.

Prerequisite: course 102 and senior standing. Mr. Wilson

Psychological factors and processes in criminal and delinquent behavior, components of normal and abnormal personality, methods of personality measurement and clinical diagnosis, psychopathology and mental disorder in relation to crime and delinquency.

104A-104B. The Correctional and Penal System. (2-2) Yr. Mr. Smith

Organization and function of institutions and noninstitutional services in the punishment, correction and/or incapacitation of criminal and juvenile offenders, contemporary philosophies and methods in the treatment of adult criminals and juvenile delinquents.

105A-105B. Fundamentals of Police Administration. (3-3) Yr. Mr. Lindquist

Prerequisite: students who have not taken 105A must receive consent of instructor before enrolling in 105B.

The police as a functional aspect of the system of criminal justice, principles of organization and personnel management, line, staff and auxiliary functions, modus operandi of arrest and detention, political controls and limitations on authority and jurisdiction, professionalization of the police.

106. The Criminal Self and Criminal Careers. (3) II.

Prerequisite: course 102 and senior standing.

The development of criminal self-conceptions, social-psychological processes of group alienation and individual estrangement, maturation and professionalization in the development of criminal careers, selected case studies.

*108. History of Crime and Its Treatment. (3)

Perspectives and methods in the study and control of crime, the evaluation of correctional philosophies and programs, 18th and 19th Century Schools of Criminology, contemporary correctional practices and their philosophical antecedents.

*109. Theories of Criminal Causation. (3)

The major criminological theories, comparison and analysis of their assumptions and methodologies, particularistic, eclectic and integrated approaches, current theoretical contributions.

* Not to be given, 1961-1962.
110. European Systems of Criminal Justice. (3)
A comparative survey of the police, the courts and corrections in selected European countries.

112. Organized Crime and the Professional Criminal. (2)
Prerequisite: senior standing.
A systematic analysis of criminal associations in their various manifestations, informal types of cliques and mobs and formal organizations of industry and area-wide rackets, the professional criminal as a social type, varieties and modus operandi of professional criminals.

113. Forensic Medicine in Criminology. (3) I. Mr. Breyfogle
Prerequisite: Physiology I, or equivalent; course 101A–101B or consent of instructor.
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.

114. Prevention and Control of Crime in Metropolitan Areas. (2) I. Mr. Sherry
Crime in relation to the development of metropolitan areas, incongruent patterns of criminal activity and police organization, demographic and ecological factors in the incidence and distribution of crime and delinquency, considerations of policy and planning.

115A–115B. The Criminal Law in Action. (2–2) Yr. Mr. Sherry
Basic concepts of the criminal law, their origin and development in Anglo-American jurisdictions; constitutional limitations on the police power, the administrative processes of law enforcement, modern criminal procedure.

116. Constitutional and Procedural Problems in Law Enforcement. (2)
Prerequisite: senior standing.
 Constitutional and procedural restraints on law enforcement, their purpose and implementation; Federal and state relationships in the administration of criminal justice.

117. The Prison Community. (2)
Prerequisite: senior standing.
Effects of informal inmate social interaction, types of formal prison organization, latent effects of inmate culture and prisonization, antithetical processes of socialization, types of group controls, authoritarian and permissive.

118. The Alcoholic, the Narcotic and the Sexual Offender. (3)
Selected studies of psychological deviants and criminal offenders.

119. Ethnic Tension and Conflict in Relation to Law Enforcement. (3) II.
Prerequisite: course 105A–105B.
Race and cultural differences as a factor in differential law enforcement, variations in punitive sanctions, double standards as modus operandi, symbolic reactions of tension and conflict, positive and negative factors in the control of ethnic hostilities.

151A–151B. Microscopy and Microchemistry of Physical Evidence. (4–4) Yr. Mr. Kirk
Lectures and laboratory. Prerequisite: Chemistry 5, 12, 112C, with a grade of C or higher (112C may be taken concurrently).
Identification principles and practice. Chemical microscopy, physical constants, microchemical tests, physiological fluids, poisons, inorganic and organic materials.

153A–153B. Quantitative and Instrumental Techniques. (3–3) Yr. Mr. Kirk
Lecture and laboratory. Prerequisite: course 151A–151B; Chemistry 5, 12, 112C.
Advanced identification by instrumental and quantitative procedures.

* Not to be given, 1961–1962.
155. Comparative Microscopy. (3) II. Mr. O'Neill
Lecture, demonstration, and laboratory. Prerequisite: course 101A–101B. Recommended: Botany 1 and Zoology 109.
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.

163. Problems and Procedures in Criminal Interrogation. (3) I. Mr. Wilson
Prerequisite: senior standing.
Survey of historical and contemporary methods of interrogation including techniques for detection of deception, psychological and physiological variables in subject response, evaluation of responses and of instrumental techniques.

180. Juvenile Delinquency: Prevention and Control. (3) II. Mr. Shaner
Social dimensions of juvenile delinquency, its nature, amount and distribution, comparison and analysis of agencies of control and correction, the role of the police and the courts, individual group and community oriented programs of treatment and prevention.

199. Research and Special Study for Advanced Undergraduates. (1–4)
I and II.

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 163.)

*280. Crime and the Political Process. (2)
The nature and sources of criminal political power, ecological aspects of criminal-political organization, reciprocal relations of organized crime and political parties, political functions of criminal groups, political crimes.

*281. Latent Functions in Law Enforcement and Correction. (2)
Ambivalence in the social processes of the law, the courts and corrections is evaluated; empirical analysis of latent and manifest functions; identification of crimogenic and otherwise abortive characteristics of the institutions of criminal justice.

*282. Prediction Methods in Parole and Probation. (2)
Survey of research in methods and techniques of selection for probation and parole, validity of prediction factors and experience tables, application of predictive methods to other aspects of delinquency and criminality, practical implications and limitations for crime control.

*283. Seminar in Experimental Criminology. (2)
Advanced study in the field of crime causation and the development of delinquency prediction techniques.

*284. Seminar in Community Approaches to Delinquency and Crime. (2)
Advanced study of the organization and operation of delinquency and crime prevention groups in the urban community.

290A–290B. Seminar in Crime Investigation. (2–2) Yr. Mr. O'Neill
291A–291B. Seminar in Police Administration. (2–2) Yr. Mr. Comber
292. Seminar in Problems in Criminal Law Enforcement. (2) II. Mr. Sherry
(Open also to students in the School of Law.)

* Not to be given, 1961–1962.
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. Wilson

295A–295B. Seminar in Criminalistics. (2–2) Yr.  
Mr. Kirk

296A–296B. Seminar in the Correctional Treatment of Offenders. (2–2) Yr.  
Mr. Smith

*297. Principles of Counseling and Psychotherapy. (2)  
Techniques of rehabilitation of criminal offenders, psychological evaluation of offenders under supervision and control.

298. Directed Group Study. (1–4) I and II.  
The Staff

299. 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 Design.*

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.*


Hope M. Gladding, *Professor of Decorative Art and Design, Emeritus.*

Mary A. Dumas, M.A., *Associate Professor of Design.*

Willard V. Rosenquist, M.A., *Associate Professor of Design.*

Charles E. Rossbach, M.F.A., *Associate Professor of Design.*

Peter H. Voulkos, M.F.A., *Associate Professor of Design.*

†Imogene B. Gieling, M.F.A., *Assistant Professor of Design.*

William R. McIntyre, M.S., *Assistant Professor of Design.*

Alan R. Meisel, M.F.A., *Assistant Professor of Design.*


Ragnhild L. Kingsbury, *Instructor in Design.*

Joseph A. Pugliese, Ph.D., *Instructor in Decorative Art.*

* Not to be given, 1961–1962.
‡ In residence fall semester only, 1961–1962.
§ In residence spring semester only, 1961–1962.
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 95.

Departmental Major Advisers: Miss Gruber, Mr. Meisel, Mr. Schaefer.

Entrance with Advanced Standing. All undergraduate transfer students requesting advanced standing are required to present examples of their work for evaluation by the staff.

The Major. The following lower division courses are required: 1A or 1B, 6A–6B, 7A–7B; Art 2A and 1B or 1C; History 4A–4B. Recommended: Anthropology 2A–2B; Art 1A, 1D, 3, 14A–14B; Classics 28; History 8A–8B; Philosophy 6A–6B.

A total of 27 to 29 units of upper division work must also be completed, and must include the following: (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 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 certain 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. Mr. Schaefer
1A not prerequisite to 1B.
From the ancient Near East to the present. Development of style and evaluation of form.

6A–6B. Theory of Design and Color. (2–2) Yr. Beginning each semester. Miss Gruber, Mr. McIntyre, Mr. Meisel, Mr. Rosenquist, Mr. Rossbach, Mrs. Kingsbury, Mr. Pugliese, Mr. Haskin.

Survey of the elements and principles of two- and three-dimensional design.
6B. Emphasis on color.

† Prerequisites for this course should be noted, as they must be included in the maximum of 30 upper division units offered for the degree.
Prerequisite: course 6A–6B.  
Miss Dumas, Mrs. Miller, Mr. McIntyre  
7A. Emphasizing line and space, based upon calligraphy and the alphabet from Pre-Roman times.  
7B. Three-dimensional design; the nature and use of materials.  

Upper Division Courses  
Group A: Lecture Courses  
General prerequisite: upper division standing and consent of the instructor.

*125. American Decorative Art from the First Colonial Periods to 1850.  
(3) II.  
(Formerly numbered 195B.)  
The styles and their significant artists, housewrights, and craftsmen.  
Miss Nelson

127A not prerequisite to 127B or 127C.  
Analysis of salient art styles in their cultural contexts.  
*127A. Paleolithic West Europe, South and West Africa.  
127B. Oceania and South America. I.  
127C. Middle and North America. II.  

130A–130B. Interior Design. (2–2) Yr.  
130A not prerequisite to 130B.  
Design, selection, and arrangement of furniture, with consideration for its relation to the architectural background.  
Mr. Wellington

140A–140B–140C. Survey of Ceramic and Glass Forms. (3–3–3)  
140A not prerequisite to 140B or 140C.  
Their design as expressions of aesthetic and social values.  
Mr. Pugliese  
140A. Ceramics: Classic Mediterranean; the Near East; Medieval and Renaissance Europe. I.  
140B. Ceramics: The Far East; Pre-Columbian America; Modern Europe and the United States. I.  
140C. Glass. I.

167. History of Design since the Industrial Revolution. (3) II. Mr. Schaefer  
The theory and practice of design from preindustrial handcrafts to mechanical production, and the evolution of a machine aesthetic.  
Miss Gayton

175A–175B. History of the Textile Arts. (2–2) Yr.  
175A not prerequisite to 175B.  
175A. The New World: Native America; Oceania.  
175B. The Old World: Europe, India, Asia.  

180A–180B. Survey of Expression in Materials. (3–3) Yr.  
Mr. Wellington  
180A not prerequisite to 180B.  
Form as exemplified by significant objects made from metals, wood, glass, clay, etc.  

193A–193B. Historic Costume. (3–3) Yr.  
193A not prerequisite to 193B.  
Design, material, cultural factors, and contemporary arts as expressed in costume.  
193A. Native America; Indonesia; Asia.  
193B. Classic Mediterranean; Medieval to Modern Europe.  

* Not to be given, 1961–1962.
195A not prerequisite to 195B.
Mr. Schaefer, ———
The interior as an aesthetic composition and as an expression of domestic culture from the Middle Ages to the present.

Group B: Laboratory Courses
General prerequisite: 6A–6B, 7A–7B or the equivalent and consent of the instructor. These courses may be repeated indefinitely without duplication of credit.

141A–141B. Advanced Design: Ceramics. (2–2) Yr. Beginning each semester.
Mr. Vouklos
Prerequisite: 140A or 140B which may be taken concurrently. Enrollment limited.
Preference given to decorative art majors.
A study of processes of construction and glazing, especially in relation to their influence upon design.

Miss Dumas, Mrs. Kingsbury
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, Mr. Haskin
166A not prerequisite to 166B.
166A. Interrelation of space and material as problems of abstract design, emphasizing color, light, and motion.
166B. Studies of volume and spatial relationships in metal.

168. Introduction to Industrial Design. (2) II
Lectures, demonstrations and studio exercises offering insight into methods of analysis and solution employed in the design of industrial products.

Mrs. Miller, Mr. Rossbach
Prerequisite: 175A or 175B which may be taken concurrently.
Design, emphasizing structure in relation to color, texture, and pattern.

196A–196B. Interior Design. (2–2) Yr. Beginning each semester.
Mr. Wellington
Prerequisite: 130A–130B, 195A, which may be taken concurrently, and some mechanical drawing.
Individual criticism and discussion of theory.

Group C: Special Study Courses

*101. Reading Course in the Decorative Arts. (2) I and II.
Prerequisite: 6A–6B and 7A–7B. Enrollment limited.
Designed to acquaint majors with the critical literature of the decorative arts.

179. Textile Analysis. (2) II.
Miss Gayton
Prerequisite: 175A, 176A–176B, or consent of the instructor. Enrollment limited; preference given to decorative art majors.
Basic problems in the construction and design of ethnic and historic textiles.

* Not to be given, 1961–1962.
190. Proseminar in Decorative Art. (2) I and II.
The Staff (Mr. Rossbach in charge)
Prerequisite: senior standing in decorative art or the equivalent.
Contemporary developments in the decorative arts, emphasizing the relation to historical antecedents and other areas of the visual arts.

198. Special Study in the Practice of Design. (2) I and II.
(Formerly numbered 197.)
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.
198A. Enamel design. (2) I. Mr. Rosenquist
*198B. Metal design. (2) II. Mrs. Gieling
198C. Design of woven textiles. (2) II. Mr. Rossbach
198D. Design of printed textiles. (2) I. Miss Dumas
198E. Ceramic design. (2) II. Mr. Voulkos

199. Special Study for Advanced Students. (1-4) I and II.
The Staff (Mr. Pugliese 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.

Graduate Courses
Concerning conditions for admission, 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) I. The Staff
*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 and historic costume.
294E. Studies of Form in Primitive Art. (2) II. Miss Nelson
294F. Industrial Design. (2) I. Mr. Schaefer
294G. Ceramic Design. (2) II. Mr. Pugliese

*298. Special Study in the Practice of Design. (2) I and II.
The Staff
Prerequisite: graduate 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.

299. Directed Research. (2-4) I and II. The Staff (Mr. Rossbach 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 Policies. * Not to be given, 1961–1962.
Planning 110, 121; Classics 170; Geography 176; History *122, 131, *176A–176B; Philosophy 136B; Psychology 131.

For detailed descriptions see the announcement section of the respective departments.

**DRAMATIC ART**

(Department Office, 1205 Dwinelle Hall)

Travis Bogard, Ph.D., *Professor of English* (Chairman of the Department of Dramatic Art).

Fred Orin Harris, M.F.A., *Professor of Dramatic Art*.

Marvin Rosenberg, Ph.D., *Professor of Dramatic Art*.

Garff B. Wilson, Ph.D., *Professor of Speech and Dramatic Art*.

Robert W. Goldsby, M.F.A., Associate Professor of Dramatic Art.

Henrietta G. Harris, A.B., Assistant Professor of Dramatic Art.

William I. Oliver, Ph.D., Assistant Professor of Dramatic Art.

Harry M. Ritchie, D.F.A., Assistant Professor of Dramatic Art.

George A. Marchi, M.A., *Instructor in Dramatic Art*.

Harry W. Smith, Jr., M.A., *Instructor in Dramatic Art*.

*Letters and Science List*. All undergraduate courses are included in the Letters and Science List. A total of not more than 8 units from courses 49 and 190 will be accepted for Letters and Science credit. For regulations governing this list see page 95.

*Departmental Major Adviser*: Mr. Bogard.

**The Major.** Required: 37 units, including the following lower division courses: 10A (3), Resources for Acting; 20A–20B (3-3), Introduction to Dramatic Literature; 45 (3), Introduction to Theater; 49 (1), University Theater; and 24 units of upper division courses including 120 (3), Dramatic Theory; 181 (3), Senior Proseminar; and at least 6 units of 125A–125B–125C–125D–125E (3–3–3–3–3), Dramatic Literature of Western Civilization. Not more than 3 units of course 190 (Advanced University Theater) may be offered as part of the 24-unit major requirement. The department will certify to the completion of a major program for graduation only those students who have an average grade of C in courses taken in the department.

**Higher degrees.** Consult Mr. Bogard; see also the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION.

**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

* Not to be given, 1961–1962.

1 In residence fall semester only, 1961–1962.
presentations are designed to present to the University community a program of distinguished dramas of all times and countries. Participation in productions is open to all students.

**Lower Division Courses**

**10A–10B–10C. Theory of Acting.** (3–3–3) I and II.

Mr. Harris, Miss Harris, Mr. Oliver, Mr. Marchi

10A. Resources for Acting. I and II. Physical, psychological, and spiritual resources for acting. Mr. Harris, Miss Harris, Mr. Oliver, Mr. Marchi.

10B. Methods of Acting. I and II. Approaches and practices in characterization. The fundamentals of stage speech and movement. Mr. Harris, Mr. Oliver, Mr. Marchi.

10C. Vocal Resources for Acting. I and II. Study of the use of the voice as an element in stage characterization, involving physical, intellectual, and emotional resources. Miss Harris.

**20A–20B. Introduction to Dramatic Literature.** (3–3) Yr. Beginning each semester.

Course 20A is not prerequisite to 20B.

A study of masterworks of theater from the Greek classic period to the present.

20A. Aeschylus to the Renaissance.

20B. The Renaissance to the Present.

**39. Introduction to Playwriting.** (3) II.

Mr. Oliver

**40A–40B. Twentieth-Century World Theater.** (3–3) Yr.

Mr. Ritchie

Course 40A is not prerequisite to 40B.

A survey of the characteristic forms of the major contemporary theatrical modes.

**45. Introduction to Theater.** (3) II.

Mr. Smith

One lecture and two section meetings weekly.

An introduction to theater history and the elements of stage practice.

**49. University Theater.** (1) I and II.

The Staff (Mr. Bogard in charge)

Prerequisite: consent of instructor. May be repeated for credit.

**Upper Division Courses**

**110. Advanced Theory of Acting.** Mr. Harris, Mr. Goldsby, Mr. Ritchie

(Formerly numbered 130.)

Prerequisite: course 10A, 10B, 10C, 20A, 20B, and junior standing.

110A. Acting in Classical Styles. (2) II.

Mr. Harris

110B. Acting in Renaissance Styles. (2) I.

Mr. Ritchie

110C. Acting in Major Modes, 1700–1900. (2) I.

Mr. Goldsby

110D. Acting in Twentieth-Century Plays. (2) II.

Mr. Ritchie

**120. Dramatic Theory.** (3) I and II.

Mr. Rosenberg

Prerequisite: junior standing.

Major documents of dramatic criticism and theory, studied in historical sequence and related to analysis of important plays.

**125. Dramatic Literature of Western Civilization.**

Mr. Oliver, Mr. Ritchie, Mr. Marchi

125A. Greek and Roman Dramatic Literature. (3) II.

Mr. Marchi

* Not to be given, 1961–1962.
125B. Dramatic Literature of Western Europe from the Middle Ages to 1600. (3) I. Mr. Marchi
125C. Dramatic Literature of Western Europe from 1600 to 1700. (3) I. Mr. Oliver
125D. Dramatic Literature of Western Europe and the United States from 1700 to 1900. (3) I. Mr. Ritchie
125E. Dramatic Literature of Western Europe and the United States from 1900 to the Present. (3) II.

139A–139B. Playwriting. (3–3) Yr. Beginning each semester. Mr. Rosenberg
Prerequisite: course 39, junior standing and consent of instructor.
Practice in the fundamentals of dramatic composition. Group readings and discussion of written work.

145. History of the American Theater. (3) I. Mr. Wilson
Prerequisite: course 20A–20B, or consent of instructor.
The development of the American theater from colonial times to the twentieth century.

150A–150B. The Visual Theater. (3–3) Yr. Mr. Smith
Course 150A not prerequisite to 150B.
150A. History of Visual Theater.
150B. Aesthetics of Visual Theater.

160. Theory of Directing. (3) I and II. Mr. Harris, Mr. Goldsby
Prerequisite: junior standing.

181. Senior Proseminar. (3) I and II.
Prerequisite: course 120 and senior standing.
Designed primarily for senior students in the dramatic art major. Sections limited to 20 students. Studies in a single playwright or mode of theater; not for practice of acting or playwriting.

190. Advanced University Theater. (1) I and II.
The Staff (Mr. Bogard in charge)
Prerequisite: junior standing and consent of instructor. May be repeated for credit.

199. Special Study for Advanced Undergraduates. (1–3) I and II.
The Staff (Mr. Bogard in charge)
Prerequisite: nine or more units in upper division dramatic art courses with an average grade of not less than "B."
Reading and conference for individual honor students.

Graduate Courses
(Concerning admission to graduate courses, see page 163.)

Requirements for the M.A. degree: 24 units in upper division and graduate courses, of which at least 12 units must be in graduate courses in the Department of Dramatic Art. All students are required to take course 220, at least one seminar in dramatic literature, and either course 290 or 299. Before certification for the degree will be given, candidates must pass an examination testing their reading knowledge of either French or German and a comprehensive final examination.

* Not to be given, 1961–1962.
210A–210B. Advanced Acting. (3–3) Yr.  Mr. Harris, Mr. Goldsby

220. Theater Research. (2) I and II.  Mr. Rosenberg

An introduction to bibliographical methods and materials for theater research projects.

221A*–221B. Studies in the Modern Theater. (3–3) I and II.  Mr. Goldsby

Prerequisite: course 220; may be taken concurrently. Course 221A not prerequisite to 221B.

*221A. Realism in Twentieth Century Drama. I.

221B. Anti-Realistic Trends in Twentieth-Century Drama. II.

222. Studies in Classical Theater. (3) I.

Prerequisite: course 220; may be taken concurrently.

223. Studies in the Theater of Shakespeare. (3) II.

Prerequisite: course 220; may be taken concurrently

224. Studies in the French Theater. (3) I.

Prerequisite: course 220; may be taken concurrently.

*225. Studies in the Russian Theater. (3) II.

Prerequisite: course 220; may be taken concurrently.

*226. Studies in Dramatic Genre. (3) I.

Prerequisite: course 220; may be taken concurrently

Seminar in one of the major dramatic genres: tragedy, comedy, melodrama, farce.

239. Advanced Playwriting. (3) I.

Prerequisite: consent of instructor, not open to undergraduates.

*245. Studies in the American Theater. (3) II.

Prerequisite: course 220; may be taken concurrently.

250. Theater Design. (3) I.

Open to qualified seniors with the consent of the instructor.

Theory and practice of design for the visual theater.

260. Advanced Directing. (3) II.

Open to qualified seniors with the consent of the instructor.

290. Theater Laboratory. (1–4) I and II.  The Staff (Mr. Bogard in charge)

Prerequisite: course 210A–210B, or 239, or 250, or 260.

Advanced practice in theater design, directing, playwriting and acting. May be repeated for credit.

299. Special Studies. (1–4) I and II.  The Staff (Mr. Bogard in charge)

Prerequisite: consent of instructor. Not open for practice of acting, design, directing or playwriting. May be repeated for credit.

Related Courses in Other Departments

The Classic Myths (Classics 28).

Greek Tragedy (Classics 35).

Mythology (Classics 178).

* Not to be given, 1961–1962.
Shakespeare (English 17).
The English Drama to 1642 (English 114A).
The English Drama, 1660 to 1850 (English 114B).
British and American Drama, 1850 to the Present (English 114C).
Shakespeare (English 117A–117B).
Modern French Drama (French 115A–115B).
The Seventeenth Century (French 120A–120B).
Drama (Greek 103).
Nineteenth-Century German Drama (German 104B).
The Early Works of Goethe and Schiller (German 106).
Italian Literature of the Eighteenth Century (Italian 114).
Italian Literature of the Twentieth Century (Italian 116).
Romantic Comedy (Latin 145A).
Introduction to Opera (Music 127A).
Survey of Chinese Vernacular Literature (Oriental Languages 172).
Rhythmic Basis of Dance and Allied Arts (Physical Education 35).
Theology of Dance (Physical Education 160A–160B).
The History of Scandinavian Drama up to 1900 (Scandinavian 106).
The Plays of Ibsen (Scandinavian 107).
Strindberg and His Writings (Scandinavian 108).
Scandinavian Drama of the Twentieth Century (Scandinavian 109).
Chekhov (Slavic 133F).
The Russian Drama from the Seventeenth Century to the Twentieth (Slavic 135).
Modern Peninsular Drama: From the Romantic Movement to the Present (Spanish 105).
The Spanish Drama of the Sixteenth and Seventeenth Centuries (Spanish 109A–109B).

**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. Davisson, J.D., Ph.D., Professor of Economics.
- Howard S. Ellis, Ph.D., LL.D., Flood Professor of Economics.
- Walter Galenson, C.P.A., Ph.D., Professor of Industrial Relations and Business Administration.
- 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, Agricultural Economics and Business Administration.
Clark Kerr, Ph.D., L.L.D., Professor of Industrial Relations.
Frank L. Kidner, 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.
*Harvey Leibenstein, Ph.D., Professor of Economics.
John M. Letiche, Ph.D., Professor of Economics.
*Andreas G. Papandreou, Ph.D., Professor of Economics.
*Roy Radner, Ph.D., Professor of Economics.
Earl R. Rolfp, 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.
Emily H. Huntington, Ph.D., Professor of Economics, Emeritus.
Melvin M. Knight, Ph.D., Professor of Economics, Emeritus.
Carl Landauer, Ph.D., Professor of Economics, Emeritus.
George F. Break, Ph.D., Associate Professor of Economics.
Richard E. Caves, Ph.D., Associate Professor of Economics (Vice-Chairman of the Department).
Gregory Grossman, Ph.D., Associate Professor of Economics.
Dale W. Jorgenson, Ph.D., Associate Professor of Economics.
*Hyman P. Minsky, Ph.D., Associate Professor of Economics.
*Henry Rosovsky, Ph.D., Associate Professor of Economics.
Albert Fishlow, B.A., Acting Assistant Professor of Economics.
Bernard Saffran, B.A., Acting Assistant Professor of Economics.
*Benjamin N. Ward, Jr., Ph.D., Assistant Professor of Economics.
Richard L. Ernst, B.S., Associate in Economics.
Paul E. Ivory, B.A., Associate in Economics.

Bela Balassa, Ph.D., Visiting Assistant Professor of Economics.
Meredith O. Clement, Ph.D., Visiting Assistant Professor of Economics.
Hugh W. Folk, M.S., Lecturer in Economics.
Arthur H. Leigh, Ph.D., Visiting Professor of Economics.
Robert Matthews, M.A., Visiting Associate Professor of Economics.
Thomas Mayer, Ph.D., Visiting Associate Professor of Economics.
George L. Mehren, Ph.D., Professor of Agricultural Economics.
Don Patinkin, Ph.D., Visiting Research Professor of Economics.

* In residence spring semester only, 1961–1962.
Letters and Science List. All undergraduate courses in economics are included in the Letters and Science List. For regulations governing this list, see page 95.

Departmental Major Advisers: Mr. Rolph (chairman), Mr. Caves, Mr. Gulick, Mr. Landauer, Mr. Landes.

The Major. Required: either (A) Economics 1A–1B and 2; or (B) Social Science 1A–1B and Economics 2, and 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 prior to the senior year. For students electing alternative (B) above, Economics 103A–103B, 100B and either 112A, 112B, or 113 are required and should be taken prior to the senior 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.

Except under extraordinary circumstances, no more than 10 units of economics and business administration combined may be taken in one semester.

The Honors Program. The honors program of the Department of Economics is devised to give interested and promising students special opportunities for development of breadth and depth in their departmental major work. Students with an average of 3.0 or better, both over-all and in their course work in economics, are eligible to apply for honors work at the beginning of or during their junior year. They will normally take one tutorial unit of Economics H195 each semester of their junior year under the general guidance of the chairman of the honors program; in their senior year they will take three units each semester of Economics H196, write an honors thesis under the direction of a member of the department, and take a comprehensive written examination upon completion of their other work. For students thought to be eligible for an award of Highest Honors, an oral examination in addition to the comprehensive written examination will be administered by members of the department. Sophomore students who may be interested in undertaking honors work in the junior year would do well to consult with the chairman of the department honors program at an early stage to facilitate planning of their course work leading to the honors program.

Lower Division Courses

1A–1B. Elements of Economics. (3–3) Yr. Beginning each semester.

Mr. Rolph, Mr. Leigh, Mr. Break

1A. I: Mr. Rolph, Mr. Leigh; II: Mr. Break; 1B. I: Mr. Break; II: Mr. Rolph, Mr. Leigh.

Two lectures and two recitation sessions per week to be arranged. Credit will not be given for both 1A–1B and 103A–103B.
2. Economic Statistics. (4) I and II.  
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 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.

Upper Division Courses

Primarily for undergraduates. Prerequisite: for major students in economics, course 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. Economics Analysis and Economic Policy. (3–3) Yr. Beginning each semester.

Mr. Clement, Mr. Mayer, Mr. Jorgenson, Mr. Balassa, Mr. Bain
100A. I: Mr. Clement; 100A. II: Mr. Mayer; 100B. I: Mr. Jorgenson; 100B. II: Mr. Bain, Mr. Balassa, Mr. Clement.
Not open to students who have completed Business Administration 100 or 101.

100A. The problems of economic stability; the problem of economic progress; and problems in the foreign economic relations of the United States.

100B. The problems of competition, monopoly and economic power, economic opportunity, motivation, efficiency, and freedom.

Mr. Leigh
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.

(3–3) Yr.  
Mr. Saffran
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.

*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. II. European and American movements for social reform since 1914.

110. Economic Development. (3) I.  
Mr. Fishlow
Theories of economic development and of underdevelopment; historical aspects; policies for achieving development in poor countries; favorable conditions for development in rich countries.

* Not to be given, 1961–1962.
112A–112B. Economic History of Europe. (3–3) Yr. Mr. Cipolla, Mr. Landauer
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. Fishlow
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.
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.
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.

116A–*116B. Comparative Economic Systems. (3–3) Yr. Mr. Landauer
Economic organization and institutions, and their impact on economic variables.

116A. Theory; models of economic systems.

*116B. Studies of types of actual economies. Prerequisite: course 116A or consent of the instructor.


118A. The Soviet economy.

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. Caves
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 to prevent monopoly and maintain competition.

122. Theory of Domestic Trade. (3) I. Mr. Mehren
Primarily for seniors. Prerequisite: course 100A, Business Administration 101, or their equivalent.

Interregional trade and the location of economic activity; determinants of the channels of distribution; the economics of marketing policies; resale price maintenance and public regulation of domestic trade; productivity in the distributive sector; the distributive sector and economic growth.

*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.
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.

* Not to be given, 1961–1962.
130. Government Finance. (3) I and II.  
Mr. Davisson  
Budget-making, expenditures, public debt, taxation, and fiscal policy at federal, state, and local levels. 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. Rolph, Mr. Break  
Prerequisite: 131B: course 131A, or 130 and consent of instructor. Credit will not be given for both course 130 and 131A.  
Fiscal theory and policy and of the incidence and effects of taxation, governmental expenditure programs, and public debt operations.

133. Dynamic Economics and Business Fluctuations. (3) II.  
Mr. Matthews  
Prerequisite: course 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. Mayer  
I: Mr. Mayer; II: Mr. Ellis.  
Two lectures and one discussion section per week.  
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. Mayer  
(136B formerly numbered 137.)  
Prerequisite, 136B: course 136A, or 135 with consent of instructor.  
136A: The monetary economy; survey of monetary interest, and income theory; commercial and central banks, the Treasury, and the supply of money. Credit will not be given for both course 136A and 135.  
Monetary standards and international finance; competing objectives of monetary policy; recent monetary experience; current issues.

138. Economic Accounting. (3) I.  
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.  
Prerequisite: course 2 or equivalent.

150. Labor Economics. (3) I and II.  
Mr. Gulick  
Students will not receive credit for both course 150 and Business Administration 150.  
The social background of labor legislation and trade unionism.

152. Labor Economics. (3) II.  
Mr. Gulick  
Comparative survey of American and foreign labor movements. Course 150 not prerequisite to course 152.

153. Wage Theory and Policy. (3) I.  
Mr. Ulman  
Prerequisite: course 150 or consent of 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.  
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.  
Mr. Folk  
An analysis of the theories underlying social insurance and social insurance legislation throughout the world.

* Not to be given, 1961–1962.
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.
190A. Theory. 
190B. International Economic Policies. Mr. Letiche, Mr. Balassa

H195. Junior Honors Course. (1–3) I and II. The Staff (Mr. Caves in charge)
H196. Senior Honors Course. (3) I and II. The Staff (Mr. Caves in charge)

197. Advanced International Economics. (3) I.
Prerequisite: course 100A–100B or consent of instructor.
Problems of international economic theory and policy.

198. Directed Group Study for Advanced Undergraduates. (3) I and II.
Prerequisite: consent of 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. Caves 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.

Two lectures and one discussion section per week. Mr. Bain, Mr. Scitovsky

200B. Macro-economics: Determination of national income, employment, price level, growth, distribution. Mr. Scitovsky.

201A–201B. History of Economic Thought. (3–3) Yr. Mr. Letiche
Analysis of the relationships between historical conditions, economic theory, and economic policy from the Greeks to modern times.

202. Advanced Economic Theory. (3) I and II. Mr. Scitovsky
Prerequisite: course 200A or equivalent.
Further treatment of micro-economics beyond what is covered in course 200A.

203. Advanced Topics in Economic Theory. (3) I and II.
, Mr. Matthews, Mr. Leibenstein, Mr. Hoos
Prerequisite: course 200A–200B.
For students desiring further training in theoretical analysis. Topics to be covered in the different sections will be announced annually.

* Not to be given, 1961–1962.
I. Sec. 1: ——, ——. Sec. 2: Seminar in Macro-Economics, Mr. Matthews; II. Sec. 1: Seminar in Micro-Economics, Mr. Leibenstein, Sec. 2: Organization Theory and the Theory of the Firm, Mr. Hoos.

205A–205B. Theory of Economic Development and Institutional Change. (3–3) Yr. Mr. Ellis, Mr. Leibenstein

205A: II; 205B: I.

Theory of economic change; applications to the development of underdeveloped economics; relation of such theories to general economic theory. Institutional patterns of development; population problems, changes in resource and product composition.

206A–206B. Social Reform Movement. (3–3) Yr.

207A–207B. Mathematical Economics. (3–3) Yr.

Prerequisite: course 200A–200B; 2 years of college mathematics, including Mathematics 111 or equivalent; one semester of upper division probability or statistics. Applications of mathematics to economic theory, including; utility and subjective probability, behavior of producers and consumers, equilibrium and optimum of an economy, theories of games and organizations, economic growth, dynamic programming.

210A–210B. Advanced Study in Economic History. (3–3) Yr.

Prerequisite: consent of instructor. Mr. Cipolla, Mr. Fishlow

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: Problems of demographic history with special emphasis on the history of epidemics in late medieval and modern times. Mr. Cipolla.

210B. Sec. 1: Seminar in American economic history. Mr. Fishlow.

211. Economic History of Japan. (3) I.

Emphasis on the post-Restoration (1868) period.

212A–212B. Topics in Economic History. (3–3) Yr. Mr. Cipolla, Mr. Landes

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

Development problems since 1949: 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.

217A–217B. Problems in Economic Planning. (3–3) Yr. Mr. Balassa

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.

* Not to be given, 1961–1962.
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. Public policies affecting competition and monopoly.

230A–230B. Public Finance. (3–3) Yr. Mr. Break, Mr. Rolph
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 Economic Policy. (3) II. The Staff (Mr. Gordon in charge)
Prerequisite: graduate work in economic theory and one or more applied fields.
Analysis of important questions of contemporary economic policy in the United States and other countries. The precise topics will vary from year to year.

*238. Theory and Measurement of the National Income. (3) II.
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.

242. Applied Economic Statistics. (3) I and II. Mr. Jorgenson
Prerequisite: Statistics 131 or equivalent.
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. Jorgenson
Prerequisite: course 242; Mathematics 190A–190B or equivalent.

250A–250B. Advanced Labor Economics. (3–3) Yr. Mr. Gulick
Prerequisite: two courses in labor and consent of 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. 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 economic development and politics.

*288. Population and Economic Development. (3) II.
Population and migration problems in economic development.

* Not to be given, 1961–1962.
290A–290B. International Economics. (3–3) Yr. Mr. Balassa, Mr. Letiche
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. Research on current problems of international economic interest.

298. Research. (1–6) I and II. The Staff (Mr. Break 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 desire to do special work in a particular field.

299. Individual Study. (3) I and II. The Staff (Mr. Break in charge)
Economics of Agricultural Production and Consumption. (Agricultural Economics 200A–200B.) (3–3) Yr. Mr. Bressler, Mr. Hoos
Rural Sociology. (Agricultural Economics 112A–112B.) (2–2) Yr. Mr. McEntire

Introduction to Social Science. (Social Science 1A–1B.) (3–3) Yr. The Staff (Mr. Feuer in charge)

Statistical Inference for Social Scientists. (Statistics 131.) (3) I and II. Mr. Kuznets, ———
Laboratory Course in Statistical Inference for Social Scientists. (Statistics 131L. (1) I and II. Mr. Kuznets, ——— in charge
Survey of Algebra and Analysis. (Mathematics 190A–190B.) (3–3) Yr. Mr. Bade, Mr. Bredon

EDUCATION
(Department Office, 207 Haviland Hall)

-William A. Brownell, Ph.D., LL.D., Professor of Education.
-Harold D. Carter, Ph.D., Professor of Education.
-Jack A. Holmes, Ph.D., Professor of Education.
-Frederic Lilge, Ph.D., Professor of Education.
-Thomas R. McConnell, Ph.D., LL.D., D.H.L., Professor of Education.
-Leland L. Medsker, Ed.D., 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.

* Not to be given, 1961–1962.
* In residence fall semester only, 1961–1962.
James C. Stone, Ed.D., Professor of Education and Director of Teacher Education.

J. Chester Swanson, Ph.D., Professor of Education.

Frederick T. Tyler, Ph.D., Professor of Education.

Edna W. Bailey, Ph.D., Professor of Education, Emeritus, and Associate Director 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.

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.

Mary C. Jones, Ph.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.

Lars H. Peterson, Ph.D., Associate Professor of Education, Emeritus.

Thomas Bentley Edwards, Ph.D., Associate Professor of Education.

Walter D. Loban, Ph.D., Associate Professor of Education and Supervisor of the Teaching of English.

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.

Val E. Arnsdorf, Ph.D., Assistant Professor of Education.

Arthur R. Jensen, Ph.D., Assistant Professor of Education.

Aubrey H. Roden, Ph.D., Assistant Professor of Education.

Royce R. Ronning, Ph.D., Assistant Professor of Education.

John G. Ross, Ed.D., Assistant Professor of Education.

Lloyd F. Scott, Ph.D., Assistant Professor of Education and Coordinator of Laboratory Schools.

Walter R. Stellwagen, Ph.D., Assistant Professor of Education.

Martin A. Trow, Ph.D., Assistant Professor of Education and Sociology.


Enoch Dumas, Ed.D., Lecturer in Education, Associate Director of Teacher Education, 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.

In residence fall semester only, 1961–1962.
George H. Kyme, Ph.D., Lecturer in Music and Supervisor of the Teaching of Music.
Karl E. Schevill, Ph.D., Lecturer in Education, Associate Director of Teacher Education and Supervisor of the Teaching of Foreign Languages.
Paul S. Taylor, Ph.D., Professor of Economics.

Meidel Applegate, M.A., Associate Supervisor of Secondary Education.
Neva Aubin, M.A., Supervisor of Elementary Education.
Ernest H. Berg, M.Sc., Supervisor of Secondary Education.
Donetta C. Brainard, A.B., Assistant Supervisor of the Teaching of English.
Marilyn H. Cutright, M.A., Supervisor of Elementary Education.
Edmund Farrell, M.A., Supervisor of Secondary Education.
Barbara J. Grant, M.A., Supervisor of Elementary Education.
Robert F. Hogan, M.A., Supervisor of Secondary Education.
Katharyn Hole, Supervisor of the Teaching of Art.
Margaret C. Jackson, M.A., Supervisor of Secondary Education.
Constance C. L'Aventure, A.B., Supervisor of Secondary Education.
Mark C. Luca, Ph.D., Supervisor of Elementary Education.
William G. McCarthy, Ed.D., Supervisor of Elementary Education.
Eugene McCreary, M.A., Supervisor of Secondary Education.
Grace M. Maertins, M.A., Supervisor of Secondary Education.
Anne F. Merrill, M.A., Supervisor of Elementary Education.
John A. Nelson, Jr., M.A., Supervisor of Secondary Education.
Arnold R. Pagano, M.A., Supervisor of Elementary Education.
Claire N. Pederson, Ed.D., Supervisor of Secondary Education.
T. Clyde Polson, Ph.D., Supervisor of the Teaching of Science.
Lorine Prochaska, Ed.D., Supervisor of Secondary Education.
Leo P. Ruth, A.B., Supervisor of Secondary Education.
Philip J. Sinnott, M.A., Supervisor of Elementary Education.
Harry B. Stehr, Jr., A.B., Supervisor of Secondary Education.
Mary K. Stiles, M.S., Supervisor of Secondary Education.
Staten W. Webster, Ph.D., 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 95.

Departmental Advisers: Mr. Lund, Mr. Tyler.

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.  
Mr. Roden, Mr. Ronning, Mr. Tyler  
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. Edwards, Mr. Loban, Mr. Lund, Mr. McCarthy,  
Mr. Schevill, Mr. Stone, Mrs. Zari  
Development and operation of the school as a social institution; current purposes and programs; roles of school personnel; relation to other social agencies. Systematic observations in the schools and other social agencies. Sections 10–16 elementary, sections 20–24 secondary.

101. History of Education—General Course. (3) I and II.  
Mr. Mosier  
The development of educational thought and practice viewed as a phase of social progress.

102. History of American Education. (2) II.  
Mr. Mosier  
The leading ideas and ideals of American education and the institutions in which they have been embodied.

105. Introduction to Comparative Education. (2) I.  
Mr. Lilge

106. Contemporary Educational Thought. (2) II.  
Mr. Lilge

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 Psychology of Reading. (2) I.  
Mr. Holmes

114. Statistical Methods in Education. (3) I and II.  
Mr. Stellwagen  
Prerequisite: course 100A or former course 110. Mathematics D recommended.
115. Informal Evaluation Techniques. (2) I. Mr. Ronning
Prerequisite: course 100A or former course 110 or the equivalent, and 114.

116. The Exceptional Child. (2) I. 
Prerequisite: course 100A or former course 110 or a course in psychology in addition to Psychology 1A.

117. Psychology of High School Subjects. (2) II. 
Prerequisite: course 100A or former course 110.

119. Standard Tests in Education. (3) I and II. Mr. Carter
Prerequisite: course 100A or equivalent.

127. Principles of Teaching the Slow Learner. (2) II. 
Prerequisite: teaching experience. May be counted toward the special credential for working with mentally retarded children.

130. The Elementary School Curriculum. 
Mr. Dumas, Mr. Scott
Purposes, content, organization, instructional materials, and evaluation of subjects in the curriculum.

130A. Arithmetic. (2) I and II. (Formerly numbered 131.)
Mrs. Aubin, Mr. Kyme, Mr. Luca

130B. Art and Music. (2) I and II. (Formerly numbered 132.)
Prerequisite: Decorative Art 6A, Music 10.

130C. Reading and the Other Language Arts. (3) I and II. Mr. Russell
(Formerly numbered 134.)

130D. Social Studies and Science. (3) I and II. Mr. Arnsdorf, Mr. Michaelis, Mr. Pagano
(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. 

153. Mental Hygiene—Elementary. (2) I and II. Mr. Roden
Prerequisite: course 100A or former course 110.
Basic course concerned with problems of childhood.

154. Mental Hygiene—Advanced. (2) I. 
Prerequisite: course 153 or 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. 
Nature, scope, organization, and administration of personnel services in educational institutions. Basic guidance techniques. For nonmajors in student personnel and counseling psychology.

165. Business Education in Secondary Schools. (3) I and II. Mr. Hitch
This course is prerequisite to 320E, Section 13.

* Not to be given, 1961–1962.
167. Personality Theory in Counseling. (2) II.
   Prerequisite: consent of instructor.
   Critical analysis of personality theories and their relationships to counseling theories.

172. Junior High School Education. (2) I.
   Prerequisite: course 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. Introduction to Adult Education. (3) I and II. Mr. London
   The role of adult education in an industrial society.

182. Problems of Adulthood. (3) II. Mr. London
   Problems of work, leisure, and aging.

196. 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
   for the work proposed; adequate preparation will consist normally of the com­
   pletion of at least 12 units of upper division work basic to the subject to 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. Brownell
   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 and II. Mr. Brownell
   (Formerly numbered 210A.)
   Prerequisite: 8 units in educational psychology and/or psychology.
   A systematic course designed to organize and to integrate the field of educational psy­
   chology at an advanced level.

200C. Foundations of Curriculum Development. (3) I and II. Mr. Parker
   General concepts, principles, and practices of public school curriculum planning.

200D. Public School Organization and Administration. (3) I and II.
   Enrollment restricted to nonmajors in administration.
   Mr. Morphet
   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.

* Not to be given, 1961–1962.
201A–201B. History of Education. Seminar. (2–2) Yr. Mr. Mosier
Admission on consultation with the instructor.
The theory and practice of historical inquiry as applied to research in the history of education.

203. Problems in the History of Education. (2) I. 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.

205. Problems in Comparative Education.
The different subdivisions deal with the recent history and present status of education in the countries and areas mentioned, with educational problems and programs common to newly developing countries, and with community development as an educational and organizational process.

205A. Soviet Russia. (2) I. Mr. Lilge
205B. Western Europe. (2) I and II.
205C. Asian Countries. (2) I and II.
205D. Latin American Countries. (2) I and II.
205E. Newly Developing Countries. (2) I and II.
205F. International Community Development. (2) I and II. Mr. Taylor

206A–206B. Philosophy of Education. Readings and Research. (2–2) Yr. Mr. Lilge

209. Selected Problems in the Philosophy of Education. (2) II. Mr. Lilge

210. The Learning Process. (2) II. Mr. Tyler
Prerequisite: consent of instructor. Doctoral candidates in educational psychology may not register for this course.

211B. Children’s Thinking. (2) II. Mr. Russell
Children’s thinking with special reference to influences of home and school, and development of concepts, problem-solving abilities, critical thinking, and creative thinking.

212. Analysis of Difficulties in Reading and Language Arts. (2) II. Mr. Holmes
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.

213. Individual Intelligence Tests in Guidance. (2) II.
Prerequisite: course 100A, or former course 110, 111, 114 or their equivalent.
The history and techniques of individual intelligence testing. The theory of individual intelligence testing is emphasized, some supervised practice in administering, scoring and interpreting both the Stanford-Binet and the Wechsler-Bellevue scales is a regular requirement.

214A. Advanced Statistics with Application to Methods of Educational Investigation. (2) I. Mr. Stellwagen
Prerequisite: a course in elementary statistics and consent of instructor.

214B. Factor Analysis. (2) II. Mr. Stellwagen
Prerequisite: course 114 and 214A.

* Not to be given, 1961–1962.
215. Advanced Educational Psychology.
Prerequisite: consent of instructor.
A systematic and critical appraisal of the scientific literature of the field. Primarily for doctoral candidates in educational psychology.

215A. Principles and Theories of Psychological Measurement. (4) II. Mr. Carter
The development and application of methods of measuring human behavior, including intelligence, interests, attitudes, adjustments, etc.

215B. Learning Theory. (4) I. Mr. Jensen

*215C. Human Development: Individual Differences. (4) I. Mr. Tyler

215D. Human Development: Personal and Social. (4) II. Mr. Roden

217A. Experimental Education. (2) I. Mr. Holmes
Laboratory experiments applied to the various school subjects. Voice recording, photgraphing eye movements in reading and spelling, analysis of rhythm in reading, arithmetic, and writing, and studies of the motor responses accompanying appreciation.

217B. Experimental Education. (2) II. Mr. Holmes
Prerequisite: course 217A.
Students expected to complete an advanced laboratory project.

Research in the curriculum; students will have an opportunity to specialize in a selected area.

218A. Psychological Bases. (2) I. Mr. Russell
(Formerly numbered 118.)

218B-218C. Language Arts. (2-2) Yr. Mr. Russell
(Formerly numbered 218A-218B.)
218B: II; 218C: I.

218D. Arithmetic. (2) I and II. Mr. Brownell
(Formerly numbered 219.)

226. Curriculum Development. (2) I. Mr. Parker
Principles and operational techniques of public school curriculum construction.

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 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) II. 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.

233A-233B. Supervision of Elementary Education Practicum. (2-2) Yr. Mr. Arnsdorf
Prerequisite: consent of instructor.

235. The Elementary School Curriculum. (2) II. Mr. Arnsdorf
Prerequisite: consent of instructor.

236A-236B. Evaluation of Elementary Education. (2-2) Yr. Mr. Arnsdorf
Theories and principles of evaluation applied to various aspects of elementary education.

* Not to be given, 1961-1962.
237. Trends in Elementary Education. (2) I and II. Mr. Michaelis
   Current practices, issues, and problems descriptive of the emerging elementary school.

241A–241B. Introduction to Educational Administration. (4–4) Yr.
   Mr. Morphet, Mr. Reller, Mr. Swanson
   Prerequisite: consent of 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 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.

242D. Finance and Business Administration. (2–4) I.
   Mr. Morphet

242E. School-Community Relations and Schoolhousing. (2–4) II.
   Mr. Reller

243. Administration of the Individual School. (2) I. Mr. Edwards
   (243: Sec. 1 formerly numbered 231.)
   Sec. 1: The Elementary School; Sec. 2: The Secondary School. Mr. Edwards.
   Principles and practices in the organization and administration of the elementary and secondary school. Students preparing for the elementary and secondary school principalship respectively will consider together matters of importance to both.

261. Student Personnel and Counseling Psychology. Mr. Stewart
   Prerequisite: course 213 or 100A, or former course 110, 111 and 114. Primarily for students working for graduate degrees in this field or for the general pupil personnel services credential.
   Courses designed to organize and integrate the field at an advanced level.

261A. Principles and Theories of Guidance. (2) I. Mr. Stewart
   Development and scope of guidance work as a profession; critical analysis of basic philosophies, ethics, and professional responsibilities.

261B. Environmental Factors in Counselor Adjustment. (2) I.
   Theories of environmental interaction in personal adjustment and the counseling process. Labor market dynamics, occupational surveys and studies, investigation of training opportunities. Sources and interpretation of data.

261C. Group Guidance. (2) II.
   A critical analysis of the literature on group dynamics and social psychology applicable to group procedures in counseling and personnel work. Theory, function, and operation of group guidance activities in an educational setting.

261D. Individual Appraisal in Counseling. (2) II. Mr. Stewart
   Prerequisite: course 114, 119, and consent of 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.
   Prerequisite: course 261 and consent of instructor.
   Counseling theory, schools of counseling, intensive investigation of counseling techniques, diagnostic procedures and treatment, evaluation of counseling.
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272A. Secondary School Curriculum: Basic Principles. (2) I. Mr. Edwards
Prerequisite: course 100A, 100B or former course 110, 111, 170, or their equivalent, graduate standing, and consent of instructor.
For advanced students. A study of the basic principles of curriculum development, with special reference to the secondary school.

272B. Secondary School Curriculum: Techniques of Curriculum Making. (2) II. Mr. Edwards
Prerequisite: course 272A, graduate standing, and consent of instructor.

273. Supervision in Secondary Schools. (2) II. Mr. Edwards
Prerequisite: course 100B or former course 130 or 170, teaching experience, and consent of instructor.
The organization, function, and techniques of secondary school supervision.

275. Secondary Education: Survey. (2) I. Mr. Lund
Survey and critical review of secondary education and related literature. Admission on consultation with the instructor.

279. The Junior College. (2-4) I and II. Mr. Medsker, Mr. Roden
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.
Credentialed 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
(Formerly numbered 281.)
281A: II.
Prerequisite: course 181 or experience in adult education.
Social forces which create and mold various designs of adult education.

285. Higher Education in the United States. (3) I. Mr. McConnell
Prerequisite: consent of instructor.
Trends and problems, with emphasis on functions and educational programs; admission and counseling of students; instructional problems; and administration, control, and financing.

288. Seminar in Higher Education. Mr. McConnell, Mr. Stone
Prerequisite: course 285 or consent of 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.
Historical and scientific methods; design of investigations; bibliographical techniques, survey methods, and laboratory techniques; methods of reporting results.

293. Surveys and Field Studies. (2) I and II. Mr. Ross, Mr. Swanson
The theory, techniques, procedures, and results of surveys and field studies.

294. Seminar. (2-4) I and II.
Prerequisite: consent of instructor.
Required of all master’s and doctor’s candidates in connection with seminar papers and dissertations.

A. Adult Education. I.
B. Educational Administration. I and II.
C. Educational Curriculum. I and II.

* Not to be given, 1961-1962.
D. Educational Psychology. I and II.
E. Educational Sociology. II.
F. Elementary Education. I and II.
G. Higher Education. I and II.
H. History of Education. I and II.
I. Philosophy of Education. I and II.
J. Secondary Education. I and II.
K. Student Personnel and Counseling Psychology. I and II.

Mr. Carter
Mr. Trow
Mr. Michaelis, Mr. Russell
Mr. Stone
Mr. Lund
Mr. Stewart

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 candidates 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.

313. School Psychologist Internship. (4) II.
Prerequisite: course 213 and consent of 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.
Prerequisite: consent of 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.
Prerequisite: course 241A–241B and 293, and consent of instructor.

Supervised Teaching

I and II.
Mr. Stone, Mr. Schevill, and Supervisory Staff
The University will accept only those candidates who meet the requirements set up by the State Board of Education.

Education 320A, 320C, 320E and 323 are scheduled as extra-session courses, to begin with the opening of the University and to end with the closing of the semester in the public schools. In order to enroll in supervised teaching, students must have been admitted to the Graduate Division and must satisfy the requirements for admission to supervised teaching as listed in the Announcement of the School of Education.

320A. Secondary Supervised Teaching. (3) I and II.
Mr. Stone, Mr. Schevill, and Supervisory Staff
Lectures, conferences, and supervised teaching. Prerequisite: course 100A, 100B, or equivalent, 320B. Course 320E (major field) must be taken concurrently with course 320A. In order to enroll in course 320A, students should meet the grade-point requirements listed above (page 298) and must have been admitted to the Graduate Division. Enrollment is limited to available facilities.

320B. Introduction to Teaching in Secondary Schools. (2) I and II.
Mr. Applegate, Mr. Brown
Prerequisite: course 100A. Ordinarily course 320B should be taken concurrently with course 100B.

* Not to be given, 1961–1962.
Introduction to the curriculum of the secondary school. It will include directed experience as teacher assistants and laboratory work on utilization of instructional resources, including audio-visual materials. 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, 100B, or equivalents, 320A, 320B. It is strongly recommended that course 320E be taken concurrently.

320E. Methods of Teaching. (2) I and II. Mr. Stone, Mr. Schevill, and Supervisory Staff
Lectures, conferences, and laboratory.
All students enrolled in 320A or 324 must carry concurrently one of the following sections:
Sec. 2. Life Science and Physical Science.
Sec. 3. Mathematics.
Sec. 4. English.
Sec. 5. Foreign Languages.
Sec. 7. Social Studies.
Sec. 8. Physical Education for Men.
Sec. 9. Physical Education for Women.
Sec. 10. Art.
Sec. 11. Homemaking.
Sec. 12. Music.
Sec. 13. Business Education.
Sec. 16. Junior College.
*Sec. 17. Special Education.
Admission on approval by the instructor. Hours to be arranged.

School Library Administration (Librarianship 206). (2) II. Mrs. Durham
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 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 with the opening of the University and ending with the semester in the public schools. (See page 277.)

324. Junior College Supervised Teaching. (4) I and II. Mr. Schevill, Mr. Berg
Prerequisite: course 279. Course 320E, Sec. 16, must be taken concurrently.
Conferences, observation, and supervised teaching.
Note that this is an extra-session course, beginning and ending with the semester in the public schools (see page 277.) Enrollment is limited to available facilities.

330. Elementary Supervised Teaching, Professional Methods. I and II. Mr. Dumas, and Supervisory Staff
The University will accept only those candidates who meet the requirements set up by the State Board of Education.
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.
Education 330C is scheduled as an extra-session course, to begin and end with the semester in the public schools (see page 277).

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. Enrollment is limited to available facilities.
*Not to be given, 1961-1962.
330C. Elementary Supervised Teaching. (8) I and II.
Mr. Dumas, and Supervisory Staff
Prerequisite: course 100A, 100B, or equivalent, 130A, 130B, 130C, 130D, 330A; Decorative Art 6A; Music 10; History 189A or 189B; Physical Education 12; Sections on Elementary School Activities. Enrollment is limited to available facilities.
Conferences, observation, and supervised teaching.
Note that this is an extra-session course, beginning and ending with the semester in the public schools (see page 277).

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 326E, 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.

*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 speech correction classes in the public schools in California.

*379. Educational Treatment of Cerebral Palsied Children. (2) II.
Admission only on consultation with the instructor.

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.

* Not to be given, 1961–1962.

EDUCATION / 279
Education Field Service Center

The Field Service Center is an administrative unit of the Department of Education. The Center’s principal purpose is to make available to schools and other educational organizations of California resources to assist them in solving problems by working with laymen and professional people in cooperative efforts to find practical solutions. The Center is under the administration of a director and an associate director who are also members of the faculty of the School of Education. Policies and plans are formulated by a departmental Field Service Committee which is assisted by an advisory group representing the State Department of Public Instruction, large and small school districts, county schools, and other departments of the University.

ENGINEERING

(Office, 315 Engineering Building)

Morrough P. O’Brien, B.S., D.Sc.(hon.), Professor of Engineering, Emeritus.

Don O. Horning, M.E., Lecturer in Engineering.

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, 113 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.

Warren J. Kaufman, Sc.D., Professor of Sanitary Engineering.

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.(hon.), Professor of Sanitary Engineering, Emeritus.

Erman A. Pearson, Sc.D., Professor of Sanitary Engineering.

Gerald T. Orlob, Ph.D., Associate Professor of Civil Engineering.
William J. Oswald, Ph.D., Associate Professor of Sanitary Engineering.
Jerome F. Thomas, Ph.D., Associate Professor of Sanitary Engineering.
David K. Todd, Ph.D., Associate Professor of Civil Engineering.
Robert L. Wiegel, M.S., Associate Professor of Civil Engineering.
James A. Harder, Ph.D., Assistant Professor of Civil Engineering.
Peter C. Klingeman, M.S., Associate in Hydraulic Engineering.
Marvin E. Stephenson, M.S., Associate in Sanitary Engineering.

Frank M. Stead, M.S., Lecturer in Civil 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.*
Ray W. Clough, Jr., Sc.D., Professor of Civil Engineering (Vice-Chairman of the Division).
Howard D. Eberhart, M.S., Professor of Civil Engineering (Chairman of the Department of Civil Engineering).
Joe W. Kelly, B.S., Professor of Civil Engineering.
Tung-Yen Lin, M.S., Professor of Civil Engineering (Chairman of the Division) and Director of the Structural Engineering Laboratory.
Egor P. Popov, Ph.D., Professor of Civil Engineering.
Jerome M. Raphael, S.M., Professor of Civil Engineering.
George E. Troxell, B.S., Professor of Civil Engineering.
Raymond E. Davis, C.E., M.S., D.Eng.(hon.), Professor of Civil Engineering, Emeritus, and Director of Engineering Materials Laboratory, Emeritus.
Bruce Jameyson, B.S., Professor of Civil Engineering, Emeritus.
Vitelmo Bertero, Sc.D., Associate Professor of Civil Engineering.
Hugh D. McNiven, Ph.D., Associate Professor of Civil Engineering.
Joseph Penzioni, 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.
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.
Jerome L. Sackman, Eng.Sc.D., Assistant Professor of Civil Engineering.
Richard A. Parmelee, M.S., Associate in Civil Engineering.
Maynard O. Serbousek, M.S., Associate in Civil Engineering.

Alexander Klein, M.S., Lecturer in Civil Engineering.

Transportation Engineering

(Division Office, 107 Engineering Materials Laboratory)

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.(hon.), Professor of Transportation Engineering.
Harry Bolton Seed, Ph.D., Professor of Civil Engineering.
Francis S. Foote, E.M., Professor of Railroad Engineering, Emeritus.
Francis H. Moffitt, M.C.E., Associate Professor of Civil Engineering.
Carl L. Monismith, M.S., Associate Professor of Civil Engineering.
James K. Mitchell, Sc.D., Assistant Professor of Civil Engineering.
Robert L. Alexander, M.S., Associate in Transportation Engineering.
Wolfgang S. Homburger, M.S., Associate in Transportation Engineering.
James H. Kell, M.S.C.E., Associate in Transportation Engineering.

ELECTRICAL ENGINEERING

(Department Office, 231 Cory Hall)

*Diogenes J. Angelakos, Ph.D., Professor of Electrical Engineering.
Leonard J. Black, Ph.D., Professor of Electrical Engineering.
Charles F. Dalziel, E.E., Professor of Electrical Engineering.
Arthur M. Hopkin, Ph.D., 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.
Victor H. Rumsey, B.A., Professor of Electrical Engineering.
Robert M. Saunders, M.S., Professor of Electrical Engineering (Chairman of the Department).
Herbert J. Scott, E.E., Professor of Electrical Engineering.

Samuel Silver, Ph.D., Professor of Engineering Science and Director, Space Sciences Laboratory.
Otto J. M. Smith, Ph.D., Professor of Electrical Engineering.
John R. Whinnery, Ph.D., Professor of Electrical Engineering.
Lotfi A. Zadeh, Ph.D., Professor of Electrical Engineering.
Lester E. Reukema, Ph.D., Professor of Electrical Engineering, Emeritus.
Charles K. Birdsall, 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.
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 and Director, Electronics Research Laboratory.
Jerome R. Singer, Ph.D., Associate Professor of Electrical Engineering.
David H. Sloan, Ph.D., Associate Professor of Electrical Engineering.
*Charles Süskind, Ph.D., Associate Professor of Electrical Engineering.
Aram J. Thomasian, Ph.D., Associate Professor of Electrical Engineering and Statistics.
Shyh Wang, Ph.D., Associate Professor of Electrical Engineering.
John R. Woodyard, Ph.D., Associate Professor of Electrical Engineering.
Robert M. Bevensee, Ph.D., Acting Assistant Professor of Electrical Engineering.
Thomas E. Everhart, Ph.D., Assistant Professor of Electrical Engineering.
Arthur Gill, Ph.D., Assistant Professor of Electrical Engineering.
Morimi Iwama, Ph.D., Assistant Professor of Electrical Engineering.
Allan J. Lichtenberg, M.S., Acting Assistant Professor of Electrical Engineering.
Alvin W. Trivelpiece, Ph.D., Assistant Professor of Electrical Engineering.
Willard H. Wattenburg, Ph.D., Assistant Professor of Electrical Engineering.
William J. Welch, Ph.D., Assistant Professor of Electrical Engineering.
Michael Athanassiadess, M.S., Associate in Electrical Engineering.
William H. Evans, M.S., Associate in Electrical Engineering.
Syed A. Nasar, M.S., Associate in Electrical Engineering.
David E. Norton, B.S., Associate in Electrical Engineering.
M. Anantha Pai, M.S., Associate in Electrical Engineering.
Elijah Polak, M.S., Associate in Electrical Engineering.

George L. Turin, Sc.D., Lecturer in Electrical Engineering.
Antonius A. Van Trier, D.Tech.Sc., Visiting Professor of Electrical Engineering for the fall semester.

INDUSTRIAL ENGINEERING
(Department Office, 201 Building T-4)
George B. Dantzig, Ph.D., Professor of Engineering Science.
Louis E. Davis, M.S., Professor of Industrial Engineering.
E. Paul DeGarmo, M.S., Professor of Industrial Engineering.
Raymond C. Grassi, M.S., Professor of Industrial Engineering.
Thomas H. Hazlett, M.S., Professor of Industrial Engineering.
Ronald W. Shephard, Ph.D., Professor of Engineering Science (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.
Edward C. Keachie, Ph.D., Associate Professor of Industrial Engineering.
James T. Lapsley, Jr., M.S., Associate Professor of Industrial Engineering.

MECHANICAL ENGINEERING
(Department Office, 320 Engineering Building)
Aeronautical Sciences
(Division Office, 203 Mechanics Building)
Warren H. Giedt, Ph.D., Professor of Aeronautical Sciences.
Edmund V. Laitone, M.A., Professor of Aeronautical Sciences.
George J. Maslach, B.S., Professor of Aeronautical Engineering (Chairman of the Division).
Antoni K. Oppenheim, Ph.D., Professor of Aeronautical Sciences.
Samuel A. Schaaf, Ph.D., Professor of Engineering Science (Chairman of the Department of Mechanical Engineering).
Ernest S. Starkman, M.S., Professor of Mechanical Engineering.
Gilles M. Corcos, Ph.D., Associate Professor of Aeronautical Sciences.
Frederick S. Sherman, Ph.D., Associate Professor of Aeronautical Sciences.
Lawrence Talbot, Ph.D., Associate Professor of Aeronautical Sciences.

Franklin C. Hurlbut, Ph.D., Lecturer in Aeronautical Sciences.

Heat-Power Systems
(Division Office, 215 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. Iverson, 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.
Herman Thal-Larsen, M.S., 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.
Chang-Lin Tien, Ph.D., Assistant Professor of Mechanical Engineering.

Mechanics and Design

(Division Office, 124 Building T-7)

Clyne F. Garland, M.S., Professor of Mechanical Engineering.
Werner Goldsmith, Ph.D., Professor of Engineering Mechanics.
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.
*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 Acoustical Sciences.
Cyril P. Atkinson, M.S., M.E., Associate Professor of Engineering Mechanics.
G. Wayne Brown, M.S., Associate Professor of Mechanical Engineering.
Don M. Cunningham, M.S., Associate Professor of Mechanics and Design.
Iain Finnie, Ph.D., Associate Professor of Mechanical Engineering.
Joseph Frisch, M.S., Associate Professor of Mechanical Engineering.
Frank E. Hauser, Ph.D., Associate Professor of Mechanical Engineering.
Chieh S. Hsu, Ph.D., Associate Professor of Engineering Mechanics.
George Leitmann, Ph.D., Associate Professor of Engineering Science.
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.
Peter T. Lyman, M.S., Associate in Mechanical Engineering.
George P. Wilson, M.S., Associate in Mechanical Engineering.


* In residence spring semester only, 1961-1962.
MINERAL TECHNOLOGY

(Department Office, 210 Hearst Memorial Mining Building)

John E. Dorn, Ph.D., Professor of Materials Science.
Irving Fatt, Ph.D., Professor of Petroleum Engineering.
Herbert E. Hawkes, Ph.D., Professor of Mineral Exploration.
Ralph R. Hultgren, Ph.D., Professor of Metallurgy (Chairman of the Department).

Earl R. Parker, Met.E., Professor of Metallurgy and Director, Institute of Engineering Research.
Joseph A. Pask, Ph.D., Professor of Ceramic Engineering.
John A. Putnam, Ph.D., Professor of Petroleum Engineering.
S. Frederick Ravitz, Ph.D., Professor of Metallurgy.
Alan W. Searcy, Ph.D., Professor of Materials Science.
Lysle E. Saffier, E.M., Professor of Mining.
Parker D. Trask, Ph.D., Professor of Geological Engineering.
Jack Washburn, Ph.D., Professor of Metallurgy.
Edward H. Wisser, B.S., Professor of Mineral Exploration.
Paul A. Witherspoon, Ph.D., Professor of Petroleum Engineering (Vice-Chairman of the Department).

Ander J. Carlson, Ph.D., Professor of Petroleum Engineering, Emeritus.
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.
Richard M. Fulrath, Ph.D., Assistant Professor of Ceramic Engineering.

Granville S. Borden, LL.B., Lecturer in Mineral Technology.
Philip R. Bradley, B.S., Lecturer in Mining.
Ian Campbell, Ph.D., Lecturer in Mineral Exploration.
George M. Gordon, Jr., M.S., Lecturer in Materials Science.
Lawrence Himmel, Ph.D., Lecturer in Mining.
Kenneth K. Kelley, Ph.D., Lecturer in Metallurgy.
Robert B. Langston, M.S., Lecturer in Materials Science.
John F. McGarry, M.S., Lecturer in Process Engineering.
Gareth Thomas, Ph.D., Lecturer in Metallurgy.

NAVAL ARCHITECTURE

(Department Office, 224 T-3)

Henry A. Schade, Dr.Ing., Professor of Naval Architecture (Chairman of the Department).

‡ In residence spring semester only, 1961–1962.
John V. Wehausen, Ph.D., Professor of Engineering Science.
J. Randolph Pauling, Jr., D.Eng., Nav.Arch., Assistant Professor of Naval Architecture.

Osvald J. Sibil, M.S., Lecturer in Naval Architecture.
Ryo Tasaki, B.S., Lecturer in Naval Architecture.

NUCLEAR ENGINEERING
(Department Office, 219 T-4)

Thomas H. Pigford, D.Sc., Professor of Nuclear Engineering (Chairman of the Department).

Paul L. Chambre, Ph.D., Associate Professor of Engineering Science and of Mathematics.
Virgil E. Schrock, M.S., M.E., Associate Professor of Nuclear Engineering.
Donald R. Olander, Sc.D., Assistant Professor of Nuclear Engineering.
Harold P. Smith, Jr., Ph.D., Assistant Professor of Nuclear Engineering.

Richard M. Fulrath, Ph.D., Assistant Professor of Ceramic Engineering.
Albert J. Kirschbaum, Ph.D., Lecturer in Nuclear Engineering.
Hans Mark, Ph.D., 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 departments of the College of Engineering.
Lower division courses in the College 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.

Prerequisite: Mathematics 3A and 3B. Mathematics 3B may be taken concurrently.
Theory and practice of engineering measurements; laboratory exercises using engineering systems; analysis of errors; adjustment and evaluation of measurements; applications to surveying; measurements in various fields of engineering.

2 In residence spring semester only, 1961–1962.
11. Engineering Surveys. (3) I and II.  
Mr. Moffitt (in charge), Mr. Monismith

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. Introduction to Structural Analysis. (3–3) Yr. Beginning each semester.

Two lectures and three laboratory hours per week.
Prerequisite 18A: Mathematics 3B, Physics 2A and 3A or 4A; Engineering 21 may be taken concurrently. For students in architecture. 18B: Engineering 21.
18A. Qualitative study of loads on architectural structures and their resulting behavior. A study of Newton’s Equations and their use in obtaining reactions and stress resultants in beams, columns, and trusses subjected to loads.
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)

Prerequisites: 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.

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.

35. Statics. (3) I and II.  
The Staff (Mr. Steidel in charge)

Prerequisite: course 25; Physics 4A; Mathematics 4A and 4B (Mathematics 4B may be taken concurrently) or Mathematics 14A and 14B (Mathematics 14B may be taken concurrently).
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.  
The Staff (Mr. Ravitz in charge)

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. Applications of basic principles to the selection and use of engineering materials.
Upper Division Courses†

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.

103. Elementary Fluid Mechanics. (3) I and II.
   The Staff (Mr. J. W. Johnson in charge)
   Prerequisite: Mechanical Engineering 102, which may be taken concurrently.
   Principles of mechanics applied to the statics and dynamics 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 understanding of professional responsibilities of the engineer; practice in the elements of effective speaking and in 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. Grassi, Mr. Hazlett, Mr. Keachie, Mr. Lapsley
   Prerequisite: Mechanical Engineering 105A, or Physics 112, or Chemistry 110B; Electrical Engineering 100A, 101A and 101B 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, or 109A (may be taken concurrently), and either 101A or 101B.
   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.

142. Lighting Design. (2) II.
   Mr. Finch
   Prerequisite: course 140 (may be taken concurrently).

† 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.
Graduate Courses‡

230. Engineering Analysis. (3) I and II. Mr. Schaaf (in charge), Mr. Laitone, Mr. McNiven
Prerequisite: graduate standing in engineering or Mathematics 14B.
Methods of theoretical analysis of typical engineering systems.

241. Radiation Sources: Ultraviolet, Visible, Infrared. (3) I. Mr. Finch
Two lectures and one three-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 photoelectric 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. Mr. O'Brien
Advanced study in the general area of the history of technology. Specific topics are determined by the interests of qualified graduate students in engineering.

Courses characteristic of the various curricula offered by the College of Engineering are described under the several departments of the college, as follows:

CIVIL ENGINEERING

Upper Division Courses†

101. Elementary Photogrammetry. (3) I. Mr. Moffitt
Prerequisite: Engineering 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. Monismith
Prerequisite: Engineering 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 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.

‡ See dagger (†) footnote, page 289.
† 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.
110. Engineering Materials Laboratory. (2) I and II.

The Staff (Mr. Pirtz in charge)

Prerequisite: course 130 (may be taken concurrently); Engineering 45.

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) II. The Staff (Mr. Pirtz in charge)

Prerequisite: course 130 (may be taken concurrently); Engineering 45. For students in agricultural, mechanical, mining, geological, and petroleum engineering. Not open for credit to students who take Civil Engineering 112.

Principles and methods of testing engineering materials. Physical tests of concrete, steel, and wood.

112. Materials Testing Laboratory. (1) I. The Staff (Mr. Kelly in charge)

Prerequisite: Engineering 18B. For students in architecture. Not open for credit to students who take Civil Engineering 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.

Prerequisite: course 121 (may be taken concurrently).

Mr. Seed

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).

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.

124. Strength of Structural Materials and Systems. (3) I and II.

Mr. Scordelis

Prerequisite: Engineering 18B. For students in architecture.

Elastic and ultimate resistance of structural materials. Stress and deformation analysis for members subjected to axial force, shear, moment, or torque. Buckling of compression members. Behavior under load of cables, arches, shells, and folded plates.

126. Reinforced Concrete Design. (3) I and II.

Mr. Baron, Mr. Scordelis

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. Scordelis, Mr. Bertero

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. The Staff (Mr. Pister in charge)
Prerequisite: Engineering 35.
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.
The Staff (Mr. Pister in charge)
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. Bertero
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. Mr. Scordelis, Mr. Raphael
Prerequisite: course 130.
The analysis and design of reinforced concrete structures.

136. Analysis and Design of Bridges. (3) I and II. Mr. Scheffey
Prerequisite: course 130, 133, 135.
Analysis and design of girder, truss, rigid frame, and continuous bridges, with special emphasis on highway bridges. Economics and layout of bridges, optimum proportions, influence lines and moment envelopes for indeterminate structural systems.

137. Analysis and Design of Buildings. (3) I and II. Mr. Baron
Prerequisite: course 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. Penzien
Prerequisite: course 131 or Mechanical Engineering 112.
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. Mr. Pearson, Mr. Kaufman, Mr. Orlob
Prerequisite: Engineering 103.
Analysis and functional design of municipal and industrial water supply and treatment facilities.

141. Sewerage Engineering. (3) I and II. Mr. Orlob, Mr. Kaufman, Mr. Oswald, Mr. Pearson
Prerequisite: Engineering 103.
Hydraulic and sanitary analysis and design of municipal and industrial waste handling and treatment systems.

142. Sanitary Engineering Design. (2) II. Mr. Orlob
Prerequisite: course 140 and 141.
Functional engineering design of systems for water purification, waste disposal, and water reclamation.
144. Principles of Sanitary Engineering. (3) II.  
Mr. Oswald  
Prerequisite: upper division standing in public health, science, or engineering. Not open to civil engineering majors.  
Water supply, sewerage, solid waste disposal and waste reclamation.

145. Chemistry of Water Purification and Sewage Treatment. (2) I.  
Mr. Thomas  
Prerequisite: Chemistry 1A–1B.  
Application of physical and analytical chemistry to problems of water purification and waste treatment.

146. Sanitary Chemistry Laboratory. (3) I and II.  
Mr. Thomas  
Prerequisite: Chemistry 1A–1B.  
Chemical analysis of water and sewage; laboratory control of water purification and waste treatment processes.

147. Sanitary Engineering Chemistry. (3) II.  
Mr. Thomas  
Prerequisite: Chemistry 1A–1B.  
Application of organic chemistry to problems of water purification, atmospheric pollution and waste disposal.

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 instructor.  
Relation of municipal engineering organization, planning, financing, and design to comprehensive, long-range planning of urban communities.

159. Water Institutions and Economics. (2) II. Mr. Todd, Mr. Orlob  
Prerequisite: senior standing.  
Economic, legal, political, institutional, and policy aspects of water resources development and conservation.

160. Hydrology. (2) I.  
Mr. Todd, Mr. Orlob  
Prerequisite: course 140 (may be taken concurrently), Engineering 103.  
Nature of the water cycle with special emphasis on meteorological, surface water, and ground water phenomena.

161. Hydraulic Laboratory. (2) I and II. The Staff (Mr. Einstein in charge)  
Prerequisite: Engineering 103.  
Introductory laboratory experiments on the principles of hydraulic phenomena involved in measurement, conveyance, control and utilization of water.

166. Advanced Hydraulics. (3) I.  
Mr. Einstein  
Prerequisite: Engineering 103.  
Phenomena of flow in open channels and porous media; hydraulic models and analogies.

167. Hydraulic Engineering Design. (3) II.  
Mr. Orlob  
Prerequisite: course 161, 140; Engineering 103.  
Principles of engineering and economic design of hydraulic structures for impounding, conveying, and controlling water.

168. Design of Open Channel Flow Systems. (2) II.  
Mr. Harder, Mr. Amoroch  
Prerequisite: course 166; course 167 which may be taken concurrently.  
Hydraulic and systems design and analysis applied to open channel systems. Occasional field inspection trips.

170. Highway Engineering. (3) I and II.  
Mr. Moyer, Mr. Stubbs  
Prerequisite: Engineering 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
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. Mr. Keim
Prerequisite: senior standing in engineering.
A study of the construction industry: its development, components, economic importance; fundamental principles that underlie construction practices, 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.
The Staff (Mr. Horonjeff in charge)
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.
Prerequisite: senior standing in engineering. The Staff (Mr. Eberhart in charge)
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‡

Note: The graduate programs of study which are administered through the Department of Civil Engineering comprise major programs under the superintendence of the three operational divisions of the department (Hydraulic-Sanitary, Structural Engineering and Structural Mechanics, and Transportation), together with programs in certain areas of specialization which are administered by the department such as Soil Mechanics and

1 See double dagger (‡) footnote, page 290.
Photogrammetry. Courses relating to the latter programs are listed under Civil Engineering—General.

Courses in Hydraulic and Sanitary Engineering and Water Resources Engineering

203. Ground Water Hydrology. (3) I. Mr. Todd
Prerequisite: course 160.
Hydrologic, engineering, legal, and management considerations in the conservation and utilization of subsurface water.

204. Surface Water Hydrology. (3) II. Mr. Todd
Prerequisite: course 160.
Hydrometeorological analysis, flood estimating, routing, and control; runoff analysis.

205. River-Harbor Hydraulics. (3) I. Mr. Einstein, Mr. J. W. Johnson
Prerequisite: Engineering 103; Civil Engineering 166 desirable (may be taken concurrently).
Fundamental principles of tidal and nonsteady channel flow, wave systems and forces, and their significance in hydraulic design.

206. Sediment Transport. (3) II. Mr. Einstein
Lectures and laboratory. Prerequisite: course 166.
Nature and behavior of sediments, and the design and management of rivers and reservoirs with respect to sediment load.

207. Advanced Hydraulic Design. (2) I. Mr. Amoroch, Mr. Harder, Mr. Orlob
Prerequisite: course 167 or 168.
Design of diversion works, distribution systems, special hydraulic structures.

208. Advanced Hydraulic-Structures Laboratory. (2) II. Mr. J. W. Johnson
Prerequisite: course 166 or 167 recommended.
Mathematical and empirical investigation of river, harbor, flood, beach, and wave control through hydraulic and experimental models.

211A-211B. Water and Sewage Treatment: Theory and Design. (3-3) Yr.
Mr. McGauhey (in charge), Mr. Kaufman, Mr. Orlob, Mr. Pearson
Prerequisite: course 140, 141, and 146, which may be taken concurrently. Theory and design of unit operations and processes for water and waste treatment.

213. Advanced Sanitary Chemistry. (2) II. Mr. Thomas
Prerequisite: course 146.
Theory of advanced chemical techniques such as spectrophotometry, polarography, and chromatography, and their application to water, waste and air pollution problems.

215. Advanced Sanitary Engineering Laboratory. (2) II. Mr. Pearson
Lectures and laboratory. Prerequisite: course 145 or 211A.
Unit operations and processes for municipal and industrial water and waste treatment.

216. Industrial Wastes. (2) II. Mr. Pearson
Prerequisite: course 211A or consent of instructor.
Principles and methods of treatment and disposal of industrial wastes that may adversely affect water or air resources.

218. Atmospheric Pollution. (3) I. Mr. Tebbens
Prerequisite: course 146.
Nature of air pollutants and methods of monitoring and controlling air pollution.

290L. Water Resources Development. (3) II. The Staff (Mr. Todd in charge)

290M. Coastal Engineering. (3) II. Mr. J. W. Johnson, Mr. Wiegel
Courses in Structural Engineering and Structural Mechanics

220. Statically Indeterminate Structures. (3) I. Mr. Scordelis
Prerequisite: graduate standing.
Discussion of the classical theorems of structural theory including the theorems of Clapeyron, Betti, Castigliano, Maxwell, Mohr, Muller-Breslau, and the principle of virtual work. Analysis of statically indeterminate structures by superposition, elastic center, column analogy, conjugate structure, least work, slope deflection and moment distribution.

221. Experimental Structural and Stress Analysis. (3) I. Mr. Clough, Mr. Bertero
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
Course 230A is 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
Prerequisite: course 137, and Mechanical Engineering 102.
Analysis of stresses and deflections in structures due to the application of dynamic loads. Approximate and “exact” methods for determining the response of buildings, bridges, frames to earthquake accelerations, wind gusts, moving loads, and bomb blasts.

232. Theory of Plates. (3) II. Mr. Pister and Mr. McNiven
Prerequisite: course 230F or Mechanical Engineering 185, or consent of the instructor.
Analysis of bending, buckling, and vibration of plates, slabs and membranes; linear and nonlinear behavior, refined theories; variational principles and approximate methods; method of singularities; applications to anisotropic and nonhomogeneous plates; thermal stress problems; high frequency vibration and wave-propagation in plates.

233. Theory of Thin Shells. (3) I. Mr. Popov
Prerequisite: course 230B, or consent of instructor.
General theory of thin shells; cylindrical shells, shells having the form of a surface of revolution, hyperbolic paraboloids and other shells of double curvature; approximate methods of analysis; anisotropic and nonhomogeneous shells; buckling and vibration; limit analysis.

234. Advanced Reinforced Concrete. (3) I. Mr. Lin, Mr. Bresler
Study of shrinkage and plastic flow, elastic and ultimate design of beams, columns, footings, and slabs, unsymmetrical bending, eccentric loads, deflections, torsion, prismatic and cylindrical shells, prestressed concrete simple and continuous beams, and circular tanks.

235. Analysis and Design of Masonry Dams. (3) I. Mr. Raphael
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 Analysis and Design of Bridges. (3) II. Mr. Scheffey
Prerequisite: course 136 or equivalent.
Selection and proportioning of movable and long span types; elastic and nonlinear theory of arches and suspension bridges; secondary stresses; analysis of grid and orthotropic plate deck systems; dynamics of bridges and aerodynamic stability of suspension bridges; use of prestressed concrete, alloy steels and light alloys in bridges; and other selected topics from current research.
237. Mechanics of Solids. (3) I.  
Prerequisite: course 230A or Mechanical Engineering 185, Engineering 230 or equivalent background in mathematics, or consent of the instructor.
Elements of tensor analysis and differential geometry; analysis of strain; strain and stress tensors; mechanical equations of state; invariant formulation of the equations of the mechanics of deformable solids; selected topics in elastic and visco-elastic media.

238. Applied Elasticity. (3) II.  
Prerequisite: course 237 or consent of the instructor.
Applications of the theory of elasticity in structural mechanics and related fields.

290A. Advanced Dynamics of Structures. (3) I.  
Mr. Penzien

290B. Advanced Concrete Technology. (2) II.  
Mr. Polivka

290C. Matrix Analysis of Structures. (2) II.  
Mr. Clough

290D. Advanced Prestressed Concrete. (2) II.  
Mr. Lin

290E. Design of Reinforced Concrete Slabs and Prismatic Structures.  
(2) II.
Mr. Scordelis

290F. Advanced Topics in Structural Theory. (3) II.  
Mr. Baron

Courses in Transportation Engineering

250. Analysis of Transportation Systems. (6) I.  
The Staff (Mr. Kennedy in charge)
Prerequisite: course 170, Engineering 130, Statistics 130E.
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
Location and design of various types and classes of highways. Emphasis on advanced theory and practice in design of alignment; highway cross sections, intersections, interchanges, multilane expressways and arterial highways in urban areas.

255. Traffic Engineering: Operations. (3) II.  
Mr. Kennedy
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
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
Prerequisite: graduate standing in engineering, except when special provision is made for students in certain programs of study.
Functions of government agencies in airport planning and financing of public airports; evaluation of community airport requirements; 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
Theories, principles, and practices in the design, construction, and maintenance of highway and airport pavement, including soil stabilization, design of rigid and flexible pavements, accelerated traffic and loading tests, and the design of asphaltic mixtures.
290P. Design, Construction and Performance of Asphalt Pavements. (2 or 3) II. Mr. Monismith

290Q. Advanced Topics in Soil Mechanics. (1) II. Mr. Seed

290R. Applied Soil Mechanics. (2) II. Mr. Seed

290S. Statistical Theories of Traffic Flow. (1-3) II. Mr. Oliver

General Courses

270. Advanced Soil Mechanics. (2) II. Mr. Seed

Prerequisite: course 121 and 122 or equivalent.

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.

270L. Advanced Soil Mechanics Laboratory. (1) II. Mr. Seed

Prerequisite: course 270, may be taken concurrently

Group discussions and individual experimental studies dealing with the more advanced aspects of soil properties and their applications in design. Consolidation, strength of soils in triaxial compression with measurement of pore-water pressures, vane shear tests, pile loading tests and pavement design procedures.

271. Seepage and Earth Dams. (2) II. Mr. Seed

Principles governing the flow of water through soils and their application in the design of earth dams.

273. Applications of Physico-Chemical Principles in Soil Engineering. (3) I. Mr. Mitchell

Prerequisite: course 121 and 122.

Colloidal phenomena in soils, clay mineralogy, determination of soil composition, the relationships between soil composition and behavior, soil formation, sediments, soil structure and its significance in determining soil properties and in engineering problems, the improvement of soil properties with additives.

290. Advanced Graduate Study in Civil Engineering.

Current and advanced topics in hydraulics, sanitary engineering, soil mechanics, structural engineering, structural mechanics, and transportation engineering presented by means of lectures and informal conferences. For individual course listings, see section on above divisions.

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; advanced structural theory; matrix and digital computer analysis of structures; design of thin sheet structures; beams on elastic foundation; topics in elasticity theory using complex variables; 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. Prior to each semester, topics which will form the basis of seminars are announced.

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.

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†**

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.

Circuit analysis; electrical instruments; electrical machinery discussed primarily from the physics of performance; electronic tubes and their associated circuits; associated laboratory experiments.

101A. Electrical Circuits and Applications. (3) I and II.

Mr. Studer (in charge), Mr. Dalziel

Prerequisite: Mathematics 4A–4B; Physics 4B.

Singlephas e and polyphase circuits and machines, electromechanical energy conversion. Vacuum-tube and semiconductor characteristics; amplifiers and control circuits. Designed for students in civil and mining engineering. Students may not receive credit for both 101A and 101B.

101B. Electrical Circuits and Applications. (3) I and II.

Mr. Studer (in charge), Mr. Sloan

Prerequisite: Mathematics 4A–4B; Physics 4B.

Circuit analysis; vacuum-tube and semiconductor circuits and instruments. Electronic measuring devices, transducers, digital displays, telemetering. Designed for students in chemical engineering and in mineral technology except mining engineering. Students may not receive credit for both 101A and 101B.

102. Electrical Engineering Laboratory. (1) I and II.

One three-hour period per week.

Prerequisite: course 101A or 101B (should be taken concurrently if possible).

Experiments illustrating electrical theory and practice. Designed to accompany, and supplement course 101A or 101B.

103A–103B. Nuclear Accelerators. (2–2) Yr.

Mr. Woodyard

Prerequisite: course 100B or 106 or 109B or Physics 110B or 121 (may be taken concurrently).

Theory, design, and applications of modern electromechanical machines such as d-c accelerators, betatrons, r-f linear accelerators, cyclotrons, synchrotrons, and strong-focusing machines; recent developments; ion sources and vacuum systems, lectures and demonstrations supplemented by visits to nearby nuclear laboratories.

† See dagger (†) footnote, page 289.
106. Basic Electronics. (4) II.  
Mr. Woodyard
Prerequisite: course 100A or 101A or 101B, 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; equivalent circuits; rectifiers and amplifiers; nonlinear circuits and distortion.

The Staff
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 experimental studies of circuits carrying direct, alternating, and transient currents. Magnetic circuits and materials, with applications to inductors and transformers. Electronic and electromagnetic devices.

111A–111B. Electrical Machinery. (3–3) Yr.  
111A: I and II.  
111B: II.  
Mr. Robertson, Mr. Bergen, Mr. Iwama
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 dynamic and steady-state characteristics of rotating 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
Prerequisite: course 109A–109B.
Distributed-constant transmission lines with emphasis on energy transmission; transient and steady-state behavior of energy transmission and generation systems, including steady-state and transient stability, system protection, and reactive power requirements.

Mr. Van Trier, Mr. Everhart, Mr. Scott, Mr. Trivelpiece
Prerequisite: course 106 or 109B.
116A. 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: I and II.  
117B: II.  
Mr. Van Trier, Mr. Scott, Mr. Süsskind, Mr. Whinnery
Prerequisite: course 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. Jury, Mr. Bergen, Mr. Gill
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.

123. **Communication Circuits.** (3) I and II.  Mr. Pederson, Mr. Kuh
Prerequisite: course 119.
The properties of lumped element communication circuits and their network functions; development of synthesis methods and techniques for filters, filter amplifiers, equalizers, etc.; analysis of communication transmission lines.

124. **Principles of Communication Systems.** (3) I and II.  Mr. Desoer
Prerequisite: course 109B.
Signal descriptions, Fourier series, integral and spectrum; fundamentals of amplitude angular and pulse modulation, requirements in time and frequency domain; representative examples of transmission systems including circuits; noise in components and transmission media, effect of noise on various modulation systems.

125. **Principles of Electronic Circuits.** (3) I and II.  Mr. Pederson, Mr. Bruun
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.
Physical principles and theory underlying vacuum-tube, gaseous-conduction, and solid-state electronics, including microwave applications.

127. **Elemental Control.** (1) I.  Mr. Hopkin (in charge), Mr. 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) I and II.  Mr. Smith
Three lectures and one three-hour laboratory period per week. Prerequisite: course 111A (may be taken concurrently) or 100B; 119; Mechanical Engineering 100 or 102; Electrical Engineering 127 or 112A recommended.
Analysis, synthesis, construction, and operation of closed-loop control systems, including steady-state and transient theory, stability criteria, and performance design factors.

130. **Electrical Engineering Materials.** (2) I.  Mr. English
Prerequisite: Physics 121.
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. Van Trier
Prerequisite: 132A: course 116A or 125 (either may be taken concurrently). 132B: course 132A, 117A; 116B or 117B (either may be taken concurrently).
132A. Experiments illustrating the fundamental principles involved in the operation of communication circuits and electronic devices from audio frequencies through radio frequencies.
132B. Selected experiments illustrating the fundamentals of electronics and the generation, propagation, and radiation of electromagnetic energy. Particular consideration is given to the ultra-high-frequency and microwave regions.

133A. Power Modulator Laboratory. (2) I and II.
   The Staff (Mr. Iwama in charge)
   Prerequisite: course 111A (may be taken concurrently with 133A).
   Experiments on magnetic amplifiers and rotating electric machinery, to illustrate the theory of power modulators.

133B. Advanced Electrical Machinery Laboratory. (2) II.
   The Staff (Mr. Dalziel in charge)
   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 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.
   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. Saunders 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. Saunders 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†

205. Electron Optics and Beam Dynamics. (3) I.
   Prerequisite: courses 116A, 117A or Physics 110A; Mathematics 122 recommended.
   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) II. Mr. Whinnery, Mr. Birdsall
   Prerequisite: course 117A–117B or Physics 110A–110B; 205 recommended.
   Interchange of energy between electromagnetic fields and electron streams operating under transit-time conditions; applications to the theory of space-charge-controlled tubes, velocity-modulation tubes, magnetrons, and traveling wave tubes.

† See footnote, page 290.
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 to systems containing electrical machinery.

212. Nonlinear Magnetic Circuits. (3) II. Mr. Bourne
Generalized approach to circuits containing magnetic cores with nonlinear, multivalued characteristics; 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.

216. Microwave Antennas. (3) II. Mr. Trivelpiece
Application of Maxwell’s equations to transmission, propagation, and reception of radio waves.

217. Microwave Networks. (3) I. Mr. Trivelpiece
Prerequisite: course 117A–117B, or Physics 110A–110B.
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
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. Zadeh
Prerequisite: course 119 and Mathematics 185 (may be taken concurrently).
Operational methods applied to circuit analysis, including Laplace transform and its extension, the Z-transform, to systems having lumped and distributed parameters, and to sampled systems.

223. Linear Network Theory. (3) I. Mr. Kuh
Prerequisite: course 123 and Mathematics 185 (may be taken concurrently).
Generalized analysis; topological derivation of network functions; energy relations in passive networks and fundamental properties of physically realizable driving point and transfer functions; two-element kind canonic forms and equivalent networks; characterization and properties of N-port networks.

224. Network Synthesis. (3) II. Mr. Kuh
Prerequisite: courses 123 and Mathematics 185.
General synthesis methods of driving point impedance and transfer functions; approximation methods in the frequency and time domains.

227. Linear Feedback Control Systems. (3) I. Mr. Jury
Prerequisite: course 128, Mathematics 185, and Electrical Engineering 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.
229. Nonlinear Feedback Control Systems. (3) II. Mr. Hopkin
Prerequisite: course 128.
Analysis and design of 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.

230. Solid-State Electronics. (3) II. Mr. English
Prerequisite: course 130 and Physics 121.
Relations between the electrical, magnetic and radiation properties of solid-state electronic devices and the basic science of the solid state. Semiconductors (rectifiers, transistors, photodevices), phosphors (electroluminescence), electron emission, etc.

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. Morton
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 152.
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. Thomasian
Prerequisite: course 119 or 116A; Statistics 134 or 202A.
Continuous random processes; spectral analysis; theory of optimum linear systems and nonlinear devices with random inputs; statistical detection of signals. Applications in noise and control theory. Special topics.

263. Discrete-State Systems and Automata. (2) II. Mr. Zadeh, Mr. Gill

265. Information Theory. (3) I. Mr. Thomasian
Prerequisite: Statistics 134 or 202A.
Concepts and facts of information theory. The information rate of a source; coding for reliable transmission over discrete and continuous channels with noise; channel capacity; error correcting codes; connections with modulation systems.

290. Advanced Graduate Study in Electrical Engineering. The Staff
Current and advanced topics in electrical engineering, primarily for advanced graduate students.

290A. System Theory. (2) I and II.
Mr. Bergen, Mr. Desoer, Mr. Gill, Mr. Thomasian, Mr. Zadeh
290B. Introduction to Plasmas. (3) I.
Prerequisite: course 223 and 224.
Mr. Trivelpiece

290C. Active Circuit Theory. (1) I and II.
Prerequisite: course 217.
Mr. Kuh

290D. Quantum Electronics. (3) I.
Prerequisite: course 117A or equivalent field theory course and one solid state physics course.
Mr. Singer

290E. Theory and Applications of the Z-Transform Method. (1) I.
Prerequisite: course 222 or 228 or 229 or 227.
Mr. Jury

290F. Boundary Value Problems in Electromagnetic Theory and Radiative Transfer. (3) I.
Recommended: Mathematics 220D; Electrical Engineering 210A–210B or Physics 210A–210B.
Mr. Welch

298. Group Studies, Seminars, or Group Research. (1–5) I and II.
The Staff (Mr. Saunders in charge)
Prerequisite: specific preparation as determined by the instructor in each group.
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 1961–1962 are: (a) Antennas and Radiation (I and II, Rumsey); (b) High-Frequency Tubes (I and II, Whinnery); (c) Direct Synthesis of Control Systems (I and II, Smith); (d) Seminar on System and Communication Theories (I and II, Bergen, Desoer, Gill, Thomasian, Zadeh); (e) Solid-State Devices (I and II, Wang); (f) Digital Control Systems Theory (I and II, Jury); (g) Masers and Related Phenomena (I and II, Singer).

299. Individual Study or Research. (1–5) I and II.
The Staff (Mr. Saunders in charge)
Investigation of electrical engineering problems.

INDUSTRIAL ENGINEERING

Upper Division Courses†

101. Manufacturing Processes. (3) I and II.
(Formerly Engineering 101.)
Prerequisite: Engineering 25, 35, 45.
Mr. Thomsen
Principles of manufacturing: casting, shaping of metals, machining, joining, general purpose and production tools, tooling, jigs and fixtures; introduction to the theory of plasticity and application to machining and shaping of metals; prediction of forces and energy in metal working.

130. Principles of Metal Removing. (3) I.
Prerequisite: course 101 or consent of instructor.
Mr. Thomsen
Analysis of the mechanics of metal removing and application of the theory of plasticity to metal cutting processes, with emphasis on prediction of forces and power. Analysis of friction, wear, tool life and role of cutting fluids. Analysis of newer machining processes, such as: electrolytic grinding, electro spark, erosion, ultrasonic, plasma jet and others.

131. Principles of Metal Forming. (3) II.
Prerequisite: Materials Science 124. Industrial Engineering 101 recommended.
Mr. Thomsen
Application of the theory of plasticity to the solution of forming problems, such as rolling, roll forming, coining, heading, contour flanging, spinning, piercing and blanking, and others. Forming forces, power and distribution of stresses and strains for work-hardening and non-work-hardening metals will be discussed.

† See footnote, page 289.
132. Principles and Metallurgy of Welding. (3) I.
Mr. Hazlett
(Formerly Engineering 166.)
Prerequisite: Engineering 45 or consent of instructor.
An analysis of welding processes with emphasis on the nature of the heat source, heat flow in the work, shielding medium employed, composition and metallurgical structures produced, residual stresses, and mechanical properties of welded joints.

133. Principles of Metal Casting. (3) II.
Mr. Campbell
(Formerly numbered 152.)
Prerequisite: Engineering 45 or consent of instructor. Industrial Engineering 101 recommended.
An analytical treatment of metal casting factors with emphasis on the essential metallurgy: melting, pouring, solidification; gating; mold and pattern considerations; design factors and defects.

141. Introduction to Industrial Engineering and Organization. (2) I.
Prerequisite: junior standing in Engineering.
Evolution of industrial engineering and organization; functional organization of production; organization structures; industrial engineering functions.

142. Work Systems Design and Measurement. (3) II.
Mr. L. E. Davis
Prerequisite: course 101, 141; Statistics 135 (may be taken concurrently), or consent of instructor.
An introductory course in methods of analysis, design, experimentation, and measurement of work systems. Performance standards; analysis of work components of human activities; bio- and psycho-technical capacities and limitations.

142L. Work Systems Design and Measurement Laboratory. (1) II.
Mr. L. E. Davis
Prerequisite: course 142 (it is recommended that course 142 be taken concurrently). Laboratory exercises and experiments in work systems design and measurement. To accompany and supplement course 142.

143. Motion and Time Study. (3) I.
Mr. L. E. Davis, Mr. Redman
Prerequisite: Engineering 100 or Industrial Engineering 101, or consent of instructor; Business Administration 140 (may be taken concurrently); Statistics 130E recommended. Not open to students who have completed Industrial Engineering 142.
Principles of motion economy; study of hand motions and their simplification through the use of process charts, micromotion analysis, and work-place design; equipment layout; theory and practice of time study, rating of worker performance, and standard data theory.

144. Ergonomics. (3) I.
Mr. L. E. Davis
Prerequisite: course 142 or consent of instructor.
Human factors in work, machine control and equipment design; experimentation and methods of analysis; human capacity data and design criteria; man-machine interactions and control displays.

146. Wage and Incentive Systems. (3) II.
Mr. Keachie
Prerequisite: course 142 or 143.
Design and administration of wage and incentive systems; job analysis and evaluation; employee rating; validation; motivation and morale; incentives for indirect, supervisory and professional groups; effects of technology, government, and labor unions; relationships to other industrial engineering and business activities.

147. Job and Organization Design. (3) II.
Mr. L. E. Davis
Prerequisite: course 142, 151, 160, 161 (course 151 may be taken concurrently).
Elements, theories and structures of job and organization design; constraints and limitations; criteria development; models of experiments; measurement of job and organizational effectiveness.
151. Production Systems Analysis and Design. (3) I. Mr. Lapsley, Mr. Grassi
Prerequisite: course 142; 160, 161; Business Administration 120; Mechanical Engineering 112 (Business Administration 120 and Mechanical Engineering 112 may be taken concurrently).
Design and operations analysis of integrated production systems, with emphasis on quantitative treatment and use of operating models—application of the methods of operations research to complex systems.

152. Facilities Planning. (2) II. Mr. Grassi, Mr. Lapsley
(Formerly numbered 148.)
Prerequisite: course 151; Engineering 120 (may be taken concurrently).
Analysis and planning of industrial plants. Consideration of technical and economic aspects and use of operations research techniques in the design of industrial facilities.

153. Analysis and Design for Automated Manufacturing. (3) II.
Mr. Grassi, Mr. Lapsley

198. Directed Group Studies for Undergraduates. (1-5) I and II.
The Staff (Mr. Shephard 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.
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. Shephard 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‡

230. Advanced Metal Cutting. (3) I. Mr. Thomsen
(Formerly numbered 245.)
Prerequisite: Materials Science 124, Industrial Engineering 130, or consent of instructor.
Metal cutting theories, heat transfer and temperature distribution in cutting zone, tool chatter, tool wear, and problems in machining economics.

231. Advanced Metal Forming. (3) II. Mr. Thomsen
Prerequisite: Materials Science 124, Industrial Engineering 131, or consent of instructor.
Solution of forming problems using slip-line theory and other approximate methods.

240. Policy-level Problems in Industrial Engineering. (3) II. Mr. DeGarmo
(Formerly numbered 290.)
Prerequisite: graduate standing in industrial engineering.
Past and current factors which contribute to policy-level problems and decisions in industrial engineering practice. Case studies of problems arising from, and currently affecting industrial engineering practice. Current issues.

(3) I. Mr. L. E. Davis
(Formerly numbered 243.)
Prerequisite: course 142, 147, 151, 152. Recommended: Industrial Engineering 144, 145; Psychology 185; Sociology 229.
† See footnote, page 290.
Advanced study of topics in work systems design and work measurement; integrated design of work systems; macro- and micro-work measurement; performance standards and reward and control systems; research methods and experiments in work systems.

290. Advanced Graduate Study in Industrial Engineering.

The Staff (Mr. Shephard in charge)

Topics in operations research, manufacturing processes and industrial administration.
290A. Mathematical Programming. (3) II.
Mr. Dantzig

290B. Inventory Theory. (2) II.
Mr. Shephard

298. Group Studies, Seminars, or Group Research. (1-5) I and II.

The Staff (Mr. Shephard 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. Shephard in charge)

Individual investigation of advanced industrial engineering problems.

Courses in Operations Research

Upper Division Courses†

160. Linear Programming. (3) I. Mr. Dantzig, Mr. Shephard, Mr. Jewell
Prerequisite: Mathematics 14A, 14B.
An introductory course in deterministic model structures and linear programming methods of analysis, with problem sessions.

161. Stochastic Processes. (3) II. Mr. Shephard, Mr. Dantzig, Mr. Jewell
Prerequisite: Mathematics 14A, 14B; Statistics 134.
An introductory course in basic stochastic model structures and related methods of analysis, with problem sessions.

162. Mathematical Programming. (3) I. Mr. Dantzig, Mr. Shephard
Prerequisite: course 160 or consent of instructor. It is recommended that Mathematics 111 be taken concurrently.
A systematic treatment of the theory of linear programs and extensions to network flows and related combinatorial problems, with applications to industrial and engineering systems.

163. Markov Processes, Queuing and Inventory Theory. (3) II.
Mr. Shephard, Mr. Dantzig
Prerequisite: course 161; Statistics 134, or consent of instructor.
A systematic treatment of stochastic methods of analysis of service and storage systems for determination of optimal policies in steady-state operations, with applications to industrial and engineering systems.

Graduate Courses‡

262. Advanced Problems in Mathematical Programming. (3) I.
Mr. Dantzig, Mr. Shephard
Prerequisite: course 162; Statistics 134, or consent of instructor.

† See footnote, page 289.
‡ See footnote, page 290.
263. Advanced Problems in Applied Stochastic Processes. (3) II.  
Mr. Shephard, Mr. Oliver  
Prerequisite: course 163; Mathematics 111, or consent of instructor.  

264. Process Analysis. (3) II.  
Mr. Shephard, Mr. Dantzig  
Prerequisite: course 160.  
Programming the basic components of a process for optimum design and efficient allocation of facilities.

MECHANICAL ENGINEERING

Upper Division Courses†

100. Introduction to Dynamics. (2) I and II.  
Mr. Cunningham  
Prerequisite: Mathematics 14A–14B; 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.

102. Dynamics. (3) I and II.  
The Staff (Mr. Meriam in charge)  
(Formerly Engineering 102.)  
Prerequisite: Engineering 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.

105A. Thermodynamics. (3) I and II.  
The Staff (Mr. H. A. Johnson in charge)  
Prerequisite: course 100 or 102, which may be taken concurrently; Chemistry 1B or 8; Physics 4C; Mathematics 4B.  
Energy transformations, properties, reversibility, availability; cycles and devices for energy conversion.

105B. Thermal Systems. (3) I and II.  
Mr. H. A. Johnson (in charge), Mr. Laird  
Prerequisite: course 105A.  
Cycles for power and refrigeration; combustion and reactive systems; compressible flow; introduction to heat transfer.

107. Mechanical Laboratory. (2) I and II.  
The Staff (Mr. Laird in charge)  
Prerequisite: course 105A and either 105B and Engineering 103, or Mechanical Engineering 109. For chemical engineering students, Chemical Engineering 144 and 146A. Measurement and appraisal of the performance of mechanical engineering systems.

109. Introduction to Heat Transfer and Fluid Mechanics. (3) I and II.  
Mr. Giedt (in charge), Mr. Corcos, Mr. Howe  
Prerequisite: course 105A. No credit allowed if either Engineering 103 or Mechanical Engineering 105B is taken.  
The principles of conduction, convention and radiation heat transfer and one-dimensional flow of incompressible and compressible fluids.

† See footnote, page 289.
110. Mechanism and Dynamics of Machinery. (3) I and II.  Mr. Radcliffe
Two lectures and one three-hour laboratory period per week. Prerequisite: course 102. Advanced kinematic analysis and synthesis of typical elements of mechanism. Velocity and acceleration analysis of linkages, gearing, and cams. Inertia forces and balancing problems in 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. Radcliffe in charge)
Two lectures and one three-hour laboratory period per week. Prerequisite: course 102; Civil Engineering 130.
Application of principles of engineering mechanics 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. Refrigeration and Cryogenics. (3) I.  Mr. Hutchinson
Prerequisite: course 105B.
Production of low temperature fluids and regions; thermodynamic systems, thermo-electric and magnetic effects.

116. Air Conditioning. (3) II.  Mr. Hutchinson
Prerequisite: course 105B.
Production of atmospheric and thermal environments for human activity; special systems for space and underwater applications.

118. Power Production. (3) II.  Mr. Howe
Prerequisite: course 105B; Electrical Engineering 100B.
Systems for the conversion of chemical, thermal, and radiant energy into mechanical or electrical energy, and for the alteration and storage of these forms of energy. Steam power plants, internal combustion engines, thermo-electric converters, fuel cells, nuclear reactors, and so forth, will be considered as parts of the spectrum of devices useful under particular optimizing conditions.

123. The Internal Combustion Engine. (3) I.  Mr. Vogt
Prerequisite: course 105B; Mathematics 14B.
Design parameters and performance characteristics of rotating and reciprocating internal combustion engines.

124. Mechanical Engineering Systems. (3) I and II.
Prerequisite: course 112 and 131A.
The Staff (Mr. Vogt in charge)
Synthesis of the several fields of mechanical engineering, with applications in the design of systems such as those for power, propulsion, refrigeration, environmental control, and fluid transmission.

131A–131B. Mechanical Engineering Laboratory. (3–3) Yr. Beginning each semester.
The Staff (Mr. Thal-Larsen in charge)
Prerequisite: course 105B; Engineering 103; Electrical Engineering 100B.
Experimental investigation and analysis of the transient and steady-state behavior of mechanical engineering systems and of their thermal and dynamic processes.

151. Heat Transfer. (3) I and II.  Mr. H. A. Johnson, Mr. Tien
Prerequisite: course 105B and Engineering 103. Recommended: Mathematics 14B.
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. Mass Transfer Processes. (3) II.
Prerequisite: course 105B or 151, and Engineering 103 or Chemical Engineering 146A.
Diffusion theory and analysis of mass transfer. Water cooling and purification, gas absorption, solvent recovery, treatment of dust and aerosols. 
Mr. Stewart

154. Thermodynamics. (3) I and II.
Prerequisite: course 105B or Chemical Engineering 143 and Engineering 103. Recommended: Mathematics 14B.
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. 
Mr. Stewart

161. Turbomachinery. (3) II.
Prerequisite: course 105A and Engineering 103.
Pumps, turbocompressors, hydraulic and gas turbines. Analysis of fluid machinery performance with emphasis on the applications to fluid systems. 
Mr. Iversen

163. Fluid Mechanics. (3) I.
Prerequisite: course 105A; Engineering 103; Mathematics 14B.
Fundamental mechanics of ideal and viscous, incompressible and compressible, laminar and turbulent flows. 
Mr. Laird

164. Automatic Control. (3) I and II.
Prerequisite: Engineering 103 or Mechanical Engineering 109, Mechanical Engineering 105B or Physics 112 or Chemical Engineering 143; Mathematics 14B.
Transient and steady-state behavior of systems. Dynamics of control loops in the time, the frequency, and the Laplace domains. Application of graphical and topological techniques. Illustrative problems may be taken from the fields of mechanical, process, nuclear, aeronautical and electrical engineering. 
Prerequisite: course 164 or Electrical Engineering 128.
Mr. Takahashi, Mr. Thal-Larsen

165. Automatic Controls Laboratory. (1) I and II.
Prerequisite: course 164 or Electrical Engineering 128.
Experiments with feedback control systems such as might be encountered in mechanical, chemical, mining and metallurgical engineering. Dynamics of level, temperature, pressure and other control systems. Studies of control-loop components. Investigations of various control schemes. 
Mr. Takahashi, Mr. Thal-Larsen

170. Mechanical Vibrations. (3) I and II.
Prerequisite: course 102 and Mathematics 14A–14B or equivalent.
Introduction to the theory of mechanical vibrations with application to vibration isolation, critical speeds, and machinery. 
Mr. Garland

171. Design of Mechanical Equipment. (3) I and II.
Two lectures and one three-hour laboratory period per week. Prerequisite: course 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. 
Mr. Frisch

172. Elasticity and Stress Analysis in Design. (3) I and II.
Prerequisite: course 102; Civil Engineering 130; Mathematics 14A–14B (or consent of instructor).
Application of the basic equations of elasticity to mathematical and experimental methods of stress analysis with applications to modern design problems. 
The Staff, Mr. Hsu, Mr. Steidel

173. Noise Control. (3) II.
(Formerly Engineering 173.)
Prerequisite: course 102 and Engineering 103 or Mechanical Engineering 109.
Mr. Soroka
175. Advanced Mechanics. (3) I and II. Mr. Meriam
Prerequisite: course 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: course 102 or the equivalent; Electrical Engineering 100A–100B or equivalent; 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.

185. Theory of Elasticity. (3) I. Mr. Naghdi, Mr. Hsu
(Formerly numbered 285A.)
Prerequisite: Mathematics 14B.
Fundamentals of the theory of elasticity (in three dimensions), various types of boundary-value problems, and general theorems. Application to torsion, flexure and two-dimensional problems of plane strain, plane stress, and generalized plane stress.

198. Group Studies for Advanced Undergraduates. (1–5) I and II. The Staff
Prerequisite: upper division standing in engineering, plus particular courses to be specified by the instructor for each group.
Group studies of selected topics.

199. Individual Study and Research for Advanced Undergraduates. (1–5) I and II
The Staff (Mr. Meriam 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‡
Graduate standing is required for admission to these courses. In addition, graduate students must have completed at least Mathematics 14A–14B or the equivalent before undertaking any of the following courses, except as noted.

264. Advanced Automatic Control. (3) I. Mr. Takahashi
Prerequisite: course 164 or Electrical Engineering 128; Mathematics 185 or Engineering 230 recommended.
Analysis and synthesis of linear, nonlinear, and sampled-data control systems. Study of statistical, matrix, and dynamic programming methods of solving control problems. Examples will be chosen from the fields of mechanical and chemical operations.

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.

‡ See footnote, page 290.
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.  
Mr. H. A. Johnson  
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 of Thermodynamics. (3) II.  
Mr. Tien  
Prerequisite: course 154.  
An introduction to the statistical thermodynamics of the pure component and of mixtures. 
The thermodynamics of irreversible phenomena.

290. Advanced Graduate Study in Mechanical Engineering.  
Current and advanced topics in Mechanical Engineering. For individual course listings  
on Applied Mechanics, see Courses in Applied Mechanics.

290M. Random Vibrations. (3) II.  
Mr. Brown  

290N. Design for Extreme Environment. (3) II.  
Mr. Frisch  

290O. Experimental Mechanics. (3) I.  
Mr. Cunningham, Mr. Steidel  

298. Group Studies, Seminars, or Group Research. (1–5) I and II. The Staff  
Advanced study in various fields of mechanical engineering on topics which may vary  
from year to year.

The program for 1961–1962 may include: Acoustics, Mr. Soroka; Applications of Variational Principles to Engineering Problems, Mr. Rosenberg; Exterior Ballistics of Rockets, 
Mr. Leitmann; Mechanical Invention, Mr. Rouverol; Wave Propagation in Solids, Mr. Goldsmith; Analytical Dynamics and Relativity, Mr. Lieber; Hydrodynamic Stability; 
Mr. Lieber; Sea Water Conversion, Mr. Howe; Advanced Kinematics, Mr. Radcliffe; 
Experimental Mechanics, Mr. Brown and Mr. Cunningham; Random Vibrations, Mr. Brown; Master of Engineering Seminar, The Staff.

299. Individual Study or Research. (1–5) I and II.  
The Staff (Mr. Meriam for Mechanics and Design; Mr. Vogt for Heat-Power Systems)  
Investigation of advanced mechanical engineering problems.

Courses in Applied Mechanics

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.  
Lectures and demonstrations in the simulation of physical systems by various analogs.  
Analogs of linear and nonlinear algebraic and differential equations. Solution of ordinary differential equations on the electronic and mechanical differential analyzers;  
simulation of partial differential equations with conducting sheets and electrical networks.

283A–283B. Oscillations in Nonlinear Systems. (3–3) Yr.  
283A: II.  
Mr. Rosenberg, Mr. Hsu  
Prerequisite: Mechanical Engineering 170 or Electrical Engineering 109B.  
Oscillations of nonlinear mechanical and electrical systems having one and two degrees of freedom. Numerical and graphical methods, and systems with known exact solutions. Autonomous systems in the large. Forced harmonic and subharmonic oscillations, 
combination tones, self-sustained oscillations, stability.

* Not to be given, 1961–1962.
284A—284B. Mechanical Vibrations. (3–3) Yr. Mr. Soroka
Recommended: Mechanical Engineering 170.
Theory of mechanical vibrations. Linear and nonlinear systems. Self-excited vibrations.
Methods of Newton, Lagrange, Stodola, and Rayleigh-Ritz applied to complex lumped and distributed systems. Practical approximate methods of analysis.

*285A. Theory of Elasticity. (3) II. Mr. Naghdi
(Formerly Mechanical Engineering 285B.)
Prerequisite: Mechanical Engineering 185.
Minimum principles and variational theorems. Muskhelishvili's method and application of conformal mapping to two-dimensional elastostatic and elastokinetic problems. Three-dimensional problems of elasticity and related special theorems.

285B. Theory of Elasticity. (3) II. Mr. Naghdi
(Formerly Mechanical Engineering 285C.)
Prerequisite: Mechanical Engineering 185.

*286A. Theory of Plasticity 1. (3) I. Mr. Naghdi
Prerequisite: Mechanical Engineering 185.
Fundamentals of plasticity, the concept of yield and the associated constitutive equations in the theory of elastic-plastic solids including those for the perfectly plastic, and the elastic, perfectly plastic solids. Application to torsion and plane problems of plasticity.

286B. Theory of Plasticity 2. (3) II. Mr. Naghdi
Prerequisite: course 286A.
Continuation of Theory of Plasticity 1. Further considerations of the constitutive equations and the associated concepts. Variational theorems, the piecewise linear loading functions and related minimum principles. The linear and nonlinear theories of viscoelasticity and viscoplasticity with application.

287A. Advanced Engineering Dynamics. (3) II. Mr. Goldsmith
Prerequisite: Mechanical Engineering 102 or Physics 105B; Mathematics 14A–14B; graduate standing in engineering, mathematics, or physics. Course 284A–284B recommended.

287B. Impact. (3) I. Mr. Goldsmith
Prerequisite: course 287A. Course 284A–284B recommended.

*289A. Foundations of the Theory of Continuous Media 1. (3) I. Mr. Naghdi
Prerequisite: a course in elasticity (Mechanical Engineering 185) or a course in fluid mechanics (Aeronautical Sciences 162).
The foundations of the theory of continuous media. An introduction to tensor calculus; kinematics of deformation for initial and current coordinate systems; various measures of deformation and strain rates. The concept of the stress tensor in both initial and current coordinate systems and the Kirchoff double vector. The consequence of the laws of conservation of mass, momentum, energy, and Clausius inequality.

* Not to be given, 1961–1962.
**289B. Foundations of the Theory of Continuous Media 2. (3) II.**
Prerequisite: course 289A.
Continuation of course 289A. Classical thermodynamics and thermodynamic potential for a continuous medium. Irreversible thermodynamics, Onsager's principle and variational principles for nonequilibrium systems. Constitutive equations for various media and application.

290A. The Dynamics of Projectiles. (3) I. Mr. Leitmann
290B. The Dynamics of Rockets. (3) II. Mr. Leitmann
290C. Methods of the Calculus of Variations and Applications in Engineering. (2) I. Mr. Rosenberg
290D. Variational Principles of Mechanics. (3) I. Mr. Lieber
290E. Theory of Elastic Stability. (3) II. Mr. Hsu
290F. Acoustic Wave Propagation. (3) II. Mr. Soroka
290G. Wave Propagation in Solids. (3) II. Mr. Goldsmith

**Aeronautical Sciences**

**Upper Division Courses†**

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. Sherman, 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 aircraft and missiles.

162. Elementary Hydrodynamics. (3) I and II. Mr. Corcos, Mr. Schaa
Prerequisite: Engineering 103, Mathematics 14B.
Stream function, potential function, and conformal transformation with applications to engineering problems.

**Graduate Courses‡**

223. Dynamics of Reactive Fluids. (3) II. Mr. Oppenheim
Studies of processes involving mutual interaction between fluid dynamic, chemico-kinetic, 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 moment of wings and hydrodynamic control surfaces.

* Not to be given, 1961–1962.
† See footnote, page 289.
‡ See footnote, page 290.
276. Mechanics of Real Fluids. (3) II. Mr. Corcos, Mr. Sherman
Prerequisite: Engineering 230. Recommended: Mechanical Engineering 161 and Aeronautical Sciences 162.

277. Compressible Fluids. (3) I. Mr. Talbot
Prerequisite: Engineering 230. Recommended: Aeronautical Sciences 162 or Mathematics 270.
Fundamentals of subsonic and supersonic flow, shock waves, different theoretical methods, laboratory equipment, and procedures for supersonic investigations.

290. Advanced Graduate Study in Aeronautical Sciences.
290A. Experimental Methods in Aerodynamics. (3) I. Mr. Maslach
290B. Advanced Propulsion Systems. (3) II. Mr. Starkman
290C. Rarefied Gas Dynamics. (3) I. Mr. Schaaf
290D. Magnetohydrodynamics. (3) II. Mr. Sherman
290E. High Flux Heat Transfer. (3) I. Mr. Giedt
290F. Turbulence. (3) I. Mr. Corcos
290G. Upper Atmosphere Studies. (3) II. Mr. Hurlbut

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.

299. Individual Study or Research. (1-5) I and II.
The Staff (Mr. Schaaf in charge)
Investigation of advanced problems in aeronautical sciences.

MINERAL TECHNOLOGY

Ceramic Engineering†

Geological Engineering

Upper Division Courses‡

120. Fundamentals of Geologic Engineering. (2) I. Mr. Trask
Prerequisite: Geology 150 or 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.

*121. Structural Geological Engineering. (3) II. Mr. Trask
Two lectures and one afternoon field trip per week.
Prerequisite: Geology 150 or equivalent.
A course in geologic engineering design as related to construction and design of dams, tunnels, shafts, bridges, roads, airports, harbors, and beach protection structures. Sources of engineering construction materials. Frozen ground problems.

* Not to be given, 1961–1962.
† For courses in ceramic engineering, see Materials Science, page 318.
‡ See also courses listed under Petroleum Engineering, Mining, Geology. For basic prerequisites, see footnote, page 289.
122. 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 inviting intensive exploration by modern geological, geophysical, and engineering methods.

123. Exploration for Metalliferous Deposits. (3) II.  
Mr. Wisser  
Prerequisite: Geology 150 or the equivalent.  

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 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:†

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: Geological Engineering 123, Mining 145, Mineral Engineering 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.

290. Advanced Graduate Study in Geological Engineering.

Current and advanced topics in Geological Engineering.  
290A. Advanced Geological Engineering. (2) I. Mr. Trask  
290B. Explorations for Industrial Minerals. (2) II. Mr. Hawkes  
290C. Applied Geochemistry. (2) II. Mr. Hawkes  
290D. Geophysical Problems in Electromagnetic Theory. (3) II. Mr. Ward  
290E. Geophysical Problems in Potential Theory. (3) II. Mr. Ward

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)

† See footnote, page 290.
Materials Science

Upper Division Courses†

100. Industrial Ceramics and Metallurgy. (1) I. Mr. Fulrath
Prerequisite: Engineering 45. (Course may be repeated once for credit.)
Lectures, field trips, and reports on topics related to the ceramic and metallurgical industries.

101. Material and Energy Balances. (3) II. Mr. Ravitz
Prerequisite: Chemistry 110A.
Material and energy balances of metallurgical and ceramic processes; fuels; combustion heat utilization; introduction to unit processes.

102. Phase Changes. (3) II. Mr. Searcy
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.

103. Structure and Properties of Crystals. (4) I and II. Mr. Dorn, Mr. Washburn
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 crystal structure; X-ray diffraction techniques.

104. 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.

111. Physical Ceramics. (2) I. Mr. Pask, Mr. Fulrath
Prerequisite: course 102 or consent of instructor.
Structure, chemical and physical properties of inorganic nonmetallic materials. Emphasis on glasses and refractories.

111L. Physical Ceramics Laboratory. (1) I. Mr. Pask
Prerequisite: open only to students who have had or are enrolled in course 111.
The laboratory part of course 111.

112. Chemical Ceramics. (3) I. Mr. Fulrath, Mr. Searcy
Prerequisite: course 102 or consent of instructor.
Fundamentals of inorganic and physical chemistry applied to materials of ceramic interest: colloids, clays, glasses, oxides, and high melting materials.

113. Principles of Ceramic Engineering. (4) II. Mr. Pask, Mr. Fulrath
Prerequisite: course 111.
Unit operation of ceramic engineering processes: nature and processing of ceramic materials, rheological properties of colloidal systems, slurries and plastic masses, forming principles, drying and firing problems.

114. Seminar in Ceramic Engineering. (2) II. Mr. Fulrath
Prerequisite: course 102.
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.

† See footnote, page 289.
121. Physical Metallurgy. (2) I and II. Mr. Washburn
Prerequisite: Chemistry 1B, Physics 4B and 4C. Not open to majors in metallurgy or ceramic engineering.
Relationships between microstructure, composition, heat and mechanical treatment, and physical properties of metals and alloys.

121L. Physical Metallurgy Laboratory. (1) I and II. Mr. Washburn
Prerequisite: open only to students who have had or are enrolled in course 121.
The laboratory part of course 121.

122. Advanced Physical Metallurgy. (3) II. Mr. Hultgren
Prerequisite: course 121 and 121L (or Engineering 45).
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.

123. Mechanical Metallurgy. (3) II. Mr. Dorn
Prerequisite: course 121 and 121L (or Engineering 45).
Effects of microstructure and crystal imperfections on the mechanical properties of metals.

124. Plasticity and Metal Forming. (3) I. Mr. Dorn, Mr. Thomsen
Prerequisite: Civil Engineering 130.
The theory of plasticity and the plastic forming of metals.

132. Unit Processes for Mineral Industries. (3) I. Mr. Fuerstenau
Prerequisite: course 101.
Unit processes involved in the extraction of metals from their ores; calcining, roasting, smelting, refining, leaching, electrolysis, and related processes; metallurgical calculations.

133. Mineral Dressing. (3) I. Mr. Fuerstenau
Prerequisite: consent of instructor. Chemistry 110A may be taken concurrently.
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. Pask and Mr. Washburn in charge)
Prerequisite: courses 101 and 103.
Group study of selected topics.

199. Individual Studies or Research for Advanced Undergraduates. (1–5)
I and II. The Staff (Mr. Pask and Mr. Washburn 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.

Graduate Courses‡

202. Metallurgy of the Less Common Metals. (2) II. Mr. Ravitz

206A–206B. Materials for Nuclear Engineering. (2–2) I and II. Mr. Fulrath
Not open to majors in metallurgy or ceramic engineering.
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.

‡ To be given if a sufficient number of students enroll.
‡ See footnote, page 290.
240. Metallurgical Thermodynamics. (3) II. Mr. Kelley
Prerequisite: course 104 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 and metals and alloys, compressibility, specific heat, magnetism, electrical and thermal conductivity, thermodynamics.

256. Reaction Kinetics. (3) II. Mr. Dorn
Prerequisite: course 121, 121L; Chemistry 110A–110B.
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.

258. Statistical Thermodynamics. (3) I. Mr. Dorn
To be offered in alternate years.
Prerequisite: course 104 or equivalent.
Boltzmann, Fermi-Dirac, and Bose-Einstein statistical mechanics with special emphasis on applications to metallurgy and ceramics.

260. Dislocation Theory. (3) I. Mr. Washburn
Prerequisite: course 103 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.

271. High Temperature Materials. (3) I. Mr. Searcy, Mr. Pask
Prerequisite: course 111.
Relationships between structures, compositions and physical and chemical properties in high temperature materials.

273. Structure and Reactions in Inorganic Materials. (2) II. Mr. Pask, Mr. Searcy
Prerequisite: Chemistry 110B; Physics 131.
Theories on the structure, bonding and reaction equilibria and kinetics in various classes of inorganic solids.

275. High Temperature Thermodynamics. (3) II. Mr. Searcy
To be offered in odd-numbered years.
Prerequisite: course 104 or Chemistry 114H.
Methods for measuring and estimating thermodynamic data for high temperature materials. Application to prediction of the behavior of materials in high temperature environments.

290. Advanced Graduate Study in Materials Science.
Current and advanced topics in ceramics, extractive metallurgy, physical metallurgy.

290A. Microstructure of Ceramic Systems. (3) I. Mr. Pask
Prerequisite: course 111, 113 or consent of instructor.

290B. Surface Properties of Engineering Materials. (2) II. Mr. Fuerstenau
Prerequisite: course 111, 113 or consent of instructor.

298. Group Studies, Seminars, or Group Research. (1–5) I and II.
The Staff (Mr. Ravitz and Mr. Searcy in charge)

299. Individual Study or Research. (1–5) I and II.
The Staff (Mr. Ravitz and Mr. Searcy in charge)
Metallurgy*

Mineral Engineering

Upper Division Courses†

100. Petrophysics. (3) I. Mr. Ward, Mr. Witherspoon
Prerequisite: Physics 4C and Mathematics 14B; 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.

102. Mineral Engineering Applications of Fluid Mechanics. (3) I. Mr. Putnam
Prerequisite: Engineering 103; Mineral Engineering 105, 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. Mr. Putnam
Prerequisite: course 102.
Laboratory exercises in the application of fluid mechanics and thermodynamics to mineral engineering systems.

104. Physical Properties of Rocks. (1) II. Mr. Ward, Mr. Witherspoon
(Formerly Petroleum Engineering 160L.)
Prerequisite: course 100, 105 (may be taken concurrently).
Measurement of physical properties of solid and fluid phases encountered in mineral engineering systems.

105. Thermodynamics of Mineral Engineering Systems. (3) II. Mr. Putnam
(Formerly Petroleum Engineering 160.)
Prerequisite: Chemistry 110A; Physics 4C; Mathematics 14B.
Thermodynamics, heat transfer, combustion, and volumetric behavior.

106. Applied Geophysics. (3) I. Mr. Ward
(Formerly Mining 146.)
Prerequisite: Geology 150 or equivalent; Physics 4B.
Introduction to the theory, methods and applications of geophysics in mining and petroleum exploration and in civil engineering.

Mineral Engineering

Upper Division Courses†‡

140. Introduction to Mining. (3) II. Mr. Shaffer
Prerequisite: Geology 150 (may be taken concurrently).
The discovery, production, processing, and marketing of mineral raw materials other than petroleum.

* For courses in metallurgy, see Materials Science, page 318.
† See footnote, page 289.
‡ See also courses in geology and geological engineering.
143. Geological Factors in the Valuation and Operation of Mines. (3) II.
Prerequisite: course 140 and Mineral Engineering 101. Mr. Wisser
Geological aspects of mine valuation. Size and metal content of ore deposits, 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.

144. Mine Economic Analysis and Reports. (3) II. Mr. Shaffer
Two lectures and one laboratory period per week.
Prerequisite: course 140 and Mineral Engineering 101. Course 143 and Geological Engineering 123 may be taken concurrently.
Principles of engineering economic analysis applied to exploration, development, operation, and valuation of mineral deposits. Each analysis will be presented by the student as a formal report.

145. Geochemical Prospecting. (3) I. Mr. Hawkes
Prerequisite: Geology 150 or the equivalent.
Introduction to the principles and practice of geochemical methods of prospecting for deposits of metallic and industrial minerals.

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 instructor.
Group study of selected topics which vary from year to year.

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†

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 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)

† See footnote, page 290.
Petroleum Engineering

Upper Division Courses†

161. 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.

161L. Petroleum Engineering—Development Laboratory. (2) I. Mr. Somerton
Prerequisite: course 161, which should be taken concurrently.
Laboratory experiments in petroleum engineering development including drilling mechanics, zonal evaluation and well completion evaluation.

162. Petroleum Reservoir Mechanics. (3) II.
Prerequisite: Mineral Engineering 105, 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.

162L. Petroleum Reservoir Mechanics Laboratory. (2) II.
Prerequisite: course 162 (may be taken concurrently).
Laboratory exercises in the application of fluid mechanics to single and multiphase fluid flow through porous media.

169. Petroleum Engineering—Short Course. (3) II.
Mr. Somerton, Mr. Witherspoon
Prerequisite: 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.

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. Somerton 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‡

205. Kinetic Theory of Fluids and Surfaces. (2) I.
Prerequisite: Mineral Engineering 105, 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.

† See footnote, page 289.
‡ See footnote, page 290.
208. Advanced Reservoir Engineering. (3) II.
Prerequisite: course 162, 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.
Prerequisite: graduate standing or consent of the instructor. Mr. Witherspoon
A study of the physical and economic factors underlying the appraisal of oil-producing properties. Estimation and evaluation of oil and gas reserves.

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.

290. Advanced Graduate Study in Petroleum Engineering.
Current and advanced topics in petroleum engineering.
290A. Advanced Natural Gas Engineering. (2) I. Mr. Witherspoon
Prerequisite: Chemistry 110A–110B, or Mechanical Engineering 105A or Mineral Engineering 105 and Engineering 103.

298. Group Studies, Seminars, or Group Research. (1–5) I and II.
The Staff (Mr. Witherspoon 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 1961–1962 are:
Advanced Fundamentals: Well Logging (Somerton); Hydrocarbon Phase Behavior; Immiscible and Miscible Fluid Displacement; Thermal Recovery Processes; Surface and Colloidal Chemistry Petroleum Reservoirs (Witherspoon; Physics of Reservoir Rocks (Somerton); Rheology of Petroleum and Drilling Fluids (Witherspoon); Multiphase Fluid Flow.
Advanced Design and Professional Analysis: Natural Gas Technology (Witherspoon); Secondary Oil Recovery (Witherspoon); Drilling Mechanics (Somerton); Applications of Rheology; 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)

NAVAL ARCHITECTURE

Upper Division Courses†

151. Statics of Naval Architecture. (3) I. Mr. Paulling
Prerequisite: Engineering 103, Civil Engineering 130, Mechanical Engineering 102.
Geometry of the ship’s form; buoyancy and stability in intact and damaged conditions; subdivision, freeboard, measurement rules and requirements; grounding and launching; strength and stiffness.

152. Dynamics of Naval Architecture. (3) I. Mr. Paulling
Prerequisite: Engineering 103 and Naval Architecture 151 which may be taken concurrently.

† See footnote, page 289.
153. Marine Engineering. (3) II.  Mr. Tichvinsky
Prerequisite: Mechanical Engineering 102, 105B. Recommended: course 151.
Power requirements and selection of power plants for various types of vessels and necessary auxiliaries for steam and motor ships will be considered.

154. Applied Naval Architecture. (3) II.  Mr. Paulling
Prerequisite: course 151, 152.
Preparation of a preliminary ship design, starting with a prescribed set of owner's requirements or military requirements. 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)
Prerequisite: 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†

240A–240B. Theory of Ship Structures. (3–3) Yr. Mr. Schade
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: Aeronautical Sciences 162, Mathematics 14A–14B, and Naval Architecture 151, 152, or permission of instructor.

290. Advanced Graduate Study in Naval Architecture.
Current and advanced topics in theory and design of screw propellers, hydrodynamics of free surfaces, ship vibrations, and other specialized studies in related areas of naval architecture.

290A. Theory and Design of Screw Propellers. (3) II. Mr. Paulling

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.

† See footnote, page 290.
Related Course in Another Department
Mathematics 270. Technical Hydrodynamics. (3) I. Mr. Wehausen

NUCLEAR ENGINEERING
Upper Division Courses†

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.
Prerequisite: course 165 (may be taken concurrently).
Mr. Ruby
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.

198. Directed Group Studies for Advanced Undergraduates. (1–5) II.
The Staff
Prerequisite: senior standing in engineering or consent of instructor. Particular courses may be specified for each section.
Examples of topics that may be discussed are: Turbo Machinery, Closed Cycle Gas Turbine Systems, Energy Conversion, Power Cycles in Nuclear Reactor Systems, and Structural Problems in Nuclear Reactors.

Graduate Courses‡

250A–250B. Nuclear Reactor Theory. (3–3) Yr. Beginning each semester.
Mr. Pigford, Mr. Goldstein
Prerequisite: Physics 124 or Chemistry 123, Engineering 230 (may be taken concurrently with 250A).
The physical principles governing the behavior of nuclear fission chain reactors.

251A–251B. Nuclear Engineering Laboratory. (1–1) Yr.
Mr. Ruby
Prerequisite: course 250A–250B (may be taken concurrently) and/or consent of instructor.
Studies center around experiments with a nuclear reactor, accelerators as pulsed-neutron sources, and subcritical assemblies. Concepts appearing in reactor theory will be investigated.

252. Nuclear Reactor Systems Design. (2) II.
Mr. Schrock, Mr. Grossman
Prerequisite: course 250B, 260, and Materials Science 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.

† See dagger (†) footnote on page 289.
‡ See footnote, page 290.
260. Nuclear Reactor Systems. (3) I and II.  Mr. Schrock, Mr. Smith
Prerequisite: course 250A, Mechanical Engineering 151.
The disciplines of reactor physics and the engineering sciences of thermodynamics, heat transfer, fluid dynamics, and thermal stress analysis applied to nuclear reactors. Includes reactor fuel cycles and radiation shielding.

270A–270B. Neutron Transport Theory. (3–3) Yr.  Mr. Stuart
Prerequisite: course 250A–250B.
The theory of the distribution in space, angle, and energy of neutrons in migration through bulk media. Discussion of physical assumptions and mathematical techniques for solving the equations for neutron distribution in problems relevant to reactor theory.

290. Advanced Graduate Study in Nuclear Engineering.
Advanced group study in various fields of nuclear engineering; topics vary from year to year.

290A. Thermonuclear Reactions. (3) I. Mr. Pyle
290B. Biological Effects of Radiation and Radiation Safety. (3) I. Mr. Wallace
290C. Dynamics of Nuclear Systems. (3) II. Mr. Smith
290D. Thermoelectric and Thermionic Power Systems. (3) II. Mr. Pigford
290E. Special Uses of Nuclear Energy—Explosives and Large Transients. (3) II. Mr. Teller
290F. Nuclear Propulsion and Power Systems for Space. (3) II. Mr. Smith

298. Seminars. (1–5) I and II.
The Staff (Mr. Pigford in charge)
Advanced group study in various fields of nuclear engineering; topics vary from year to year. The program for 1961–1962 may include seminars in (a) Thermonuclear Reactions (Pyle); (b) Biological Effects of Radiation (Wallace); (c) Dynamics of Nuclear Systems (Smith); (d) Thermoelectric and Thermionic Power Systems (Pigford); (e) Special Uses of Nuclear Energy—Explosives and Large Transients (Teller); (f) Nuclear Propulsion and Power Systems for Space (Smith); (g) Current Research Topics (Pigford).

299. Individual Study or Research. (1–6) I and II.
The Staff (Mr. Pigford in charge)
Investigation of advanced nuclear engineering problems.

LABORATORY FACILITIES

Electronics Research Laboratory
The Electronics Research Laboratory conducts research in various fields of electrical engineering and, as an administrative branch of the Department of Electrical Engineering, coordinates contract and faculty research projects with the graduate program. Currently research is being conducted in the fields of controls, energy conversion, sampled-data systems, communication and information theory, microwave tubes and masers, electromagnetic radiation and scattering, semiconductors, transistor electronics, networks, analysis and synthesis, and microwave biology.
The work is largely supported by contracts with the divisions of the Department of Defense and the National Science Foundation. The personnel consists of the faculty of the Department of Electrical Engineering together with research assistants and other graduate students. All of the work is inti-
mately related to the graduate study program. With respect to the contractual obligations, the Electronics Research Laboratory is also a unit of the Institute of Engineering Research.

**Hydraulic Engineering Laboratory**

The Hydraulic Engineering Laboratory, situated in the new addition to Hesse Hall, is equipped for experimental work in general fluid mechanics, general hydraulics, hydraulic machinery, surface and ground water hydrology, water resources, hydraulic structures, and sediment transportation. There are special facilities for research on pumps, sediment transportation, and waves. Extensive research facilities are available for studies on various river, harbor, and coastal problems at the Richmond Field Station. A large model basin is used for model studies of rivers, harbors, wave phenomena, and related problems. A wind-wave channel is available for studies of wind tides and the generation of wind waves in shallow water. A large wave channel, which also serves as a towing tank, as described in connection with the facilities of naval architecture, is available for wave action studies on a large scale. Flumes and other facilities are also available for investigations of sediment transportation in open channels.

**Minerals Research Laboratory**

The function of this laboratory is to coordinate research in the fields of mining and geological engineering, ceramic engineering, metallurgy, and petroleum. The laboratory is associated with the Department of Mineral Technology, College of Engineering. The projects are under the direct supervision of the faculty members and are staffed mainly by graduate students employed as research assistants. The laboratory is supported to the extent of about $600,000 per year, mainly by contributions from government agencies. All research is of a basic nature. There is a heavy concentration of activity in the fields of metallurgy and ceramics where projects are concerned with the fundamental factors that control properties of materials. In the mining, geological engineering, and petroleum fields, research is concerned with new methods of discovering hidden ore bodies and methods for extracting presently unrecoverable petroleum from underground reservoirs.

**Minerals Thermodynamics Experiment Station**

**United States Bureau of Mines**

The Minerals Thermodynamics Experiment Station of the United States Bureau of Mines is housed in the Hearst Mining Building and is closely associated with the Department of Mineral Technology of the University. This station has as its major function the measurement and correlation of thermo-
dynamic values (heat capacities at low and high temperatures, entropies, heats of reaction, and free energies of reaction) of pure metallurgical and ceramic substances.

The superintendent of the station serves as a University lecturer in alternate years and offers a course (Metallurgy 240) in advanced metallurgical thermodynamics. He also serves formally as a consultant for the University’s project on thermodynamic properties of metals and alloys and informally as a consultant for other projects of the Department of Mineral Technology and for research of graduate students.

The personnel of the station consists of ten full-time professional employees and two full-time clerical employees.

**Nuclear Engineering Laboratory**

The Nuclear Engineering Laboratory serves as an instructional and research center for the graduate students and staff of the Department of Nuclear Engineering in the College of Engineering.

The laboratory facilities consist of a small critical nuclear reactor, and subcritical assemblies with light water, graphite, and natural uranium. An array of radiation sources, as well as various nuclear measuring and counting instruments, is available.

Laboratory instructional experiments comprise work in nuclear radiation measurements, nuclear reactor characteristics, neutron and gamma transport, and heat transfer and fluid mechanics.

Research problems presently under way in the Nuclear Engineering Laboratory are: a study of neutron thermalization in non-isothermal media; Doppler broadening of uranium resonances; nuclear reactor heat flux transients; and forced convection vaporization.

**Sanitary Engineering Research Laboratory**

The function of the Sanitary Engineering Research Laboratory is to provide a facility for the independent research requirements of graduate students in sanitary and public health engineering, as well as an opportunity for members of the instructional staff to pursue their interests and to develop in professional and academic stature through research. It offers no academic program of its own, but is coordinated with the instructional laboratories of the Hydraulic and Sanitary Engineering Division at the graduate level. Both contract and University-sponsored projects are pursued in the Laboratory under the guidance of the faculty. The wide variety of projects in environmental sanitation in progress at all times is concerned with industrial and domestic waste water treatment and reclamation, water pollution problems, radioactive waste disposal, air pollution, water resources, and many related fields. Its activities include publication of technical bulletins and the sponsoring of technical conferences. Its staff includes all members of the instructional staff in sanitary and public health engineering together with some twenty-five
to thirty professional and technical personnel, including graduate students employed on a part-time basis.

**Sea Water Conversion Laboratory**

The Sea Water Conversion Laboratory, located at the Richmond Field Station, consists of a series of experimental units connected with the demineralizing of sea water. Experimental work is carried on by graduate students and full-time research personnel in the fields of distillation (including solar), electrodialysis, ion exchange, and other schemes.

**Soil Mechanics and Bituminous Materials Laboratory**

The Soil Mechanics and Bituminous Materials Laboratory situated at the Richmond Field Station provides extensive facilities for research on soil properties, soil mechanics, foundation engineering, and the behavior and properties of asphalts and asphaltic mixtures. Graduate students working towards master's or doctoral degrees in the Department of Civil Engineering conduct individual research in the laboratory while a continuing program of research is conducted by faculty members in the Department of Civil Engineering and research engineers in the Institute of Transportation and Traffic Engineering. Main areas of research in recent years include the strength characteristics of soils under dynamic loading conditions, the performance of friction piles in clay soils, the strength characteristics of compacted soils, soil structure and soil stabilization, and the strength, flexibility and weathering characteristics of asphaltic mixtures; the laboratory provides special facilities for work in these areas, in addition to equipment for standard tests on soils, asphalts and asphaltic mixtures.

**Structural Engineering Materials Laboratory**

The Structural Engineering Materials Laboratory comprises the principal teaching and research facilities of structural engineering and structural mechanics, a Division of the Department of Civil Engineering. Located in the Engineering Materials Laboratory building, it contains facilities for class instruction and for research in materials of construction and in behavior of structures. The study of structures and structural models includes elastic displacement methods, strain measurements, and photoelastic procedures.

A wide variety of testing machines and measuring apparatus is available, including a universal testing machine with a capacity of four million pounds in compression. Facilities for determining dynamic effects on structural models include a large shaking table for simulating earthquakes and oscilloscopes, oscillographs, and strain-gage amplifiers for measuring the response.

For study of materials, control rooms are provided for tests over a wide range of temperature and humidity. The Laboratory operates an experimental plant, with a chemical laboratory, for the manufacture of cements, limes, and lightweight aggregates.
ENGLISH

(Department Office, 2125 Dwinelle Hall)

Travis M. Bogard, Ph.D., Professor of English.
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.
John E. Jordan, Ph.D., Professor of English (Vice-Chairman of the Department).

James J. Lynch, Ph.D., Professor of English.
Gordon McKenzie, Ph.D., Professor of English.
Josephine Miles, Ph.D., Professor of English.
Charles Muscatine, Ph.D., Professor of English.
Thomas F. Parkinson, Ph.D., Professor of English.
Victor S. Pritchett, Mrs. William Beckman Professor of English Language and
Literature for the spring semester.

John H. Raleigh, Ph.D., Professor of English (Vice-Chairman of the Department
for the fall semester).

David W. Reed, Ph.D., Professor of English.
Mark Schorer, Ph.D., Professor of English (Chairman of the Department).
Wayne Shumaker, Ph.D., Professor of English.
Henry N. Smith, Ph.D., Professor of English.
George R. Stewart, Ph.D., Professor of English.
Ernest Tuveson, Ph.D., Professor of English.
Ian P. Watt, M.A., Professor of English (Vice-Chairman of the Department
for the spring semester).

Arthur G. Brodeur, Ph.D., LL.D., Professor of English and Germanic Philology, Emeritus.
Willard E. Farnham, Ph.D., LL.D., Professor of English, Emeritus.
Walter M. Hart, Ph.D., LL.D., Professor of English, Emeritus.
Benjamin H. Lehman, Ph.D., LL.D., Professor of English, Emeritus.
* Jonas A. Barish, Ph.D., Associate Professor of English.
† Howard E. Hugo, Ph.D., Associate Professor of English.
‡ Alain Renoir, Ph.D., Associate Professor of English.
Louis A. M. Simpson, Ph.D., Associate Professor of English.

John L. Traugott, Ph.D., Associate Professor of English.

‡ In residence fall semester only, 1961–1962.
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 95.

*Departmental Major Advisers:* Mr. Patrides, Chairman; Mr. Knoepflmacher, Mr. Halpern, Mr. Rader, Mr. Renoir (I), Mr. Richmond, Mr. Sacks (II), Mr. Simpson, Mr. Traugott, Mr. Ziff, Mr. Orgel.

*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 17 (3), 25 (3), 30 (3), 41 (3), 44A–44B (3–3), 49 (3). Recommended lower division electives in other departments: Art 1B, 1C; Classics 10A–10B, 28, 34, 35, 36; French 4R; History 4A–4B; Music 27A–27B; Philosophy 20A–20B; Slavic 39.

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, 33A–33B, 130A, 130B, 130C; 3 units in a period or type course.

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 Mr. Jordan, Mr. Lynch, or Mr. Evans; see also the ANNOUNCEMENT OF THE SCHOOL OF EDUCATION.

Higher Degrees. Consult Mr. Watt; see also the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION.

Lower Division Courses

Freshman Courses

1A–1B. First-Year Reading and Composition. (3–3) Yr. Beginning each semester. The Staff (Mr. Muscatine in charge)

Prerequisite for the English major. 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

17. Shakespeare. (3) I. Mr. Bogard

May be taken by English majors as a lower division elective; will not satisfy the Shakespeare requirement.

Lectures on selected plays of Shakespeare.

25. Language. (3) II. Miss Miles

Designed for sophomores, but open to students in the upper division.

The origins and symbols of human speech; pattern, change, and growth in language; the interrelations of language, thought, and civilization. Emphasis on English, as written and spoken in England and in America.

30. Introduction to American Literature. (3) I and II. Mr. Smith, Mr. Halpern
33A–33B. American Studies. (3–3) Yr. Mr. MacShane
Open to sophomores with the consent of instructor. Limited to 15 students. Not open to students taking History 33A–33B or Political Science 33A–33B.
An honors course in the study of American culture, drawing on material from history, literature, political science, philosophy, and other fields. Discussion, the writing of essays, and occasional joint meetings with the staff and students of the two equivalent courses (History 33A–33B and Political Science 33A–33B).

40. Intermediate Expository Writing. (3) I and II. Mr. Tuveson, Mr. Ziff
Prerequisite: course 1A–1B or Speech 1A–1B or equivalent.

41. Writing in Connection with the Reading of Important Books of the Nineteenth and Twentieth Centuries. (3) I and II. Mr. Simpson, Mr. Flanagan
Prerequisite: course 1A–1B or Speech 1A–1B, or consent of instructor.

43. Introduction to the Study of Poetry. (3) I. Miss Garlitz
Lectures on poetry intended to develop the student’s ability to read, understand, and evaluate a poem. Designed primarily for students whose major is not English.

44A–44B. Masterpieces of Literature. (3–3) Yr. Mr. Simpson, Mr. Watt
44A is not prerequisite to 44B.
44A. I: Mr. Simpson.
44B. II: Mr. Watt.
Lectures on great works of the world’s literature.

46A–46B. Survey of English Literature. (3–3) Yr. The Staff (Mr. Rader in charge)
Close study of typical works of major authors from Chaucer to the twentieth century 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. Reed

*131. American English. (3) I. Mr. Reed

141. Modes of Writing (Exposition, Fiction, Verse, etc.). (3) I and II. Mr. Burgess, Mr. Elliott
Prerequisite: course 1A–1B or Speech 1A–1B, or consent of instructor. Open to qualified sophomores with consent of instructor.
Writing in connection with readings in recent English literature and its continental backgrounds.

* Not to be given, 1961–1962.
B. Courses in Literature

114A. The English Drama to 1642. (3) I.  Mr. Rabkin
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.

114B. The English Drama from 1660 to 1850. (3) II.  Mr. Lynch
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.

114C. British and American Drama from 1850 to the Present. (3) II.  Mr. Bogard

116. The English Bible as Literature. (3) II.  Mr. Patrides

117A–117B. Shakespeare. (3–3) Yr.  Mr. Evans, Mr. McNulty
117A is not prerequisite to 117B. Lectures on the entire works of Shakespeare, including nondramatic poems.

117C. Shakespeare. (3) I.  Mr. Bronson
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. Bronson

120A–120B. Medieval Literature. (3–3) Yr.  Mr. Jones
Students may receive credit for 120A without taking 120B.
120A. Synthesis of Hebrew, Greek, Latin, Celtic, Teutonic, and Arabic cultures expressed in narrative, rhetorical, and epistolary prose, and lyric, narrative, and dramatic verse.
120B. Nibelungenlied, Dante's Comedy, Petrarch's Secret, Boccaccio's Filostrato, Malory's Morte d'Arthur.

121. The Romantic Period. (3) I.  Mr. Caldwell

122. The Victorian Period. (3) I.  Mr. McKenzie

123. Nineteenth-Century British Prose. (3) II.  Mr. Paterson

125B. The Novel in Western Civilization. (3) I.  Mr. Hugo

125C–125D. The English Novel. (3–3) Yr.  Mr. Brightfield, Mr. Rader
125C is not prerequisite to 125D.

125E. The American Novel. (3) II.  Mr. Smith

*128. Regional Literature: California and the West. (3) II.

130A. American Literature before 1840. (3) I.  Mr. Hart

130B. American Literature, 1840–1885. (3) II.  Mr. Hart

130C. American Literature: 1885 to the Present. (3) I.  Mr. Ziff

* Not to be given, 1961–1962.
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*132. The Transcendental Movement in American Literature. (3) II.  
Mr. Smith

149. The English Lyric. (3) I.  
The development of the English traditions of structure and style in lyric poetry.  
Miss Miles

152. Chaucer. (3) II.  
Mr. Muscatine

*153. Introduction to the Study of Poetry. (3) II.  
Mr. Renoir

155. The Age of Chaucer. (3) I.  
Mr. Cline, Mr. Shumaker, Mr. Richmond

158A. Beginnings of the English Renaissance, and literature of the sixteenth century.  
158B. Literature of the seventeenth century.  
158B satisfies the English major requirement of a course on Milton or the Age of Milton.  
Mr. Schorer

160. British Literature from 1900 to the Present. (3) II.  
Mr. Halpern

161. Recent British and American Poetry. (3) I.  
Mr. Traugott

166. The Age of Swift and Pope. (3) II.  

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.  
The Staff (Mr. Richmond in charge)  
Explication and evaluation of literary texts and study of the various principles of literary judgment.

B. The Senior Course

(Sections limited to twenty students each.)  
Prerequisite: course 100. Designed primarily for English majors.  
Intensive study of the more important works of a major author and the writing of a long essay.

*151A. Arnold. (3) I.  
Mr. Caldwell

*151B. Byron. (3) I.  
Mr. Seelye

*151Br. Browning. (3) I.  
Mr. Watt

151C. Conrad. (3) I.  
Mr. Orgel

151D. Dryden. (3) I.  

* Not to be given, 1961–1962.
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151E. Henry James. (3) II. Mr. Bloom
151F. Fielding. (3) II. Mr. Sacks
*151H. Hawthorne. (3) I. Miss Garlitz
151J. Milton. (3) I and II. Mr. Patrides, Mr. Shumaker, Mr. Friedman
151K. Contemporary Authors. (3) I and II. Mr. Tracy, Mr. Flanagan
151L. Chaucer. (3) I and II. Mr. Bronson, Mr. Stewart, Mr. Caldwell
I: Mr. Stewart; II: Mr. Bronson, Mr. Caldwell.
151M. Melville. (3) I. Mr. Raleigh
*151P. Pope. (3) II. Mr. O Hehir
*151R. Keats. (3) II. Mr. Halpern
151S. Shakespeare. (3) I and II. Mr. Richmond, Mr. Rabkin
*151Sp. Spenser. (3) I. Mr. McNulty
151Sw. Swift. (3) I. Mr. Traugott
*151T. Thomas Hardy. (3) II. Mr. Paterson
151W. Whitman. (3) I. Mr. Parkinson
151Wd. Wordsworth. (3) II. Mr. Jordan

C. Honors Courses

*H195. Honors Course. (3) I and II. The Staff (Mr. Patrides in charge)
Prerequisite: candidacy for honors in English, and (normally) the completion of a section of English 151.
Open only to candidates for Honors in English. In this course the English major student will complete the bachelor’s thesis, begun in a section of English 151, required for candidacy for Honors in English.

*H197. Honors Course. (3) I and II. The Staff (Mr. Patrides in charge)
Prerequisite: candidacy for Honors in English, and (normally) the completion of a section of English 151.
Open only to candidates for Honors in English as a substitute for English H195. In this course the English major student, meeting with students working in the same area, will complete the bachelor’s thesis, begun in a section of English 151.

D. Special Studies

199. Special Study for Advanced Undergraduates. (1–3) I and II.
The Staff (Mr. Patrides in charge)
Open to honor students who have completed 9 or more units of upper division English in the junior year with an average grade of not less than B. Reading and conferences with the instructor in a field that shall not coincide with that of any regular course and shall be specific enough to permit the student to write a significant essay based upon his study. Not open to candidates for Honors in English (see courses H195 and H197).

* Not to be given, 1961–1962.
E. Advanced Composition

(Open only to upper division students who have the consent of instructor. With the consent of instructor, courses numbered 106 may be repeated without duplication of credit.)

106A. Short Fiction. (3) I and II. Mr. Burgess, Mr. Elliott
106B. Verse. (3) I and II. Mr. Gunn, Miss Miles
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. Zwerdling
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. Mr. Gunn, Mr. Halpern, Mr. Stout
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. Mr. Ritchie, Mr. Burgess
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
For seniors and graduate students undertaking an English teaching major or minor, ordinarily completed before practice teaching. 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 163.)

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.
The following courses are recommended for first-year graduate students: 200, 202, 203, 208, 211A–211B, 213.

* Not to be given, 1961–1962.
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.

200. Techniques of Literary Scholarship. (3) I and II.
   Mr. Brightfield, Mr. Caldwell, Mr. Jordan, Mr. Rader, Mr. Lynch, Mr. Seelye
   I: Mr. Brightfield, Mr. Jordan, Mr. Lynch, Mr. Seelye; II: Mr. Caldwell, Mr. Rader.

202. The History of English Criticism. (3) I. Mr. Brightfield

203M. Readings in Renaissance Literature. (3) I and II.
   Mr. Friedman, Mr. Orgel
   Open to graduate students and (with consent of instructor) to advanced undergraduates.

203N. Readings in English Literature, 1660–1744. (3) I. Mr. Traugott
   Open to graduate students and (with consent of instructor) to advanced undergraduates.

203P. Readings in American Literature of the Nineteenth and Twentieth Centuries. (3) I and II.
   Mr. Tuveson, Mr. Ziff
   Open to graduate students and (with consent of instructor) to advanced undergraduates.

204. Celtic Studies. (3) I and II.
   Mr. Hutson
   This course may be repeated for credit.

205A–205B. The Structure and History of the English Language (3–3) Yr.
   205A. I: Mr. Sacks; 205B. II: Mr. Reed.
   Mr. Reed, Mr. Sacks
   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. Reed
   Prerequisite: course 205A–205B. Students whose interest is contemporary literature may take 207 concurrently with 205B.
   The application of linguistic knowledge and methods of analysis to literary works.

208. Problems in the Study of Literature. (3) I and II.
   Mr. Coolidge, Mr. Jordan, Mr. Muscatine, Mr. Parkinson, Mr. Raleigh, Mr. Stewart
   Textual analysis, discussion of scholarly approaches based on secondary reading; problems in the presentation of materials.
   Topics will vary from year to year. The program for 1961–1962 will be as follows: Seventeenth-Century Literature (I, Mr. Coolidge), Nineteenth-Century Poetry (I, Mr. Parkinson), Nineteenth-Century Backgrounds (I, Mr. Raleigh); Romantic Critical Theory (II, Mr. Jordan), Literary Stylistics (II, Mr. Muscatine), American Literature (II, Mr. Stewart).

210. Chaucer. (3) I.
   Mr. Muscatine
   Some knowledge of Chaucer and his language is presupposed.

211A. Introduction to Old English. (3) I and II.
   Mr. Renoir
   Open to seniors with consent of instructor.
   Rapid reading of Old English texts.

* Not to be given, 1961–1962.
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#### 211B. The Beowulf. (3) I and II.
Mr. Renoir, Mr. Hutson

#### *211G–211H. Old and Middle English. (3–3) Yr.
Prerequisite for 211G: a reading knowledge of German. Especially designed for candidates for the Ph.D., degree. Development of the English language from its beginnings as illustrated in representative texts.

Mr. Reed

#### 211J. Modern English. (3) I.
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.

Mr. Reed

#### 212. Old English Poetic Forms and Techniques. (3) II.
Prerequisite: two semesters of Old English.

#### 213. Readings in Middle English. (3) I and II.
Mr. Cline, Mr. Pichler, Mr. Stewart

I: Mr. Pielhler, Mr. Stewart; II: Mr. Cline, Mr. Pielhler.
Rapid reading of selections in Middle English, and perhaps some entire poems, from the twelfth century to the fifteenth.

#### 214. American Drama. (3) II.
Prerequisite: consent of instructor.
Studies in American drama from the colonial period to the present.

Mr. Bogard

#### 217. Studies in Shakespeare. (3) II.
Mr. Evans

#### 218. Milton and His Contemporaries. (3) I.
Mr. Shumaker


220A. Readings in Medieval Latin. I.
Prerequisite: two years of high school Latin or equivalent.
An introduction to the central language and literature of the Middle Ages.

220B. Archaeology of the Manuscript: Its Importance for the History of Literature and Illumination. II.
Prerequisite: course 120 or 220A or equivalent.
Bibliography and special problems. Emphasis on medieval European literature without geographical or linguistic distinctions.

Mr. Jones

Mr. Bronson

#### *228. Regional Literature: California and the West. (3) II.
Mr. Hart

#### 230A–230B. American Literature. (3) Yr.
230A is not prerequisite to 230B.

Mr. Hart

#### 231. Linguistic Geography. (3) I.
Analysis of American dialect materials.

Mr. Reed

#### *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) I.
Mr. McNulty

#### 247. Theory of Poetry. (3) I.
Miss Miles

*Not to be given, 1961–1962.*
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251A-251B. Romantic Poets. (3-3) Yr.
251A: I. 251A is not prerequisite to 251B.

Mr. Caldwell, Mr. Jordan

254A-254B. Elizabethan Drama. (3-3) Yr.
254A is not prerequisite to 254B.

Mr. Lynch

Problems of bibliography, text, dramaturgy, performance, theatrical history in the English drama of the period 1660-1800.

257A. Literary Criticism, 1750-1850. (3) I.

Mr. McKenzie

257B. Methods and Assumptions of Recent Literary Critics. (3) II.

Mr. Shumaker

Mr. Bronson

258. Johnson and His Contemporaries. (3) I.

Mr. Lynch

260. Modern British Literature. (3) II.

From 1900 to the present.

Mr. Lynch

262. Nineteenth-Century Literature. (3) II.

Mr. Brightfield

264. John Donne and His Followers. (3) I.

Mr. Lynch

266. Period from 1660 to 1744. (3) II.

Mr. Lynch

269. Theory of Fiction. (3) I and II.

Mr. Shumaker, Mr. Pritchett

269. Special Study. (3-6) I and II.

The Staff (Mr. Watt in charge)

Normally reserved for students directly engaged upon the doctoral dissertation.

299. Special Study. (1-3) I and II.

The Staff (Mr. Watt in charge)

Primarily for students engaged in preliminary exploration of a restricted field, involving research and the writing of a report. May not be substituted for available seminars.

Related Courses in Another Department

The Literature of the Renaissance in Western Europe (Comparative Literature 151A-151B).

The Symbolist Movement in European Literature (Comparative Literature 201A-201B).

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.

* Not to be given, 1961-1962.
Woodrow W. Middlekauff, Ph.D., Professor of Entomology.
Ray F. Smith, Ph.D., Professor of Entomology (Chairman of the Department).
Morris A. Stewart, Ph.D., LL.D., Professor of Parasitology.
Edward S. Sylvester, Ph.D., Professor of Entomology.
Robert L. Usinger, Ph.D., Professor of Entomology.
Edward O. Essig, M.S., Professor of Entomology, Emeritus.
Abraham E. Michelbacher, Ph.D., Professor of Entomology, Emeritus.
John W. MacSwain, Ph.D., Associate Professor of Entomology.
Ronald W. Stark, Ph.D., Associate Professor of Entomology.
Howell V. Daly, Jr., Ph.D., Assistant Professor of Entomology.
Rudolph L. Pipa, 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 (Vice-Chairman of the Department).
Richard L. Doutt, Ph.D., LL.B., Professor of Biological Control.
Charles A. Fleschner, Ph.D., Professor of Biological Control, Riverside.
Norman W. Frazier, Ph.D., Lecturer in Entomology.
Harold T. Gordon, Ph.D., Lecturer in Entomology.
Carl B. Huffaker, Ph.D., Lecturer in Insect Ecology.
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.
Powers S. Messenger, Ph.D., Lecturer in Insect Ecology.
Robert L. Metcalf, Ph.D., Professor of Entomology, Riverside.
Edward A. Steinhaus, Ph.D., Professor of Insect Pathology.

Letters and Science List. Courses 100, 106, 110, 112, 117, 119, 126, 127, 127L, 129, 131, 133 are included in the Letters and Science List of Courses. For regulations governing this list, see page 95.

Departmental Major Adviser: Mr. Daly.

The Major in Entomology and Parasitology. To obtain a Bachelor of Science degree in this major, the following five items must be satisfied: 1. General University requirements. 2. College of Agriculture requirements (see page 63). 3. Entomology and Parasitology Curriculum requirements: (a) General—Bacteriology, 4 units. Botany and zoology, 19 units. Chemistry, 13 units. English and/or speech, 6 units. Geography, geology, or paleontology, 3 units. Physics, 3 units. (b) Agriculture—Agriculture (other than entomology and parasitology) and/or forestry, 6 units. Genetics, 3 units. Plant or animal pathology, 4 or 3 units. Plant or animal physiology, nutrition, or biochemistry, 3 units. Entomology and parasitology courses for the major, 22 units. Summer practice course, 0 units. 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), 38 or 39 units. 5. Certain courses are required for the major and, where applicable, may be used in partial satisfaction of 3 above. For details, see the Prospectus of the College of Agriculture, available without charge.

Honors. Information concerning honors may be obtained from the Dean's Office, College of Agriculture.

Lower Division Courses

10. Natural History of the Insects. (3) I. Mr. MacSwain
Lectures, demonstrations, and one or more field trips. For students not specializing in the zoological sciences.

49. Entomology Field Practice Course. (No credit) Mr. MacSwain, Mr. Bohart, Mr. Hurd
Five weeks, daily. Prerequisite: one course in entomology.

Upper Division Courses

100. General Entomology. (4) II. Mr. Daly
Lectures and laboratory.
Classification, life histories, morphology, physiology, and ecology of insects.

106. Introduction to Structure and Function in Insects. (4) I. Mr. Pipa
Lectures and laboratory. Prerequisite: course 100.
Gross and microscopic anatomy with emphasis on comparative and functional relationships.

110. Insect Physiology. (3) II. Mr. Craig
Lectures and laboratory. Prerequisite: course 106; Chemistry 8 or the equivalent.

112. Systematic Entomology. (4) II. Mr. Usinger
Lectures and laboratory. Prerequisite: course 100.
Classification of insects, taxonomic categories and procedure; bibliographical methods; nomenclature; museum practices.

114. Introductory Forest Entomology. (3) I. Mr. Stark
Lectures and laboratory. Not open to entomology majors.
Interrelationships of insect populations, forest stands, and forest practices. Identification, life histories, ecology, and control of insects affecting western forests and forest products.

115. Principles of Forest Entomology. (3) I. Mr. Stark
Lectures and laboratory. Prerequisite: course 100 or 114.

117. Helminthology. (4) I. ——, Mr. Furman
Lectures and laboratory.
Helminthic infections of man and domestic animals. Biology, host-parasite interrelationships; identification, prophylaxis, and therapeutics.

118. Plant Nematology. (4) II. Mr. M. W. Allen
Lectures and laboratory.
Identification, morphology, biology, and distribution of plant parasitic and associated nematodes. Symptomatology, pathology, and control of nematode infections in cultivated crops.

* Not to be given, 1961-1962.
119. Acarology. (3) I.
Lectures and laboratory. Prerequisite: course 112.
Taxonomy, biology, and ecology of mites and ticks.

124. Economic Entomology. (4) I.
Lectures and laboratory.
Life histories, habits, and principles involved in manipulating populations of injurious and beneficial insects and arachnids affecting plants and animals.

125. Insect Vectors of Plant Diseases. (4) I.
Mr. Sylvester, Mr. Jensen, Mr. Frazier
Lectures and laboratory. Prerequisite: Plant Pathology 120.
Role of insects in transmission and causation of plant diseases.

126. Medical Entomology. (4) II.
Mr. Stewart, Mr. Furman
Lectures and laboratory.
Role of insects and other arthropods in transmission and causation of diseases of humans and domestic animals.

127. Insect Ecology. (3) II.
Mr. Smith, Mr. Huffaker, Mr. Messenger
Prerequisite: upper division standing in one of the biological sciences.
Ecology, with examples from the insects; insect behavior; analysis of the insect environment; population dynamics.

127L. Laboratory in Insect Ecology. (1) II.
Mr. Smith, Mr. Huffaker, Mr. Messenger
Prerequisite: courses 100, 127 (may be taken concurrently). Enrollment limited to ten students.
Laboratory and field studies demonstrating principles. Emphasis on population dynamics and the analysis of the insect environment.

128. Chemistry of Insecticides and Fungicides. (4) I.
Mr. Gordon
Lectures and laboratory. Prerequisite: Chemistry 8.
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.
Mr. Douutt
Lectures and laboratory. Prerequisite: course 100.
Population phenomena; biology of entomophagous insects; theory and practice of biological control.

130A–130B. Agricultural Entomology. (3–3) Yr.
Mr. W. W. Allen, Mr. Middlekauff, Mr. Madsen
Lectures and field trips. Prerequisite: course 124. 130A is not prerequisite to 130B.
130A. Bionomics and principles involved in control of insects and mites. Side effects to vertebrates and invertebrates following insecticide usage. Primary emphasis on field and vegetable crops. Mr. W. W. Allen, Mr. Middlekauff.
130B. Plot design, sampling techniques, control programs, and equipment. Examples primarily from deciduous fruit and nut pests. Mr. Madsen, Mr. W. W. Allen.

131. Insect Pathology. (4) I.
Mr. Steinhaus, Mr. Martignoni
Lectures and laboratory. Prerequisite: course 100, and at least one course in mycology or bacteriology, or zoology.
General insect pathology and microbiology, including biological relationships between microorganisms and insects. Detailed study of bacterial, fungal, virus, and protozoan diseases of insects; noninfectious diseases; histopathology. Microbial agents and biological control.

* Not to be given, 1961–1962.
133. Biology of Aquatic Insects. (4) II. Mr. Usinger

Lectures and laboratory. Field trips for the study of stream and lake. General and applied limnology, with special reference to insects. Laboratory exercises on the life histories and identification of aquatic insects.

198. Directed Group Studies for Advanced Undergraduates. (1–5) I and II.

The Staff (Mr. Smith in charge)

199. Special Study for Advanced Undergraduates. (1–5) I and II.

The Staff (Mr. Smith in charge)

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163).

200A–200B. Research in Entomology and Parasitology. (1–6; 1–6) Yr.

The Staff (Mr. Smith in charge)

210. Insect Biochemistry. (3) I. Mr. Craig, Mr. Gordon

Lectures and laboratory. Prerequisite: courses 110, 128. Recommended: courses 106, 112, 127; Biochemistry 102. May be taken twice for credit.

212. Principles of Systematic Entomology. (3) II. Mr. Linsley, Mr. Usinger

Prerequisite: course 112.

Theory and philosophy of systematic entomology with emphasis on phylogeny, zoogeography, and nomenclature.

226. Advanced Medical Entomology. (2) I. Mr. Furman

Prerequisite: courses 117, 126; Bacteriology 101. Recommended: courses 106, 112, 127.

The genesis of arthropod-borne diseases.

227. Population Ecology. (2) I. Mr. Smith, Mr. Huffaker, Mr. Messenger

Prerequisite: course 127.

Population dynamics, regulation, and mensuration, theory of natural control.

232. History of Entomology. (3) II. Mr. Jensen

Prerequisite: course 100.

Development of influential ideas and principles in biology with special reference to entomology. Consideration given to effects of philosophy, religion, political and economic factors on evolution of scientific method.

250. Principles and Methods of Entomological Research. (3) I. Mr. Sylvester

Techniques and purposes of the scientific method in entomology, with emphasis on problem selection and the collection, evaluation, and presentation of data.

290. Seminar. (2) I and II. The Staff (Mr. Smith in charge)

Simultaneous enrollment for credit in more than one seminar permitted. May be repeated for credit.

Advanced study in various fields of entomology and parasitology. Topics will vary from year to year. Program for 1961–1962 will probably include seminars in: (a) Agricultural Entomology (Middlekauff, Madsen, W. W. Allen); (b) Parasitology (Stewart, Furman); (c) Insect Physiology and Toxicology (Craig, Gordon); (d) Insect Pathology (Steinhaus, Martignoni); (e) Systematic Entomology (I. MacSwain, Usinger; II. Dalv, Hurd); (f) Insect Ecology (Smith, Huffaker, Messenger); (g) Forest Entomology (I. Stark).

Staff Seminar in Entomology. (No credit) Yr. The Staff (Mr. Smith in charge)

Biweekly meetings for presentation of special topics.
Graduate Courses
(Given at Riverside)

200A–200B. Seminar in Entomology, Including Biological Control.
(1–1) Yr. The Staff (Entomology, Mr. Metcalf in charge; Biological Control, Mr. Fleschner 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. Fleschner

FOOD TECHNOLOGY
(Office, 119 Home Economics Building)

Maynard A. Joslyn, Ph.D., Professor of Food Technology.
Gordon Mackinney, Ph.D., Professor of Food Technology.
William V. Cruess, Ph.D., Professor of Food Technology, Emeritus.

Harold S. Olcott, Ph.D., Professor of Marine Food Technology.

The Major in Food Technology. Information concerning training in the area of food science and technology may be obtained from the Department of Nutrition and Home Economics. The courses listed below are now offered by that Department.

Honors. Information concerning honors may be obtained from the Dean’s Office, College of Agriculture.

Upper Division Courses

112. Principles and Practices of Food Processing. (3) I. Mr. Joslyn
Prerequisite: Chemistry 1A–1B and 8; Bacteriology 1 and 4; and a course in botany or zoology.

113. Chemical and Biochemical Aspects of Food Processing. (3) II. Mr. Olcott
Prerequisite: Chemistry 1A–1B, 8; Bacteriology 1 and 4.

118. Enzyme Technology. (3) I. Mr. Joslyn
Prerequisite: Biochemistry 102.
Enzymes in preparation and preservation of foods.

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.
Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

200A–200B. Seminar in Food Technology. (1–1) Yr. Mr. Joslyn, Mr. Olcott
237A–237B. Research in Food Technology. (1–9; 1–9) Yr.
Mr. Joslyn, 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
*142A–142B. French Literature of the Middle Ages.
*146A–146B. Readings in Contemporary French Literature.

German

Italian
130. Dante's Divine Comedy.
*140. Dante, Petrarch, and Boccaccio.

Near Eastern Languages

Oriental Languages
22. Indonesian Civilization.

* Not to be given, 1961–1962.
104E. Studies in Ancient Chinese Literature: Interpretation.
*142C. Civilizations of Eastern Asia: China.
142K. Civilizations of Eastern Asia: Korea.
*163. Readings in Pacific Literature in English Translation.

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.
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. Survey of Russian Literature and Intellectual Trends.
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 Western and Southern Slavic Literatures.
153. Polish Literature of the Post-Romantic Period.
154. Polish and Russian Romanticism.
155. Mickiewicz.
160. Survey of Czech and Slovak Literatures.
161. Czech and Slovak Literature of the Nineteenth Century.
*170. Survey of Serbian and Croatian Literatures.
*180A. Survey of Russian Culture to 1800.
*180B. Survey of Russian Culture from 1800 to the Present.
182. History of Polish Culture.

Spanish

* Not to be given, 1961–1962.
FORESTRY

(Department Office, 145 Walter Mulford Hall)

*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.
Rudolf F. Grah, 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 (Acting Chairman of the Department for the fall semester).

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. (hon.), 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. Zinke, Ph.D., Assistant Professor of Forestry.

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.
Eric L. Ellwood, Ph.D., Lecturer in Forestry.
Joseph E. Marian, D.Tech. Sci., Lecturer in Forestry.
Marshall N. Palley, Ph.D., Lecturer in Forestry.
Herbert C. Sampert, M.F., Lecturer in Forestry.
Arno P. Schniewind, Ph.D., Lecturer in Forestry.

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 95.

Lower Division Courses

1. Elements of Forestry. (3) II. Mr. Grah
Forest in relation to national life; principles of forestry.

The extra-session courses 46, 47, 48 listed below are offered only at the U.C. Forestry Camp, Meadow Valley, and cover approximately ten weeks of summer work.

46. Ecology of Forests and Associated Wildlands. (3) Mr. Stone
Prerequisite: Botany 1.
This course is prerequisite to all required courses in the curriculum in forestry.

* In residence spring semester only, 1961–1962.
47. Measurement and Utilization of Forests and Associated Wildland Resources. (4) Mr. Pall ey
Prerequisite: mechanical drawing, one-half year; Engineering 21. This course is prerequisite to all required courses in the curriculum in forestry.

48. Management of Forests and Associated Wildlands. (3) Mr. Colwell
Prerequisite: mechanical drawing, one-half year; Engineering 21, Botany 1. This course is prerequisite to all required courses in the curriculum in forestry.

Upper Division Courses

Courses 46, 47, 48, are prerequisite to all required courses in the School of Forestry.

103. Principles of Forest Ecology. (4) I. Mr. Stone
Lectures and laboratory. Prerequisite: Botany 1 and Chemistry 1A.

104. Silviculture. (4) I. Mr. Muelder
Lectures, laboratory, field trips. Prerequisite: course 103.
Methods of governing growth and reproduction of forest stands.

106. Forest Planting. (3) I. Mr. Muelder
Lectures, laboratory, or field trips. Prerequisite: Botany 1.
Artificial establishment of forest stands from collection of seed to planting of trees.

108. Dendrology. (3) I. Mr. Zinke
Lectures, laboratory, field trips. Prerequisite: Botany 1.
Taxonomy, identification, and silvical properties of forest trees and shrubs.

110. Forest Mensuration. (4) II. Mr. Palley
Lectures and conferences. Prerequisite: a course in elementary statistics.
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. Sampert
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 regulatory principles involved in managing forest lands for continuous production.
121. Forest Economics. (3) I. Mr. Zivnuska
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.
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.
Prerequisite: 6 units of economics and senior standing.
Production methods and principles involved in logging; cost analyses.

132. Forest Photogrammetry. (3) II. Mr. Colwell
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 163.)

201A–201B. Seminar in Forestry. (2–2) Yr. Mr. Stone, Mr. Colwell
201A is not prerequisite to 201B.

202. Research in Forestry. (1–6) I and II. The Staff (Mr. Vaux in charge)

203. Seminar in Forest Ecology. (2) I. Mr. Stone
Prerequisite: course 103 and Botany 111.
204. Seminar in Silviculture. (2) I.  
Prerequisite: course 104.  
Mr. Muelder

205. Seminar in Wood Technology. (2) I.  
Prerequisite: course 114.  
Mr. Cockrell

206. Seminar in Forest Management. (2) II.  
Prerequisite: course 120 and 6 units of economics.  
Mr. Grah

207A–207B. Seminar in Forest Economics. (2–2) Yr.  
Mr. Zivnuska, Mr. Vaux

Prerequisite: 12 units of economics, agricultural economics, or forest economics. 207A is 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

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.

Related Courses in Other Departments

Economics of Natural Resources (Agricultural Economics 175)
Taxonomy of Seed Plants (Botany 120)
Elementary Plant Physiology (Botany 140)
Principles of Plant Distribution (Botany 151)
Cost Accounting (Business Administration 122)
Production Organization and Management (Business Administration 140)
Introduction to Structural Analysis (Engineering 18A–18B)
Route Surveying (Civil Engineering 102)
Hydrology (Civil Engineering 160)
Introductory 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)

Introduction to Probability and Statistics in Biology and Public Health (Public Health 160A, 160B)
Soil Characteristics (Soil Science 100)
The Soil as a Medium of Plant Growth (Soil Science 110)
Statistical Inference (Statistics 130A–130B)
Introduction to Wildlife and Fisheries Management (Zoology 116)
Forest Products Laboratory

The Forest Products Laboratory, at the Richmond Field Station, was established in 1950 to conduct research in wood chemistry, wood physics, and related applications to wood utilization. It has excellent research facilities for investigation of a wide range of problems in these fields.

Wildland Research Center

The Wildland Research Center of the Agricultural Experiment Station enables the School of Forestry faculty to participate with members of other departments in research in forestry, watershed protection, wildlife management, range management, recreation, and other aspects of wildland resource use. These research activities as well as those of the Forest Products Laboratory provide numerous opportunities for graduate student research and, frequently, for the employment of graduate and undergraduate students in research work.

FRENCH

(Department Office, 4125 Dwinelle Hall)

Alexandre E. Calame, Docteur ès Lettres, Professor of French.
Francis J. Carmody, Ph.D., Professor of French.
Irving Putter, Ph.D., Professor of French.
Warren Ramsey, Ph.D., Professor of French and of Comparative Literature.
Manfred M. G. Sandmann, Litt.D., Professor of French and Romance Philology.
Ronald N. Walpole, Ph.D., Professor of French (Chairman of the Department).
Clarence D. Brenner, Ph.D., Professor of French, Emeritus.
Jacqueline de La Harpe, Docteur ès Lettres, Professor of French, Emeritus.
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.
Paul M. Bertrand Augst, Ph.D., Assistant Professor of French.
Marc J. Bensimon, Ph.D., Assistant Professor of French.
Frank P. Bowman, Ph.D., Assistant Professor of French.
Lionel R. Duisit, Ph.D., Assistant Professor of French.

*In residence spring semester only, 1961-1962.
Basil Guy, Ph.D., Assistant Professor of French.
Walter E. Rex, Ph.D., Assistant Professor of French.
Elie R. Vidal, Ph.D., Assistant Professor of French.
John H. Atherton, M.A., Instructor in French.
Leonard W. Johnson, M.A., Acting Instructor in French.
Marie-Louise Dufrenoy, Ph.D., Associate in French.

Roger C. Kempf, Licencié ès Lettres, Visiting Associate Professor of French.

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 95.

Departmental Major Advisers: Mr. Bowman (Teaching Majors), Mr. Guy. The Majors. Two majors are offered: Plan A, emphasis on literature; Plan B, emphasis on language and culture. Candidates for the teaching credential must take Plan B. Required: courses 1, 2, 3, 4, 25, or their equivalents. (Students who receive grade A or B in French 4 will be admitted to upper division courses without course 25.) History 4A–4B, Philosophy 20A–20B, English 1A–1B, and Latin are strongly recommended.

Plan A. 24 upper division units, including courses 101A–101B, 109A–109B and at least four semesters chosen from 112A, 112B, 120A, 120B, 121A, 121B. Courses 108, 142, 146 are not accepted. Course 104 is recommended.


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. Students who have completed French H197A–H197B with a grade of B or better, and who have passed the comprehensive examination, will be recommended for honors at graduation.

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. Mr. Duisit in charge

French for Graduate Students. (No credit) I and II. Mr. Bowman in charge
Elementary and intermediate sections. Preparation for graduate reading examinations.

2. Elementary French (continuation of 1). (4) I and II.
Prerequisite: course 1 or its equivalent. Mr. Atherton in charge
3. Intermediate French. (4) I and II.  Mr. Augst, Mr. Vidal
   Some sections emphasize reading; others conversation. Reading sections are not designed for prospective French majors.
   Reading sections: Mr. Vidal in charge; conversation sections: Mr. Augst in charge.
   Prerequisite: course 2 or equivalent.

   Prerequisite: course 3 (conversation) or equivalent.  Mr. Augst in charge

4R. Intermediate French. Reading. (4) I and II.  Mr. Vidal in charge
   Prerequisite: course 3 or equivalent.
   Reading of short, representative works with classroom analysis in English. Not for prospective majors in French.

20. Intermediate French Pronunciation. (1) I and II.  Mr. Augst in charge
   Prerequisite: course 2 or equivalent.

25. Advanced French. (3) I and II.  Mr. Augst in charge
   Prerequisite: course 4, or a grade of A or B in course 4R.

**Upper Division Courses**

The prerequisite to all upper division courses except 142, 146 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 104, 108, and 125.

   Beginning each semester.  Mr. Sandmann in charge

104. Methods of Literary Study. (2) I and II.  Mr. Augst
   Should be taken as early as possible.

108A–108B. Reading in French Literature. (3–3) Yr.  Mr. Meylan
   Prerequisite: course 4 or 4R, or equivalent.
   Masterpieces of recent French literature read in French; classroom work in English.

   Mr. Bowman (in charge), Mr. Kempf, Mr. Rex, Mr. Vidal
   109A. Middle Ages Through Seventeenth Century.
   109B. Eighteenth and Nineteenth Centuries.

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.  Mr. Augst

116A–116B. French Literature from 1885 to 1914. (2–2) Yr.  Mr. Carmody

118A–118B. The Sixteenth Century. (2–2) Yr.  Mr. Meylan

120A°–120B. The Seventeenth Century. (2–2) Yr.  Mr. Eustis

* Not to be given, 1961–1962.
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>121A-121B</td>
<td>The Eighteenth Century</td>
<td>(2-2) Yr.</td>
<td>Mr. Guy</td>
</tr>
<tr>
<td>125</td>
<td>Advanced French Pronunciation</td>
<td>(1) I and II.</td>
<td>Mr. Augst (in charge), Miss Dufreney, Mr. Duisit</td>
</tr>
<tr>
<td>130A-130B</td>
<td>Advanced Grammar and Composition</td>
<td>(3-3) Yr.</td>
<td>Mr. Carmony (in charge), Mr. Meylan, Mr. Rex</td>
</tr>
<tr>
<td>131A-131B</td>
<td>Advanced Literary Composition</td>
<td>(3-3) Yr.</td>
<td>Mr. Duisit</td>
</tr>
<tr>
<td>134A-134B</td>
<td>French Culture and Institutions</td>
<td>(3-3) Yr.</td>
<td>Mr. Johnson</td>
</tr>
<tr>
<td>160</td>
<td>Contemporary Literature</td>
<td>(2) II.</td>
<td></td>
</tr>
<tr>
<td>H197A-H197B</td>
<td>Honors Course</td>
<td>(2-2) I and II.</td>
<td>Mr. Calame, Mr. Bowman, Mr. Guy</td>
</tr>
<tr>
<td>199</td>
<td>Special Study for Advanced Undergraduates</td>
<td>(1-3) I and II.</td>
<td>The Staff (Mr. Meylan in charge)</td>
</tr>
</tbody>
</table>

Courses in Which No Knowledge of French Is Required

   Lectures (in English); reading of representative works in English translation.
   39A. To the End of the Eighteenth Century. (2) I. Mr. Putter (in charge), Mr. Atherton, Mr. Rex.
   39B. The Nineteenth Century. (2) II. Mr. Putter (in charge), Mr. Atherton, Mr. Rex.
   39C. The Contemporary Period. (2) I. Mr. Ramsey.
   Prerequisite: course 39B or consent of instructor.

*142A-142B. French Literature of the Middle Ages. (2-2) Yr. Mr. Walpole
   142A. Epic, romance, history.
   142B. Drama, lyric and allegorical poetry.

*146A-146B. Readings in Contemporary French Literature. (2-2) Yr. Mr. Carmody

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 163.)

Course 201A or 206A is required for all candidates for the M.A. degree.

201A-201B. Historical Grammar. (3-3) Yr. Mr. Walpole

* Not to be given, 1961-1962.
202A–202B. Studies in Medieval French Literature. (2–2) Yr.  
Mr. Walpole

203A–203B. Studies in French Language. (2–2) Yr.  
203A. Grammar and Style: from the Seventeenth Century to the Present Day.  
203B. Introduction to the Theory and History of French Syntax.

204A–204B. Studies in the Eighteenth Century. (2–2) Yr.  
204A. Voltaire and the Philosophers.  
204B. Rousseau.

(2–2) Yr.  
Mr. Kempf

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.

215A–215B. Seminar in Contemporary Literature. (2–2) Yr.  
Mr. Ramsey

*216A–216B. French Poetry of the Renaissance. (2–2) Yr.  
Mr. Bensimon

*217A–217B. Humanism in the French Renaissance. (2–2) Yr.  
Mr. Meylan

218A–218B. French Classicism. (2–2) Yr.  
Mr. Calame

Mr. Bowman

220A–220B. Explication de Textes. (2–2) Yr.  
Mr. Calame

230A°–230B. French Literary Criticism. (2–2) Yr.  
Mr. Eustis

235. Methods of Literary Research with Special Reference to Bibliography.  
(1) II.  
For prospective doctoral candidates.  
Mr. Eustis

298. Special Study for Graduate Students. (1–4) I and II.  
The Staff (Mr. Calame in charge)

Related Courses in Other Departments

See courses listed under Comparative Literature and Romance Philology.

* Not to be given, 1961–1962.
§ To be offered, 1961–1962 only.
GENETICS

(Department Office, 345 Mulford Hall)

Spencer W. Brown, Ph.D., Professor of Genetics.
Everett R. Dempster, Ph.D., Professor of Genetics.
James A. Jenkins, Ph.D., Professor of Genetics.
I. Michael Lerner, Ph.D., Professor of Genetics (Chairman of the Department).
§Curt Stern, Ph.D., D.Sc., Professor of Genetics and Zoology.
Patricia St. Lawrence, Ph.D., Assistant Professor of Genetics.

Donald R. Cameron, Ph.D., Lecturer in Genetics.
G. Ledyard Stebbins, Ph.D., Professor of Genetics, Davis.

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 95.

Departmental Major Adviser: Mr. Dempster.

The Bachelor of Science degree in genetics may be obtained by fulfilling the requirements for either the animal science curriculum or the plant science curriculum. Also see the group major in genetics in the College of Letters and Science (page 92).

The Major in Animal Genetics. To obtain the Bachelor of Science degree in this major, the following five items must be satisfied: 1. General University requirements. 2. College of Agriculture requirements (see page 63). 3. Animal science curriculum requirements: (a) General—bacteriology, 4 units. Botany, 4 units. Chemistry and/or biochemistry, 16 units. Economics, 3 units. English and/or speech, 6 units. Physics, 4 units. Zoology, 10 units. (b) Agriculture—animal nutrition, 3 units. Animal pathology, parasitology, or additional zoology, 3 units. Animal physiology, 5 units. Genetics, 4 units. Upper division courses in either the major or a closely related field, with approval of major adviser, 12 units. 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), 50 units. 5. Certain courses are required by the major and, where applicable, may be used in partial satisfaction of 3 above. For details, see the PROSPECTUS OF THE COLLEGE OF AGRICULTURE, available without charge.

The Major in Plant Genetics. To obtain the Bachelor of Science degree in this major, the following five items must be satisfied: 1. General University requirements. 2. College of Agriculture requirements (see page 63). 3. Plant

science curriculum requirements: (a) General—botany and plant physiology, 9 units. Chemistry, 13 units. Economics, 3 units. English and/or speech, 6 units. Physics, 3 units. (b) Agriculture—entomology and parasitology, 4 units. Genetics, 4 units. Irrigation, plant nutrition, or soils, 3 units. Plant pathology, 4 units. Upper division courses in either the major or a closely related field with approval of major adviser, 12 units. (c) Electives (restricted)—selected from the two areas listed below (16 units): 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 units. 5. Certain courses are required for the major and, where applicable, may be used in partial satisfaction of 3 above. For details, see the PROSPECTUS OF THE COLLEGE OF AGRICULTURE, available without charge.

Honors. Information concerning honors may be obtained from the Dean's Office, College of Agriculture.

Lower Division Courses

10. Heredity and Evolution. (3) II. Mr. Lerner

For students not specializing in biology. No credit to students who have had or are taking upper division genetics, botany, or zoology courses.

Inheritance, variation, and evolution 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.

100C. Principles of Genetics Laboratory. (1) I. Mr. Jenkins

Prerequisite: course 100 or Zoology 114 (may be taken concurrently). To supplement course 100 or Zoology 114.

101. Cytogenetics. (3) II. Mr. Brown

Prerequisite: course 100; general cytology.

102. Biometrical Genetics. (4) II. Mr. Dempster

Lectures and laboratory. Prerequisite: course 100, Statistics 2.

103A–103B. Organic Evolution. (2–2) Yr. Mr. Stebbins

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.

† Not including Mathematics C or D.
† In addition to University requirements.
104. Introduction to Biochemical Genetics. (3) I. Miss St. Lawrence
Prerequisite: course 100, Chemistry 8, or their equivalents. Recommended: a course in biochemistry.

105. Principles of Population Genetics. (2) I. Mr. Lerner
Prerequisite: course 100 and elementary statistics. Offered in odd-numbered years. Genetic forces in Mendelian populations, with emphasis on selection.

107. Chromosome Morphology and Behavior. (3) II. Mr. Cameron
Prerequisite: course 101 (may be taken concurrently) or consent of instructor.

198. Lectures in Advanced Genetics. (3) I. Mr. Lewis
Prerequisite: course 100.
Selected topics in advanced genetics. May be repeated for credit.

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 163.)

205. Advanced Population Genetics. (2) II.
Lecture and laboratory. Prerequisite: upper division work in statistics or biometrical genetics and consent of instructor. Offered in even-numbered years. Quantitative genetic analysis and experimental design.

280. Graduate Seminar in Genetics. (1–4) I and II.
The Staff (Mr. Lewis in charge)

299. Research in Genetics. (1–9) I and II.
The Staff (Mr. Dempster in charge)

Staff Seminar in Genetics. (No credit) I and II.
The Staff (Mr. Cameron in charge)

Weekly meeting for the presentation of special topics.

Related Courses in Other Departments

Human Evolution and Fossil Man (Anthropology 152)
Bacterial Genetics (Bacteriology 107)
Seminar in Microbial Genetics (Bacteriology 213)
Plants in Relation to Man (Botany 115 and 115L)
Plant Cytology (Botany 130)
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, 501 Earth Sciences Building)

James J. Parsons, Ph.D., Professor of Geography (Chairman of the Department).

John B. Leighly, Ph.D., LL.D., Professor of Geography, Emeritus.

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.

Paul Wheatley, Ph.D., Associate Professor of Geography.

James E. Vance, Jr., Ph.D., Assistant Professor of Geography.

David I. Blumenstock, Ph.D., Lecturer in Geography.

Hans G. Gierloff-Emden, Ph.D., Visiting Assistant Professor of Geography.

Leszek Kosiński, Ph.D., Visiting Instructor in Geography.

Daniel B. Luten, Ph.D., Lecturer in Geography for the spring semester.

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 95.

Departmental Major Adviser: Mr. Vance.

The Major. Required: Geography 1, 2, and 4. Recommended: Botany 10 or Biology 11A-11B, Geography 5A-5B, Geology 10, Paleontology 1, Soil Science 10, and an introductory course in statistics.

Twenty-four 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 from related fields under a plan approved by the departmental major adviser.

Each program should normally include Geography 101 or 102, 105A, 121A or 121B, and 151.

Honors. Candidates for honors with the major in geography are required to have an over-all grade-point average of at least 3.0 and to complete course H195.

Lower Division Courses

1. Introduction to Physical Geography. (3) I and II.

   Two lectures and two section meetings per week.

   Mr. Wheatley, Mr. Blumenstock

2. Introduction to Cultural and Historical Geography. (3) II.

   Two lectures and two section meetings per week.

   Mr. Glacken

1 In residence fall semester only, 1961-1962.
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
Three lectures and one section meeting per week. 5A is not prerequisite to 5B.
5A. Geography of world agriculture.
5B. Forest and mineral resources, manufacturing regions, trade routes, and trade centers.

Upper Division Courses

101. Field Geography. (3) I.  
Mr. Kesseli, Mr. Gierloff-Emden
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. Parsons
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. Kesseli
One lecture hour and two three-hour laboratory periods per week. Prerequisite: consent of the instructor.
105A. Map projections.
105B. Cartographic representation.

108. Analysis of Land Forms. (3) I.  
Mr. Gierloff-Emden
Origin of land forms. Review of 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. Blumenstock
Prerequisite: a knowledge of elementary physics and calculus is desirable.

113. Climatology. (3) II.  
Mr. Blumenstock

119. The Arid Lands. (2) I.  
Mr. Parsons
A comparative survey of the arid and semi-arid regions of the world. Climate, landforms, water, soils, and vegetation; population and resources.

121A. Geography of Eastern North America. (3) I.  

121B. Geography of Western North America. (3) II.  

122A. Geography of Middle America. (3) I.  
Mr. Parsons

*122B. Geography of South America. (3) II.  
Mr. Parsons

123A. Geography of Mediterranean Europe. (3) I.  
Mr. Glacken

123B. Geography of Northwest Europe. (3) II.  
Mr. Wheatley

124. Geography of the Soviet Union. (3) I.  
Mr. Mirov

125A. Geography of Southeast Asia. (3) II.  
Mr. Wheatley

* Not to be given, 1961–1962.
125B. Geography of East Asia. (3) I. Mr. Glacken, Mr. Wheatley

*126. The Geography of the Middle East. (3) I. Mr. Wheatley

§129. Geography of the Pacific Islands. (3) I. Mr. Blumenstock

  The islands, seas, and peoples of Melanesia, Micronesia, and Polynesia (including Hawaii). The tropical ocean and the nature of low islands and high islands. Hypotheses of prehistoric migrations and contacts. European explorations and settlements. Contemporary cultures and economies.

*130. Geography of the Tropics. (2) II. Mr. Parsons

  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

§135. The Human Geography of Central Europe. (3) II. Mr. Kosinski

  Environmental, culture and economy in Eastern Germany, Poland, Czechoslovakia, Hungary, Rumania, Bulgaria, Yugoslavia, and Albania.

140. Transportation Geography. (3) II. Mr. Vance

  The influence of geographical factors in the creation, transformation, and maintenance of transportation forms and functions; the bearing of transportation on urban and regional development and on industrial location; its role as an "organizing force" in economic geography.

*141. Economic Geography: Primary Production. (3) I.

  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 centuries.

153. Natural Resources and Their Exploitation. (3) II. Mr. Luten

  Conservative and destructive uses of habitat by cultures 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.

176. The Relations Between Nature and Culture. (2) II. Mr. Glacken

  A history of the great ideas in Western thought, from antiquity to the present, concerning the relationship of human culture to the natural environment.

§190. Population Geography. (3) II. Mr. Kosinski

  The distribution and characteristics of human settlement and settlement forms (rural and urban) over the earth.

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. Vance in charge)

* Not to be given, 1961–1962.

§ To be offered one semester only, 1961–1962.
Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163)

For facilities for research, see the Announcement of the Graduate Division, Northern Section.

201. Seminar in Latin-American Geography. (2) I.  Mr. Parsons
202. Seminar in Historical Geography. (2) I.  Mr. Wheatley
203. Seminar in Cultural Geography. (2) II.  Mr. Sauer
205. Seminar in Physical Geography. (2) I.  Mr. Blumenstock
207. Seminar in History of Geography. (2) II.  Mr. Glacken
208. Seminar in Economic Geography. (2) II.  Mr. Parsons
219A–219B. Research. (1–5; 1–5) Yr.  The Staff (Mr. Glacken in charge)

GEOLOGY

(Department Office, 301 Earth Sciences Building)

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.
Francis J. Turner, Sc.D., Professor of Geology.
John Verhoogen, M.E., Ph.D., Professor of Geology.
Howel Williams, Sc.D., Professor of Geology.
Nicholas L. Taliaferro, Ph.D., Professor of Geology, Emeritus.
Garniss H. Curtis, Ph.D., Associate Professor of Geology.
Jack F. Evernden, Ph.D., Associate Professor of Geology.
William S. Fyfe, Ph.D., Associate Professor of Geology.
Richard L. Hay, Ph.D., Associate Professor of Geology.
Clyde Wahrhaftig, Ph.D., Associate Professor of Geology.
Lionel E. Weiss, Sc.D., Ph.D., Associate Professor of Geology.
Mark N. Christensen, Ph.D., Assistant Professor of 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 95.

* Not to be given, 1961–1962.
1 In residence fall semester only, 1961–1962.
2 In residence spring semester only, 1961–1962.
MAJOR IN GEOLOGY

Departmental Major Adviser: Mr. Curtis.

The Major. Required courses: Chemistry 1A–1B; Physics 2A–2B, 3A–3B; Mathematics 1A–1B or 3A–3B; Paleontology 1; Geology 5, 6, 101, 103, 107, 118; and at least 10 units selected from either one of the following two groups of courses.

Group 1: Geology 104A–104B, 105, 116, 117, 131, 133, and Chemistry 109 or 110A.

Group 2: Geology 105, 116, 117; Paleontology 111, 112, 136, and 137.

All students majoring in geology are advised to elect Zoology 1A in satisfaction of the Letters and Science requirement in Biological Sciences and to choose other elective courses on the advice of the major adviser. As preparation for graduate work in geology, Mathematics 2A–2B or 4A–4B or 14A and additional chemistry and physics are strongly recommended. Other recommended electives include any course listed in the two groups above, Statistics 2, Chemistry 5, Geology 102B–102C, 106A–106B, 111A–111B, and 122A–122B.

Geochemistry. Students interested in geochemistry as a major field should complete the field major in physical sciences with emphasis on chemistry and geology. For this program, upper division electives should be selected with approval of the field major adviser from the following list of recommended courses: Chemistry 104, 110B, 120, 122, 123; Geology 101, 103, 104A–104B, 118, 131, 133.

The Honors Major Program. To be eligible for graduation with honors, a student must have enrolled in the honors major program by the start of his senior year and must have a 3.0 or higher grade-point average. Courses required in addition to the regular major program are Mathematics 4A–4B and Geology H196.

MAJOR IN GEOPHYSICS

Departmental Major Adviser: Mr. Curtis.

The Major Program. Required courses: Chemistry 1A; Geology 5, 101, 103, 121 or 122A–122B; Mathematics 1A–1B, 2A–2B; Geology 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 119, 122.

The Honors Major Program. To be eligible for graduation with honors, a student must have enrolled in the honors major program by the start of his senior year and must have a 3.0 or higher grade-point average. Courses which must be included in the major program are Geology 121 and 122A–122B, plus Geology 199 (2) which includes writing a thesis.
GEOLOGY

Lower Division Courses

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.
Materials and physical processes 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.

6. Introduction to Mineralogy. (4) I and II. 
Mr. Weiss, Mr. Fyfe
(Formerly Mineralogy 6.)
Two lectures and two three-hour laboratory periods per week.
Prerequisite: Chemistry 1A and Physics 2A or equivalent.
Physical properties of rock-forming minerals; elementary crystallography.

10. Introduction to Geology. (3) I and II. 
Mr. Gilbert, Mr. Christensen
Designed for students not majoring in any physical science or engineering; not open to students who have completed any college course in geology.
Basic principles of geology; laboratory study of minerals and rocks, structure of rock masses in the field, earthquakes, interpretation of geologic maps, and evolution of natural landscapes.

11. Historical Geology. (3) II. 
Mr. Hay
Three lectures per week and two half day field trips during semester.
Prerequisite: a college course in physical geology.
A sequel to course 10 designed for nonscience majors in the College of Letters and Science. Geological history of the earth and the evolution of its animal and plant inhabitants.

15. General Geology. (3) II. 
Mr. Verhoogen
Two lectures and one three-hour laboratory period per week.
Prerequisite: Chemistry 1A, Physics 2A–2B, Mathematics 1A–1B or 3A–3B, or consent of instructor. For majors in engineering. Not open to students who have passed course 5 or 10.
Similar in scope to course 5 but with some topics omitted.

Upper Division Courses

101. Field Geology. (4) I and II. 
The Staff (Mr. Christensen, Mr. Wahrhaftig in charge)
One lecture per week and one three-hour laboratory and field trips all day Saturday.
Prerequisite: course 5, 6, and 103.
Geology of the Berkeley Hills and vicinity. Training in geologic field methods in the solution of structural problems and in the preparation of geologic reports.

102B–102C. Field Geology. (1–1) Yr. Beginning either semester. 
Mr. Wahrhaftig, Mr. Gilbert
One week-long field trip. Prerequisite: course 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. Curtis, Mr. Gilbert
Two lectures and two three-hour laboratory periods per week.
Prerequisite: course 5 and 6, or 150.
Origin, description, and classification of rocks; laboratory study of hand specimens.

104A–104B. Microscopic Petrography Laboratory. (3–3) Yr. Mr. Williams
Lecture and two three-hour laboratory periods per week. Prerequisite: course 6; and for course 104B, course 103.

105. Stratigraphy. (3) I. Mr. Hay
Two lectures and one three-hour laboratory per week. Several all-day field trips in lieu of laboratories will be scheduled on week ends. Prerequisite: course 5, and course 3 or Paleontology I; course 103 recommended.
The origin and relationships of stratified rocks; principles of stratigraphic measurement and correlation.

106A–106B. Mineral Deposits. (3–3) Yr. Mr. Meyer, Mr. Curtis
Two lectures and one three-hour laboratory period per week. Prerequisite: 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. Mr. Williams
Prerequisite: course 3 and 103.
The sedimentary, igneous, and structural evolution of the continent.

111A–111B. Petroleum Geology. (3–3) Yr. Mr. Evernden
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. Mr. Christensen
Prerequisite: course 5, 101.
Folding and faulting in the earth’s crust.

117. Geomorphology. (3) I. Mr. Wahrhaftig
Two lectures and one 3-hour laboratory per week; 3 one-day field trips will be scheduled. Prerequisite: course 101 (may be taken concurrently) or consent of instructor.
Surficial processes and evolution of land forms.

120. Elementary Seismology. (2) I. Mr. Byerly
Prerequisite: course 5 or 1, Physics 2A or equivalent.
A general discussion of earthquakes.

121. Practical Seismometry. (4) II. Mr. Byerly
Three lectures and one three-hour laboratory period per week.
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. Prerequisite: course 5, Mathematics 2A–2B or 14A–14B (may be taken concurrently), Physics 4A, 4B.
Physics of the earth, its gravitational and magnetic fields, internal constitution and heat flow.
131. Parageneses of Minerals. (3) I. Mr. Fyfe
(Formerly Mineralogy 101.)
Three lectures per week. Prerequisite: course 103 (may be taken concurrently); Chemistry 5 recommended.
Geochemical treatment of the formation and association of minerals.

133. Crystal Chemistry of Minerals. (3) II. Mr. Pabst
(Formerly Mineralogy 103.)
Three lectures per week. Prerequisite: course 103 (may be taken concurrently); Chemistry 5 recommended.

150. Geology for Engineers. (3) II. Mr. Meyer
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.

H196. Honors Course in Geology. (3) II. Mr. Turner, Mr. Williams
One two-hour period per week. Prerequisite: senior and honors standing in the geology major.
A seminar dealing with major topics in physical geology, including reports on original literature and a comprehensive examination.

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 163.)

201A–201B. Seminar in Geochemistry. (2–2) Yr. Mr. Fyfe
Prerequisite: consent of instructor.
Principles and general problems of geochemistry. Course content varies from year to year.

204A–204B. Elastic Waves. (2–2) Yr. Mr. Byerly, Mr. Evernden
(204A formerly numbered 204.)
Prerequisite: Mathematics 119, Physics 105A–105B or equivalent.
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 equivalent, Geology 131 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 equivalent.
Study of the literature of selected mining districts, with laboratory demonstration of textural and mineralogic features.

207. Seminar in Volcanology. (2) I. Mr. Williams

208. Physics of Solids. (2) I. Mr. Verhoogen
Physical and chemical properties of solids, with reference to rock-forming materials.
Content will vary from year to year.
209A-209B. Physical Stratigraphy and Tectonics. (2-2) Yr.
Prerequisite: consent of instructor. Mr. Christensen,
Critical study of original literature, discussions, and occasional lectures. Topics will vary from year to year.

210. Advanced Optical Mineralogy. (3) I. Mr. Pabst
One lecture and 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 instructor.
The nature and interpretation of microscopic fabric of deformed rocks.

212. Universal-Stage Petrography. (2) I. Mr. Turner
Prerequisite: course 210 or 214A, and consent of instructor.

213. Seminar in Geomorphology. (2) II. Mr. Wahrhaftig
Prerequisite: course 117 or equivalent.
The topics will vary from year to year.

214A-214B. Advanced Petrology. (2-4; 2-4) Yr. Mr. Turner
Prerequisite: course 104A-104B, 131 (may be taken concurrently). Recommended: Chemistry 122. A reading knowledge of French or German is required of candidates for the Ph.D. degree.
Problems of petrogenesis. Microscopic study of suites of rock sections.
214A. Igneous rocks.
214B. Metamorphic rocks.

215A-215B. Sedimentary Petrology. (3-3) Yr. Mr. Gilbert, Mr. Hay
Prerequisite: a course in microscopic petrography and consent of instructor. Recommended: course 210.
Problems in sedimentary petrogenesis; laboratory study of sediments and sedimentary rocks.
215A. Recent sediments.
215B. Consolidated sedimentary rocks.

216. Structural Analysis of Deformed Rocks. (2) I. Mr. Weiss
Prerequisite: course 101, and consent of instructor.
Content will vary from year to year.

217. Advanced Seismometry. (2) II. Mr. Byerly
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
Theory of the figure of the earth, its gravitational field, earth tides, isostasy, and internal constitution. The content will vary from year to year.

220. Research. (1-5) I and II. The Staff (Mr. Meyer in charge)

222. Geochronology. (2) II. Mr. Evernden, Mr. Curtis
Prerequisite: consent of instructor.
Radioactive decay schemes and their use in dating rocks and in geologic correlation; geologic rate problems.
237A. Crystallography. (3) I.
(Formerly Mineralogy 207A.)
Three lecture periods per week.
Prerequisite: consent of instructor.
Geometrical crystallography, including a discussion of space groups. Hermann-Mauguin symbols, the reciprocal lattice, the stereographic and gnomonic projections, crystal morphology and twinning.

237B. X-Ray Crystallography. (3) II.
(Formerly Mineralogy 207B.)
Two lectures and one laboratory period per week.
Prerequisite: course 237A or 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.

298. Directed Studies. (2) I and II. The Staff (Mr. Verhoogen in charge)
Selected readings in geology and geophysics.

University of California Seismographic Stations
The University of California now operates fifteen seismographic stations in northern California, Nevada and Oregon. The stations at Berkeley and Mt. Hamilton were established in 1887, the oldest stations in the Western Hemisphere. The other stations are operated in cooperation with local agencies.

The function is to locate all earthquake epicenters in northern California and adjacent parts of Nevada and Oregon, to study the seismicity of the region and to conduct other research in seismology.

The director of the seismographic stations is Professor of Seismology in the Geology Department, and as such teaches both upper division and graduate courses in seismology leading to the master's and doctoral degrees.

Research work has involved the study of earthquake wave propagation, the nature of the waves, their relation to earth structure, the nature of earthquake sources, the energy in earthquakes, the theory of the seismograph. Currently Advanced Research Projects Agency contract research is underway.

The offices and laboratories are in the Earth Sciences Building; the seismographs are in Haviland Hall; and an underground vault to house the seismographic instruments is being constructed in Strawberry Canyon.

The staff consists of the Director, graduate research assistants, assistant research seismologist, secretary, and technicians, as well as record changers at the outstations.

GERMAN

(Department Office, 5319 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.

1 In residence fall semester only, 1961–1962.
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 95.

Departmental Major Adviser: Miss Bonwit.

The Major. Courses 1, 2, 3, 4, or their equivalents, completed satisfactorily. Twenty-four 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 department. Attention is also directed to the courses listed under “Foreign Literature in Translation,” pages 347 and 348.

Higher Degrees. See the Announcement of the Graduate Division, Northern Section.

GERMAN

A. German for Graduate Students, Beginning. (No credit) I and II.
(Formerly numbered 1G.) Mr. Packham in charge
Preparation for graduate reading examinations.

1 In residence fall semester only, 1961–1962.
B. German for Graduate Students, Advanced. (No credit) I and II.
(Formerly numbered 2G.)
Preparation for graduate reading examinations.

Lower Division Courses

1. Elementary German. Beginners’ Course. (4) I and II.
Mr. Grotegut in charge
In addition to regular sections, certain sections, limited to fifteen students, meet five hours per week for those interested in conversational German.

12. Elementary German. Intensive Course. (8) I and II.
Two hours daily, four times per week.
This course is equivalent to course 1 and 2.

2. Elementary German (continuation of 1). (4) I and II.
Mr. Grotegut in charge
Prerequisite: course 1 or two years of high school German.
Conversational sections available. See course 1 above.

3. Intermediate German. (4) I and II.
Mr. Tubach in charge
Prerequisite: course 2 or three years of high school German.
Certain sections, limited to fifteen students, are for those interested in conversational German.

3S. Scientific German. (4) I and II.
Mr. Hannum in charge
Prerequisite: course 2 or equivalent. Open only to students in the colleges of Chemistry and Engineering, premedical and predental students, and science majors in Letters and Science.

4. Intermediate German. (4) I and II.
Mr. Tubach in charge
Prerequisite: course 3 or four years of high school German.
Conversational sections available. See course 3 above.

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. Tubach.
39B. Eighteenth Century. (2) I. Miss Bonwit.
39C. Nineteenth Century. (2) II. Mr. Loomis.
39D. Twentieth Century. (2) II. Mr. Politzer.

Upper Division Courses

Prerequisite: 16 units of lower division German courses.

100A. Twentieth-Century German Drama. (3) I and II.
Mr. Politzer, Mr. Mileck

100B. Twentieth-Century German Prose. (3) I and II.
100A is not prerequisite to 100B.
Mr. Mileck, Mr. Politzer

* Not to be given, 1961–1962.
101. Introduction to German Literature. (3) I and II.
Miss Harris, Miss Bonwit

Designed primarily for juniors whose major subject is German. Introduction to basic structural elements of literary genres and literary terminology. Limited to thirty students.

104A. Nineteenth-Century German Prose. (3) I.
Mr. Jászi

104B. Nineteenth-Century German Drama. (3) II.
104A is not prerequisite to 104B.

106. The Early Works of Goethe and Schiller. (3) I.
Mr. Grotegut

112A–112B. Survey of German Culture and Institutions. (2–2) Yr.
112A is not prerequisite to 112B.
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. Tubach

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. Grotegut

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.

119B. German Literature from the Romantic Movement to 1900. (3) II.
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 1855. (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. Tubach, Mr. Mileck

Not open to native Germans except with consent of the instructor.

131A–131B. Composition and Style. (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.

135B. Middle High German. (3) II.
Mr. Tubach

Prerequisite: course 135A.
Readings in Middle High German literature.

* Not to be given, 1961–1962.
140. Introduction to Descriptive and Historical German Grammar.  
(3) II.  
Prerequisite: same as for course 118A.  
For prospective teachers and those planning to take courses in linguistics.  
Mr. Beeler  

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 163.)  

Prerequisite: an undergraduate major in German or its equivalent. For advanced 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) I.  
Prerequisite: course 135A.  
Mr. Spahr  

*205. German Literature during the Renaissance and Reformation.  
(2) II.  
Mr. Loomis  

206. German Literature during the Seventeenth Century. (2) I.  
Mr. Loomis  

*214. Lessing and His Time. (2) I.  
Mr. Guthke  

*220. Goethe to the Period of the Italian Journey. (2) II.  
Mr. Politzer  

221. Goethe from the Period of the Italian Journey to His Death.  
(2) II.  
Mr. Politzer  

*228. Early German Romanticism: 1795–1810. (2) I.  
Mr. Politzer  

229. Kleist, Büchner, Grabbe. (2) II.  
Mr. Guthke  

*231. Grillparzer and the Austrian Drama. (2) I.  
Mr. Politzer  

238. German Realism, 1850–1900. (2) I.  
Miss Bonwit  

239. Interpretation and Criticism of German Poetry. (2) I.  
Studies in Rilke.  
Mr. Jászi  

240. Twentieth-Century German Prose. (2) II.  
Thomas Mann, Hermann Hesse, and Franz Kafka.  
Mr. Mileck  

249. Seminar in German Literature. (2 or 3) I.  
The Staff (Mr. Palmer in charge)  

I. Topic: Studies in Kafka and Expressionism (2). Mr. Politzer  

298. Special Study for Graduate Students. (1–4) I and II.  
Mr. Palmer in charge

* Not to be given, 1961–1962.
**German Linguistics**

For the courses in English philology, see the Department of English, page 333.

**260. Germanic Linguistics. (3) II.**
Prerequisite: 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.

Mr. Beeler

262. History of the German Language. (3) I.
Prerequisite: grade B or higher in course 135A.

Mr. Palmer

265. Gothic. (3) I.

Mr. Beeler

275. Old High German. (3) I.

Mr. Palmer

*290. Seminar in Germanic Linguistics. (2 or 3) II.
Topic: Old Saxon (2).

Mr. Palmer

**Related Course in Another Department**

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 238.

**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 History.

Delmer M. Brown, Ph.D., Professor of History (Chairman of the Department).

A. Hunter Dupree, Ph.D., Professor of History.

†George H. Guttridge, M.A., 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.

Thomas S. Kuhn, Ph.D., Professor of the History of Science.

David S. Landes, Ph.D., Professor of History and of Economics.

Joseph R. Levenson, Ph.D., Professor of History.

* Not to be given, 1961–1962.


Bryce Lyon, Ph.D., Professor of History (Vice-Chairman of the Department).
Henry F. May, Ph.D., Professor of History.
* Nicholas V. Riasanovsky, D.Phil., Professor of History.
Hans W. Rosenberg, Ph.D., Shepard Professor of History.
Carl E. Schorske, Ph.D., Professor of History.
Charles G. Sellers, Ph.D., Professor of History.
Engel Shuiter, Ph.D., Professor of History.
Raymond J. Sontag, Ph.D., Litt.D., LL.D., Sidney Hellman Ehrman Professor of European History.
* Kenneth M. Stampp, Ph.D., A. F. and May T. Morrison Professor of History.
John D. Hicks, Ph.D., LL.D., A. F. and May T. Morrison Professor of History, Emeritus.
Lawrence Kinnaird, Ph.D., 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.
Paul B. Schaeffer, Ph.D., Associate Professor of European History, Emeritus.
William J. Bouwsma, Ph.D., Associate Professor of History.
Robert J. Brentano, D.Phil., Associate Professor of History.
Gene A. Brucker, Ph.D., Associate Professor of History.
Richard Herr, Ph.D., Associate Professor of History.
* Charles Jelavich, Ph.D., Associate Professor of History.
* Adrienne Koch, Ph.D., Associate Professor of History.
* Martin E. Malia, Ph.D., Associate Professor of History.
Armin Rappaport, Ph.D., Associate Professor of History.
H. Franz Schurmann, Ph.D., Associate Professor of History and of Sociology.
Werner T. Angress, Ph.D., Assistant Professor of History.
Thomas G. Barnes, Ph.D., Assistant Professor of History.
Robert C. Padden, Ph.D., Assistant Professor of History.
* James R. Scobie, Ph.D., Assistant Professor of History.
William G. Sinnigen, Ph.D., Assistant Professor of History.
George W. Stocking, Jr., Ph.D., Assistant Professor of History.
Richard A. Webster, Ph.D., Assistant Professor of History.
Richard M. Abrams, M.A., Acting Instructor in History.
Roger Hahn, Ph.D., Instructor in History.
Robert O. Paxton, M.A., Acting Instructor in History.
Albert U. Romasco, Ph.D., Acting Instructor in History.
Richard C. Simmons, M.A., Acting Instructor in History for the fall semester.

Mario S. De Pillis, Ph.D., Visiting Assistant Professor of History.
Arnolfo B. Ferruolo, Dottore in Lettere, Professor of Italian.

* In residence fall semester only.
* In residence spring semester only, 1961–1962.
HISTORY

Zygmunt J. Gasiorowski, Ph.D., Visiting Associate Professor of History.
Harold C. Kirker, Ph.D., Visiting Assistant Professor of History.
Peter D. Marshall, Ph.D., Visiting Assistant Professor of History.
George T. Scanlon, Ph.D., Lecturer in History.
Juergen Schulz, Ph.D., Assistant Professor of Art.
Paul Wheatley, Ph.D., Associate Professor of Geography.

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 95.

Departmental Major Advisers: Mr. Sinnigen, Chairman; Mr. Abrams, Mr. Angress, Mr. Barnes, Mr. De Pillis, Mr. Drinnon, Mr. Kirker, Mr. Malia, Mr. Marshall, Mr. Rappaport, Mr. Romasco, Mr. Sluiter, Mr. Stocking, Mr. Webster.

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 (History 103); (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).

Lower Division Honors Courses. The department offers at the freshman and sophomore level honors courses History H4B, H17A–H17B and 33A–33B, which are open, with consent of the instructor, to qualified students whether or not they intend to major in history.

Honors Program. Students with an overall grade-point average of 3.0 may apply to the departmental honors committee for admission as juniors to the honors program. Application should be made on a form available at the departmental office. Applications will be accepted during registration week.

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 including (1) History H102 and (2) a proseminar (History 103; see under course listings, Group II, B, "Proseminars in History"); honors candidates will not take History 101.

(c) In the senior year, History H198A–H198B (6 units per semester), devoted to preparation of 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. For further information concerning the teacher-training curriculum, see the ANNOUNCEMENT OF THE SCHOOL OF EDUCATION, and consult the department’s Social Studies Adviser, Mr. Harper.

**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. Western Civilization. (3–3) Yr.

Mr. Brentano, Mr. Webster, Mr. Barnes

8A–8B. The Americas since 1492. (3–3) Yr.

Mr. Padden

17A–17B. The United States. (3–3) Yr.

Mr. Sellers, Mr. Kirker

19A–19B. Asia. (3–3) Yr.

Mr. Bingham

Political and cultural survey from ancient to modern times, covering China, Japan, India and the Middle East including relations with the West.

33A–33B. American Studies. (3–3) Yr.

Mr. Stocking

Open to sophomores with consent of instructor. Limited to fifteen students.

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 1—Unrestricted Courses

(Open to all students in the upper division; prerequisites as noted.)

111A–111B. Ancient Greece and Rome. (3–3) Yr. 
Mr. Sinnigen

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.

121A–121B. Medieval Europe. (3–3) Yr. 
Mr. Lyon

*122. European Culture in the Middle Ages. (3) II.

*123. Medieval France. (3) II.

*125A–125B. Medieval Institutions. (3–3) Yr. 
Mr. Lyon

130. Italian Culture in Transition, 1450 to 1650. (3) II.
Mr. Brucker, Mr. Ferruolo, Mr. Schulz

Two lectures and one discussion hour per week. Prerequisite: consent of 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. Given in conjunction with the Departments of Art, Architecture, and Music.

131. The Age of Renaissance. (3) I. 
Mr. Brucker

132. The Age of Reformation. (3) I. 
Mr. Bouwsma

133. The Age of Absolutism and Enlightenment. (3) II. 
Mr. Herr

134A–134B. European Intellectual History. (3–3) Yr. 
Mr. Schorske

Thought and art since 1750 considered in their social and political context.

*135A. Russia to 1689: Kievan and Moscovite Russia. (3) I.

135B. Russia, 1689–1890: Peter the Great through the Great Reforms. (3) II.

136. Russia since 1890: The Russian Revolutions and the Soviet Regime. (3) I. 
Mr. Malia

139A–139B. Southeastern Europe and the Near East. (3–3) Yr. 
Mr. Gasiorowski

The Ottoman Empire, Turkey, Albania, Bulgaria, Greece, Yugoslavia, and Rumania since the eighteenth century.

*140A–140B. The Habsburg Monarchy and the Succession States. (2–2) Yr. 
Mr. Jelavich

* Not to be given, 1961–1962.
141A–141B. Modern France. (3–3) Yr. Mr. Herr, Mr. Landes

*142A–142B. Germany and Central Europe, 1300–1815. (3–3) Yr.

143A–143B. Germany from 1815 to the Present. (3–3) Yr. Mr. Angress

144A–144B. European Diplomacy since 1815. (3–3) Yr. Mr. Sontag

*145. The Revolutionary Era in Europe. (3) I.

*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.

*148A–148B. Italy since 1789. (3–3) Yr. Mr. Webster

149. Rise of the Dutch Republic and Empire. (3) II. Mr. Sluiter

(Formerly numbered 133C.)
Economic, political, religious, and cultural history of the Netherlands from the Burgundian and Hapsburg periods through the Dutch Revolt and Golden Age of the Republic, including overseas expansion and establishment of the Dutch colonial empire.

150A–150B. Medieval England. (3–3) Yr. Mr. Brentano
Emphasis will be placed on constitutional and intellectual developments.

151A–151B. England since 1500. (3–3) Yr. Mr. Barnes
Prerequisite: an elementary knowledge of the history of Western Europe.

*152A–152B. Constitutional History of England. (3–3) Yr. Mr. Barnes

155A–155B. The British Commonwealth and Empire. (3–3) Yr.
Prerequisite: course 151B or equivalent. ——, Mr. Marshall

*159. Great Britain since 1900. (3) I.

*160A–160B. Spain and Portugal. (3–3) Yr. Mr. Herr

161A–161B. Hispanic-American History. (3–3) Yr. Mr. King, Mr. Scobie

161A. The Colonial Empire.
161B. Since Independence.

*162. The Caribbean Area since 1700. (3) I. Mr. King

163. Brazil. (3) II.

*164. Argentina since 1800. (3) I. Mr. Scobie
Emphasis on post-1800 developments. Designed for majors in the social sciences.

*165A–165B. Modern Social History of Latin America. (3–3) Yr. Mr. Scobie

*166A–166B. Mexico. (3–3) Yr. Mr. Padden

* Not to be given, 1961–1962.
Mr. Rappaport

*168. Inter-American Relations. (3) II.
Emphasis will be placed on the Pan-American movement and the development of the Organization of American States.

Mr. King

Mr. Padden

170A–170B. American History to 1789. (3–3) Yr. Mr. Bridenbaugh
170A, or written consent of instructor, prerequisite to 170B.

171A–171B. The United States. (3–3) Yr.
A student may not receive credit for both course 17A–17B and 171A–171B.
Mr. Harper

172A–172B. Constitutional History of the United States. (2–2) Yr.
Prerequisite: course 17A–17B or 171A–171B or consent of instructor.
Mr. Harper

172C–172D. Constitutional History of the United States. (1–1) Yr.
An extra hour of class discussion to be taken only with course 172A–172B.
Mr. Harper

*173A. The Era of Sectional Conflict, 1820–1865. (3) II.
Mr. Stampp

*173B. Reconstruction and the New Nation, 1865 to 1900. (3) II.
Mr. Stampp

174A–174B. Recent History of the United States. (3–3) Yr.
174A. 1900 to 1928.
174B. 1928 to the present.

175A–175B. Intellectual History of the United States. (3–3) Yr. Mr. May

*176A–176B. Social History of the United States: 1763 to the Present. (3–3) Yr.
Mr. Stocking

*177A–177B. The United States, 1787 to 1845. (3–3) Yr.
Mr. Sellers

*180A–180B. The American Political Tradition. (3–3) Yr.
Miss Koch
Among the major figures to be considered are Franklin, Jefferson, John Adams, Hamilton, Lincoln, Thoreau, Holmes, Wilson, Franklin D. Roosevelt, John Dewey.

*187A–187B. The West in United States History. (2–2) Yr.

*188. The Opening of the Pacific, 1513 to 1800. (3) II.
Mr. Sluiter

189A–189B. California. (2–2) Yr.
Mr. Bean

191A–191B. Social History of Asia. (3–3) Yr. Mr. Schurmann
Prerequisite: consent of instructor. Recommended: A background in European and Asian history and a reading knowledge of either Chinese, Japanese, French, or German.

191A. China.
191B. Japan.

* Not to be given, 1961–1962.
194A–194B. China. (3–3) Yr. Mr. Levenson
195A–195B. Japan. (3–3) Yr. Mr. Brown
§196. Southeast Asia. (3) II. Mr. Wheatley
*197A–197B. Indian. (3–3) Yr.

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. Simmons, Mr. Stocking

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

103. Proseminar: Problems in Interpretation and Research in the Several Fields of History. (3) I and II. The Staff

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 consent of instructor. Enrollment is limited to 15 students.

B. Europe. I: Mr. Hahn, Mr. Paxton, Mr. Rosenberg; II: Mr. Bouwsma, Mr. Hahn, Mr. Paxton.
C. United States. I: Mr. Abrams, Mr. De Pillis, ———, Mr. Kirker, Mr. Mashall; II: Mr. Abrams, Mr. De Pillis, Mr. Rappaport, Mr. Romasco.
D. Latin America. I: ———; II: Mr. Scobie.
E. China. I: Mr. Bingham; II: Mr. Levenson.
F. Ancient Greece and Rome. II: Mr. Sinnigen.

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 instructor. Recommended for teachers or prospective teachers.

D. Honors Courses

H102. Colloquium on Historical Thought. (3) I. Mr. Schorske

Limited to junior honors candidates.
Consideration of the nature and function of historical thought as manifested in major historical classics, ancient and modern.

H198A–H198B. Senior Honors. (6–6) Yr. The Staff

Limited to senior honors candidates.
Directed study centering upon the preparation of an honors thesis. Supervisors will be assigned to each student after consultation with the honors committee.

* Not to be given, 1961–1962.
§ To be offered one semester only, 1961–1962.
E. Special Individual Study

Open to those history majors, with at least a B average in all courses, including history, who wish to undertake special advanced study. Consent of instructor required.

199. Special Study for Advanced Students. (1–4) I and II. The Staff

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

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

A. Europe. I: Mr. Angress, Mr. Barnes, Mr. Bouwsma, Mr. Brucker, Mr. Gasiorowski, Mr. Landes, Mr. Lyon, Mr. Rosenberg, Mr. Sinnigen; II: Mr. Angress, Mr. Landes, Mr. Marshall.

B. United States. I: Mr. Abrams, Mr. Bean, Mr. De Pillis, ———, Mr. Harper, Mr. May, Mr. Romasco; II: Mr. Abrams, Mr. Bridentaugh, Mr. De Pillis, ———, Mr. Rappaport, Mr. Romasco.

C. Latin America. I: Mr. Padden; II: Mr. King, Mr. Sluiter.

D. Asia. I: Mr. Bingham, Mr. Brown; II: ———, ———.

202. Historical Method and Bibliography. (3) I and II.

Mr. Schorske, Mr. Sontag, Mr. Brentano

I: Mr. Schorske; Mr. Sontag; II: Mr. Brentano.

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

211A. Ancient Greece and Rome. (3) II. Mr. Sinnigen

A reading knowledge of French or German, and Latin or Greek is required.

220. Historical Auxiliaries to Medieval Studies. (3) I. Mr. Brentano

(Formerly numbered 205.) Emphasis upon diplomatic and practical paleography.

221. Medieval Europe. (3) II. Mr. Lyon

231. The Renaissance. (3) II. Mr. Brucker

232. Europe in the Seventeenth and Eighteenth Centuries. (3) II. Mr. Bouwsma

233. Western Europe. (3) I. Mr. Herr

234. European Intellectual History. (3) II. Mr. Schorske

* Not to be given, 1961–1962.
235. Russian Thought and Politics in the Nineteenth Century. (3) II.

236. Modern Russia. (3) I.

239. Central and Southeastern Europe. (3) II.

241. Modern France. (3)

242. Germany and Central Europe before 1815. (3) II.

243. Modern Germany. (3) I.

244. European Diplomatic History. (3) II.

246. European Social and Institutional History in the Nineteenth Century. (3) I.

248. Modern Italy. (3) I.

250. Medieval England. (3) II.

251. England, 1660 to 1837. (3) I.

252. Tudor-Stuart England. (3) II.

255. The British Commonwealth and Empire. (3)

260. Spain. (3) Prerequisite: course 160A–160B, a reading knowledge of Spanish, and German or French.

261. Hispanic-America. (3) I and II.

263. Hispanic-America: Colonial Period and Brazil. (3) I.

265. Modern Social History of Latin America. (3) II.

266. Mexico. (3) II.

267. Diplomatic History of the United States. (3) I. Prerequisite: course 167A–167B.

270. The American Colonies. (3) I.

271. The American West. (3)

272. Economic and Legal History of the United States. (3) II. Mr. Harper

273. The Old South, the Civil War, the Reconstruction. (3) Mr. Stampp

274. Recent History of the United States. (3) II.

275. Intellectual History of the United States. (3) II. Mr. May

* Not to be given, 1961–1962.
276. American Social History, 1700 to 1900. (3) Mr. Stocking
277. Early National Period of United States History. (3) II. Mr. Sellers
278. History of Science and Technology in America. (3) II. Mr. Dupree
281. North America. (3) Mr. Hammond
282. Spanish Borderlands. (3) Mr. Hammond
289. California and the West. (3) II. Mr. Bean
290. Asia. (3) II. Mr. Bingham
291. Social History of Asia. (3) II. Mr. Schurmann
294. Modern China. (3) I. Mr. Levenson
295. Japan. (3) II. Mr. Brown
297. India. (3) Mr. Cipolla

Advanced Study in Economic History (Economics 210A–210B). (3–3) Yr. Mr. Cipolla

Topics in Economic History (Economics 212A–212B). (3–3) Yr. Mr. Cipolla, Mr. Rosovsky

Group III—Individual Research and Study
298. Directed Research. (1–6) I and II. The Staff
299. Independent Study. (3–6) I and II.
   Mr. Brucker, Mr. Herr, Mr. Levenson, Mr. May, Mr. Padden, Mr. Sellers
   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.

History of Science
All the courses in this section are acceptable for major credit in history and most of them are acceptable for major credit in philosophy as well. (For details see the cross-listings in the philosophy section of this bulletin.) Students interested in graduate programs in the history of science should consult Mr. Kuhn or Mr. Dupree.

Upper Division Courses
105A–105B. Development of Scientific Thought and Technique. (3–3) Yr. Mr. Hahn
105A. Antiquity to Newton.
105B. Newton to the present.
* Not to be given, 1961–1962.
(Formerly Philosophy 127A–127B.) Mr. Kuhn  
Prerequisite: high school or college physics will normally be prerequisite to 127A and  
college physics is required for 127B.  
127A. Scientific Cosmology: Aristotle to Newton.  
127B. Matter and Energy: Dalton to Einstein.  
Intensive study, using primary sources where possible, of a closely related series of  
eesades in the development of scientific thought.

178A–178B. History of Science and Technology in American Society.  
(3–3) Yr. Mr. Dupree  
178A. Science.  
178B. Technology.

Graduate Courses

201S. Advanced Studies in the Sources and General Literature of the  
History of Science. (3) I. Mr. Kuhn  
205. Seminar in the History of Science. (3) II. Mr. Kuhn  
(Formerly numbered 204.)

278A. Seminar in the History of Science and Technology in America.  
(3) II. Mr. Dupree

HUMANITIES

David D. Boyden, M.A., Mus.D. (h.c.), Professor of Music.  
Richard Herr, Ph.D., Associate Professor of History.  
Jackson V. Burgess, M.A., Assistant Professor of English.  
Price Charlson, Ph.D., Assistant Professor of Philosophy.

Alfred Frankenstein, Ph.B., Lecturer in Art.

Committee in Charge:  
Karl Aschenbrenner, Ph.D., Professor of Philosophy.  
William G. Bade, Ph.D., Associate Professor of Mathematics.  
Howard A. Bern, Ph.D., Professor of Zoology.  
Marianne Bonwit, Ph.D., Associate Professor of German.  
Martin E. Malia, Ph.D., Associate Professor of History.  
Lawrence H. Moe, Ph.D., Associate Professor of Music.  
Charles Muscatine, Ph.D., Professor of English (Chairman of the Committee).  
Herwin Schaefer, Ph.D., Professor of Decorative Art.

Letters and Science List. All undergraduate courses are included in the  
Letters and Science List of Courses. For regulations governing this list, see  
page 95.

* Not to be given, 1961–1962.
The Field Major. See the Announcement of the College of Letters and Science, page 92.

Upper Division Courses

§101. The Arts. (3) I. Mr. Boyden, Mr. Frankenstein
Restricted to seniors in the Humanities Field Major, except by permission of the instructor. Enrollment limited to twenty students.
Analytical and critical methods in music and the visual arts exemplified through the careful study of selected masterpieces. Problems in the comparison of the arts; the roles of form and content related to different media.

§102. Literature. (3) I. Mr. Burgess
Restricted to seniors in the Humanities Field Major, except by permission of the instructor. Enrollment limited to twenty students.
Study of selected masterworks in English and in translation. Discussion of critical criteria; universality, individuality, and literary tradition; the forms, functions, and limitations of language.

§103. Theories of Ethics and of Knowledge. (3) II. Mr. Charlson
Restricted to seniors in the Humanities Field Major, except by permission of the instructor. Enrollment limited to twenty students.
A study of the interrelation of the metaphysical and moral ideas of a few selected philosophers.

§104. Topics in the History of Culture. (3) II. Mr. Herr
Restricted to seniors in the Humanities Field Major, except by permission of the instructor. Enrollment limited to twenty students.
An analysis of the historical contexts in which were produced some of the works of art, literature, and philosophy which form the subject of courses 101, 102, 103.

ITALIAN

(Department Office, 4226 Dwinelle Hall)

Enrico De Negri, Dottore in Lettere, Professor of Italian.
Arnolfo B. Ferruolo, Dottore in Lettere, Professor of Italian (Chairman of the Department).
Michele De Filippis, Ph.D., Professor of Italian, Emeritus.
Aldo D. Scaglione, Dottore in Lettere, Associate Professor of Italian.
Nicolas J. Perella, Ph.D., Assistant Professor of Italian.
Gustavo Costa, Dottore in Lettere, Instructor in Italian.
Ruggero Stefanini, Dottore in Lettere, Instructor in Italian.
Catherine Feucht, B.A., Associate in Italian.
Cecilia Ross, Ph.D., Associate in Italian.

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 95.

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. In addition to satisfying with distinction the requirements for the major, candidates for honors must take course H 195 in the two semesters of their senior year and pass a comprehensive examination.

Lower Division Courses

1. Elementary Italian. (4) I and II. Mr. Ferruolo (in charge)
   Five meetings per week.

2. Elementary Italian. (4) I and II. Mr. Ferruolo (in charge)
   Five meetings per week. Prerequisite: course 1 or the equivalent.

3. Intermediate Italian. (4) I and II. Mr. Ferruolo (in charge)
   Five meetings per week. Some sections emphasize reading, others conversation. Prerequisite: course 2 or the equivalent.

4. Intermediate Italian. (4) I and II. Mr. Costa
   Five meetings per week. Prerequisite: course 3 or the equivalent.

39. Italian Literature in English Translation.
   The most important authors from the origins to the present, with lectures in English and readings of representative works in translation.
   39A. From the Middle Ages to the End of the Renaissance. (3) I and II. Mr. Costa, Mr. Scaglione, Mr. Scott
   39B. From the End of the Renaissance to the Present. (3) I and II. Mr. Scaglione, Mr. Perella

Upper Division Courses

101A–101B. Advanced Grammar, Composition, and Conversation. (3–3) Yr. Mr. Stefanini

103A–103B. A Survey of Italian Literature. (3–3) Yr.
   Representative authors and works, with a consideration of the more important aspects of Italian literary history in their philosophical and historical background.

109A–109B. Dante's Divina Commedia. (3–3) Yr. Mr. De Negri

110A–110B. Italian Literature of the Fourteenth Century. (3–3) Yr. Mr. Stefanini
   Emphasis on Dante's minor works, Petrarch's poetry, and Boccaccio's Decameron.

112A–112B. Italian Literature of the Renaissance. (3–3) Yr. Mr. Ferruolo
   The main trends in the literature of the fifteenth and sixteenth centuries. Emphasis on the works of Lorenzo De'Medici, Poliziano, Castiglione, Leonardo, Machiavelli, Ariosto, and Tasso.
114. Italian Literature of the Eighteenth Century. (3) I. Emphasis on the works of Vico, Goldoni, Parini, and Alfieri. Mr. Costa

115A–115B. Italian Literature of the Nineteenth Century. (3–3) Yr. Mr. Perella
Emphasis on the works of Foscolo, Leopardi, Manzoni, Carducci, Pascoli, and Verga.

116. Italian Literature of the Twentieth Century. (3) II. Mr. Costa
The main trends in poetry, drama and the novel, from Pirandello to the present.

H195. Special Study for Honors Candidates. (1–3) I and II. The Staff
Specifically designed for students who wish individually to pursue a program of reading and study not covered by any other course. Units of credit to be determined by the instructor.

Literature Courses in English

130. Dante’s Divine Comedy. (3) II. Mr. Scaglione
Prerequisite: consent of instructor.
A historical and critical reading of the poem.

140. Dante, Petrarch, and Boccaccio. (3) I. Mr. De Negri
Prerequisite: consent of instructor.
The works of Dante, Petrarch, and Boccaccio and their relation to the Middle Ages and to the Renaissance.

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 163.)

201. Historical Grammar. (2) I. Mr. Stefanini

202. Early Italian Texts. (2) II. Mr. Stefanini

203. Methods of Literary Study and Stylistic Analysis. (2) II. Mr. Scaglione

204. Italian Literary Criticism. (2) II.

209. Studies in the Divina Commedia. (2) I. Mr. De Negri

211. Seminar on Petrarch. (2) I. Mr. Ferruolo
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
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.

* Not to be given, 1961–1962.
*217. Studies in the Renaissance. (2) II.  
Mr. Ferruolo

218. Seminar on the Baroque. (2) I.  
Especially: the pastoral drama, Marino, and the Marinisti.  
Mr. Perella

221. Romanticism in Italy. (2) II.  
The Romantic movement in Italy in its relationship to European Romanticism, with emphasis on Foscolo, Leopardi, and Manzoni.  
Mr. De Negri

299. Special Study for Graduate Students. (1–4) I and II.  
Specifically designed for student who wish individually to pursue a special program of study and research not covered by any other course or seminar. Units of credit to be determined by the instructor.  
Mr. Ferruolo (in charge)

Italian for Graduate Students. (No credit) I.  
(Formerly numbered 1G.)  
First course.  
Mr. Scott

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).
Albert G. Pickerell, Ph.D., Professor of Journalism.
Philip F. Griffin, M.A., Associate Professor of Journalism.
Walter Gieber, Ph.D., Assistant Professor of Journalism.
Jean S. Kerrick, Ph.D., Assistant Professor of Journalism.
Galen R. Rarick, M.A., Acting Assistant Professor of Journalism.

Allan Temko, A.B., Lecturer in Journalism.

Letters and Science List. All courses except 131, 152, and 181 series. For regulations governing this list, see page 95.

Departmental Major Advisers: Mr. Desmond (spring semester); Mr. Griffin, Mr. Gieber, Miss Kerrick, Mr. Rarick.

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

* Not to be given, 1961–1962.
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 includes 24 units in upper division courses in the department. The candidate must submit his program to a departmental adviser for approval.

Courses in journalism must include 131A, 131B, either 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. In course descriptions, where the words “press” or “journalism” are used, they include newspapers, magazines, radio, television and other mass media of communication, as these media relate to public affairs.

Honors Program. A candidate for honors with the bachelor’s degree will elect, in each semester of the senior year, Journalism H198 (2-4 units). These units will be included in the units required for the major. Journalism H198 will consist of an approved program of independent study. The candidate will present an acceptable term paper.

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 Courses

21. Elementary News Writing. (3) I and II.
Mr. Griffin, Miss Kerrick, Mr. Rarick
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.
The reporter’s functions and responsibilities; interrogation and evaluation of data.

Mr. Gieber
Lecture and laboratory. Prerequisite: course 21 or the equivalent. Prescribed in the junior year for journalism majors.
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 outlets is required.

140. History of Journalism. (3) I.
Mr. Gieber
Development of journalism, particularly in the United States, with an introduction to the important media and personalities.

* Not to be given, 1961–1962.
141. The Press and Society. (3) II.  
Mr. Hulten

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.
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. Griffin

A survey of significant reporting and comment in the American press.

152. Magazine Article Writing. (3) II.  
Mr. Temko

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.

155. 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. Pickerell, Mr. Rarick

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.

181I. Radio Journalism. (3) II. Mr. Rarick  
(Formerly numbered 180.)
Two hours of lecture and one two-hour laboratory per week.

181J. Newspaper Advertising. (3) I. Mr. Rarick  
(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.

(3–3) Yr.  
Mr. Desmond

190A is not prerequisite to 190B.

190A. Press and World Affairs.
Examining of sources and flow of news throughout the world; influences that affect information reaching people.

190B. Comparative World Journalism.

195. Critical Reviewing for the Press. (3) I.  
Mr. Temko

Prerequisite: senior standing and consent of the instructor.
Theory and technique of reviewing current literature, drama, film, and the arts. Practice in writing reviews.

* Not to be given, 1961–1962.
196. Theories and Problems in the Conduct of International Information Programs. (3) I.  
Prerequisite: senior or graduate standing and consent of the instructor. Governmental efforts at international persuasion.  
Mr. Hulten

H198. Senior Honors Program. (2-4) I and II.  
Prerequisite: senior standing, a grade-point average of not less than 3, and consent of committee in charge.  
Intensive individual or group examination of a topic, to be completed in part by presentation of written paper and an oral report. Students must submit a prospectus of their study before admission to course.  
The Staff

199. Special Study for Advanced Students. (1-4) I and II.  
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.  
Mr. Griffin

Graduate Courses

Prerequisite: courses 21 or 131 and 140. Admission to all graduate courses is at the discretion of the instructor. See also page 163.

201. Research Methods in Journalism. (2) I.  
Required of all candidates for the Master of Journalism degree.  
Miss Kerrick

220. The Newspaper and Public Affairs. (2) I.  
Mr. Desmond

231. The Press and Its Audience. (2) II.  
Miss Kerrick

240. Seminar in History of Journalism. (2) I.  
Mr. Griffin

251. Literature of the Press. (2) II.  
Study of journalistic writings, principally contemporary.  
Mr. Griffin

263. Public Opinion, Propaganda, and the Mass Media. (2) II.  
Mr. Rarick

265. The Law of Communications. (2) II.  
A seminar inquiring into legal controls affecting the press. Case studies.  
Mr. Pickerell

270. Economic Organization of the Press. (2) I.  
A seminar analyzing the business practices and financial structure of the press and its relationship to the community in which it operates. Case studies.  
Mr. Rarick

290. Seminar in Comparative World Journalism. (2) I.  
Mr. Desmond

296. Seminar in International Persuasion. (2) II.  
Prerequisite: course 196 or consent of instructor.  
Use of communication in international relations; examination of propaganda campaigns and techniques.  
Mr. Hulten

298. Group Study in Journalism. (2) I and II.  
Mr. Hulten

299. Special Research Projects and Field Study in Communications.  
(1-4) I and II.  
May be taken both semesters.  
Individual investigation of a selected topic, conducted under guidance of a member of the faculty.  
Mr. Hulten
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.L.A., Professor of Landscape Architecture (Chairman of the Department).
Francis J. Violich, B.S., Professor of City Planning and Landscape Architecture.
John W. Gregg, B.S., D.L.A., Professor of Landscape Architecture, Emeritus.
R. Burton Litton, Jr., M.L.A., Associate Professor of Landscape Architecture.
Robert J. Tetlow, M.S., Associate Professor of Landscape Architecture.
May K. Arbegast, M.S., Assistant Professor of Landscape Architecture.
Robert T. Buchanan, M.L.A., Assistant Professor of Landscape Architecture.
David B. Chase, M.L.A., Assistant Professor of Landscape Architecture.

Robert N. Royston, B.S., Lecturer in Landscape Architecture.
Geraldine K. Scott, B.S., Lecturer in Landscape Architecture.

Departmental Major Advisers: Mr. Litton, Mr. Vaughan.

Preparation for the Major. For courses required in preparation for the major, see page 83. For further information, consult the ANNOUNCEMENT OF THE COLLEGE OF ENVIRONMENTAL DESIGN.

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.

The department will certify to the completion of a major program for graduation only on the basis of at least a grade average of C for all courses taken in landscape architecture. Students who do not maintain such an average may be required to withdraw from the major in landscape architecture.

Lower Division Courses

1. Theory and Elementary Design. (4) I and II.
   Lecture and laboratory. Prerequisite: Architecture 1 or equivalent.

2. History and Literature of Landscape Architecture. (2) I. Mr. Litton
   Limited to major students in landscape architecture.
   Landscape design through the ages, with emphasis on its relation to climate, topography, and society.
11. Delineation. (1) I and II.

Mr. Buchanan

Laboratory. Limited to major students in landscape architecture or in city and regional planning.

Methods of graphic communication in landscape architecture. May be repeated once for credit.

20. Introduction to Plant Materials and Planting Design. (3) II.

Mrs. Arbegast

Lecture, laboratory, and field trips. Prerequisite: general botany.

Identification of common trees and shrubs; classification for use in landscape design.

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.

Upper Division Courses

Architecture 1 and 2, 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, 

Lecture and laboratory. Prerequisite: advanced standing in architecture, or city and regional planning. Not open to majors in landscape architecture.

An introduction to the history, theory, and materials of landscape architecture.

111A–111B. Landscape Construction. (3–3) Yr. Mr. Tetlow, 

Lectures and laboratory.

Design, calculations and graphic solutions to problems involving grading and surfacing; simple structures; irrigation and drainage.

120. Plant Materials and Elementary Planting Design. (3) I. Mrs. Arbegast

Lecture, laboratory, and field trips. Prerequisite: course 20 or the equivalent.

Reading assignments on ecology and plant geography; identification, graphics of presentation.

121. Plant Materials and Planting Design. (3) II. Mrs. Scott

Lecture, laboratory, and field trips. Prerequisite: courses 20 and 120, or equivalent.

Identification, problems in planting design, plans and specifications.

122. Advanced Planting Design and Plant Materials. (3) I. Mrs. Scott

Lecture, laboratory, and field trips. Prerequisite: courses 20 and 120, 121, or equivalents.

Planting design problems of complex nature.

130. Theory and Design. (3) I.

Mr. Vaughan, Mr. Litton

Lecture and laboratory.

Problems of limited scope.

131. Theory and Intermediate Design. (3) II. Mr. Tetlow, 

Lecture and laboratory. Prerequisite: course 130, or enrollment in the Department of City and Regional Planning.

Analysis and design with special reference to problems of residential sites and related public use areas.
132A-132B. Advanced Design and Construction. (4-4) Yr.
Lecture and laboratory. Prerequisite: course 131. Mr. Royston, Mr. Buchanan
Analysis and design of complex site projects; working drawings for construction and planting; introduction to office procedure, contract documents, specifications, and estimates.

134. Park and Recreation Area Planning. (4) I. Mr. Violich
Lecture, laboratory, seminars, and field trips. Prerequisite: City and Regional Planning 100 or 110.
Principles, standards and procedures in planning and design of areas for park recreation use; laboratory problems.

135. Site Planning. (4) II. Mr. Vaughan
Lecture, laboratory, seminars, and field trips. Prerequisite: City and Regional Planning 100 or 110 and advanced standing in architecture or landscape architecture.
Planning and design of large-scale site developments with special reference to the landscape architect's role.

198. Directed Group Study. (1-5) I and II. The Staff (Mr. Litton in charge)
Prerequisite: consent of the instructor.

199. Special Study for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. Vaughan in charge)

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 163.)

201A-201B. Graduate Design and Theory. (1-6; 1-6) Yr.
Advanced problems and research. The Staff (Mr. Vaughan 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. Vaughan in charge)
Prerequisite: graduate standing in landscape architecture or city and regional planning.

LATIN
For courses in the Latin language and literature, see under Department of Classics, page 238.

LAW
(Department Office, 225 Law Building)
Edward L. Barrett, Jr., B.S., LL.B., Professor of Law.
Rex A. Collings, Jr., M.A., LL.B., Professor of Law.
Albert A. Ehrenzweig, Dr.Jur., J.D., J.S.D., Walter Perry Johnson Professor of Law.
John G. Fleming, D.Phil., D.C.L., Professor of Law.
Geoffrey C. Hazard, Jr., A.B., LL.B., Professor of Law.
John R. Hetland, LL.B., Professor of Law.
Ira M. Heyman, A.B., LL.B., Professor of Law.
Richard W. Jennings, 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, LL.B., Professor of Law.
Frank C. Newman, A.B., LL.B., LL.M., J.S.D., Professor of Law (Chairman of the Department).
William Lloyd Prosser, A.B., LL.B., LL.D., Dr.Jur. h.c., Elizabeth Josselyn Boalt Professor of Law.
*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 of Criminology.
Barbara Nachtrieb Armstrong, 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.
Richard M. Buxbaum, A.B., LL.B., LL.M., Acting Associate Professor of Law.
Jerome A. Cohen, A.B., LL.B., Associate Professor of Law.
Robert H. Cole, A.B., LL.B., Acting Associate Professor of Law.
Edward C. Halbach, Jr., A.B., J.D., Associate Professor of Law.
John H. Jackson, A.B., J.D., Acting Associate Professor of Law.
Nicholas Johnson, A.B., LL.B., Acting Associate Professor of Law.
Preble Stolz, A.B., J.D., Acting Associate Professor of Law.
Justin Sweet, A.B., LL.B., Associate Professor of Law.
Herma H. Schreter, A.B., J.D., Acting Assistant 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.
Edward S. Bade, A.B., LL.B., LL.M., Visiting Professor of Law.
Babette B. Barton, B.S., LL.B., Lecturer in Law.
Newell C. Barnett, A.B., LL.B., Lecturer in Law.
William J. Bowe, A.B., LL.B., Visiting Professor of Law.
Valentine Brookes, A.B., LL.B., Lecturer in Law.
John W. Cowee, M.B.A., Ph.D., LL.B., Professor of Insurance.
Folger Emerson, A.B., LL.B., Lecturer in Law.
Kathryn A. Gehrels, A.B., LL.B., Lecturer in Law.
David Hardy, A.B., LL.B., Lecturer in Law.

* In residence fall semester only, 1961–1962.
Robert Cronley Harris, A.B., LL.B., Lecturer in Law.
John N. Hazard, A.B., LL.B., J.S.D., 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.
Samuel A. Ladar, A.B., J.D., Lecturer in Law.
Scott C. Lambert, LL.B., Lecturer in Law.
Dana Latham, A.B., LL.B., Lecturer in Law.
William D. McKee, B.S., LL.B., Lecturer in Law.
John A. Pettis, Jr., A.B., LL.B., Lecturer in Law.
James E. Sabine, A.B., LL.B., Lecturer in Law.
Samuel Taylor, A.B., LL.B., Lecturer in Law.
Julian Towster, Ph.B., J.D., Ph.D., Professor of Political Science.

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 $310 each semester, which includes the incidental fee charged all students.

Professional Curriculum

First Year
200A–200B. Contracts. (3–3) Yr. Mr. Jackson, Mr. Laube, Mr. Sweet
202. Crimes. (3) II. Mr. Barrett, Mr. Collings
206A–206B. Pleading and Procedure in Civil Cases. (3–3) Yr. Mr. Hazard, Mr. Louiseill, Mr. Stolz
208A–208B. Property. (3–3) Yr. Mr. Bade, Mr. Hetland
210. Equity. (3) I. Mr. Hazard, Mr. Johnson, Mr. Prosser
212A–212B. Torts. (3–3) Yr. Mr. Cole, Mr. Fleming, Mr. Prosser
214A–214B. Introduction to Law. (½–½ Yr. Mr. Hazard and Law Associates

Second Year
220. Administrative Law: First Course. (3) II. Mr. Johnson, Mr. Newman
222A–222B. Business Associations; Corporations. (3–3) Yr. Mr. Buxbaum, Mr. Jennings
224A–224B. Constitutional Law. (2–2) Yr. Mr. Barrett, Mr. Heyman
227. The Legal Profession. (1) II. Mr. Ehrenzweig, Mr. Fleming, Mr. Keeler
230. Marital Property. (2) I. Mr. Collings, Mrs. Schreter
232. Security Transactions. (2) I. Mr. Hetland
234A–234B. Estates and Trusts. (2–2) Yr. Mr. Bowe, Mr. Halbach
237A–237B. Income Taxation. (2–2) Yr. Mrs. Barton, Mr. Kragen

Third Year

240. Administrative Law: Second Course. (2) I. Mr. Johnson
241. Admiralty. (2) I. Mr. Stolz
242. International Law. (2) II. Mr. Buxbaum
243. Commercial Paper. (2) II. Mr. Prosser
244. Creditors’ Remedies. (3) II. Mr. Laube
245. Comparative Jurisprudence. (2) I. Mr. Ehrenzweig
246. Conflict of Laws. (3) I and II. Mr. Ehrenzweig, Mrs. Schreter
I: Mr. Ehrenzweig; II: Mrs. Schreter.

247. Corporation Finance and Securities Regulation. (2) I. Mr. Jennings
248. Selected Problems in Corporations and Partnerships. (2) II. Mr. Jennings
249. Sales. (2) I and II. Mr. Laube, Mr. Fleming
I: Mr. Laube; II: Mr. Fleming.
250A–250B. Evidence. (2–2) Yr. Mr. Louisell, Mr. Sherry

*251. Selected Problems in Comparative Jurisprudence. (2) II. Mr. Ehrenzweig

252. Selected Problems in Constitutional Law. (2) I and II. Mr. Barrett, Mr. Cole
I: Mr. Barrett; II: Mr. Cole.
253. Family Law. (2) I. Mrs. Schreter
254. Federal Jurisdiction. (2) II. Mr. Stolz
255. Political Institutions and Law in the Communist World. (2) I. Mr. Cohen, Mr. Towster, Mr. J. Hazard

*256. Selected Problems in Property and Future Interests. (2) II.

* Not to be given, 1961–1962.
257. Insurance. (2) II. Mr. Ehrenzweig, Mr. Cowee
258. Law of International Organization. (2) I. Mr. Jackson
259. International Conflict of Laws in the United States. (2) II. Mr. Ehrenzweig
260. Land Use Planning. (2) II. Mr. Heyman
262. Labor Law. (3) I. Mr. Kagel
263. Negotiation, Conciliation, Arbitration. (2) II. Mr. Kagel
264. Modern Social Legislation. (2) I. Mr. Cole
265. Advanced Legal Writing. (1–2) I and II. Mr. Heyman
266. Legislation. (2) I. Mr. Newman
268. State and Local Government Law. (2) I. Mr. Sato
270. Government Control of Business. (2) I. Mr. Buxbaum
271. Trial Practice. (2) II. Mr. G. Hazard
274. Restitution. (2) I and II. Mr. Sweet, Mr. Jackson
275. Selected Problems in Contracts. (2) II. Mr. Sweet
276. Unfair Competition and Copyrights. (2) I. Mr. Fleming
277. Advanced Study in Criminal Law. (2) I. Mr. Collings
278. Selected Problems in Criminal Law and Administration. (2) II. Mr. Sherry
279. Natural Resources Law. (2) I. Mr. Sato
280. Oil and Gas Law. (2) I. Mr. Johnson
281. Estate Planning and Taxation. (3) I. Mr. Halbach
282. Estate and Gift Taxation. (2) I. Mr. Bowe
283. Selected Problems in Estate Planning. (2) II. Mr. Bowe, Mr. Halbach
284. Selected Problems in the Taxation of Business Enterprise. (2) I. Mrs. Barton

Graduate Curriculum
285A–285B. Seminar in Administrative Law and Procedure. (2–2) Yr. Mr. Cohen, Mr. Newman, Mr. Riesenfeld
286A–286B. Seminar in Business Associations. (2–2) Yr. Mr. Jennings
287A–287B. Seminar in Commercial Transactions. (2–2) Yr.
Mr. Fleming, Mr. Laube, Mr. Prosser, Mr. Riesenfeld, Mr. Sweet

288A–288B. Seminar in Constitutional Law. (2–2) Yr.
Mr. Barrett, Mr. Heyman

289A–289B. Seminar in Criminal Law and Procedure. (2–2) Yr.
Mr. Barrett, Mr. Collings, Mr. Sherry

290A–290B. Seminar in International and Maritime Law. (2–2) Yr.
Mr. Riesenfeld

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. Cohen, Mr. Newman

295A–295B. Seminar in Practice and Procedure. (2–2) Yr.
Mr. Barrett, Mr. G. Hazard, Mr. Louisell

296A–296B. Seminar in Property and Trust Administration. (2–2) Yr.
Mr. Halbach, Mr. Hetland, Mr. Heyman, Mrs. Schreter

297A–297B. Seminar in Public Finance and Taxation. (2–2) Yr.
Mr. Kragen, Mr. Sato

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.
LeRoy C. Merritt, Ph.D., Professor of Librarianship (Acting 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 (Vice-Chairman of the Department).
Ray E. Held, Ph.D., Assistant Professor of Librarianship.

Mae J. Durham, B.L.S., Lecturer in Librarianship.
Russell Shank, M.B.A., Lecturer in 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 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 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 1961–1962, 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.

The 28-unit program of each student must include the following basic courses: 201, 202, 203, 204, 211, 212, 214 and one of 206, 207 or 208; the remaining units are to be elected from other courses in the curriculum and must include not fewer than four or more than six upper division or graduate courses in departments other than Librarianship approved by the Dean of the School of Librarianship.

Programs for Advanced Degrees

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.

201. Introduction to Cataloguing and Classification. (4) I. Miss Markley
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. (4) I. Mr. Held
Basic reference materials including national and trade bibliography. Lectures, discussions, and reports on assigned problems.

203. Introduction to Librarianship. (2) I. Mr. Mosher
Introductory survey of the evolution of libraries and basic information about the principal fields of library service, with emphasis on major trends and problems. Readings and written reports.

204. Selection and Acquisition of Library Materials. (2) I and II. Mrs. Durham, Mr. Merritt
Theories, principles, and practice of selecting books and other library materials. Techniques of acquisition by public, school, academic, and special libraries.
205. Special Problems in the Selection of Materials and Evaluation of Collections. (2) II.
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, University, and Special Library Administration. (2) II.
Mr. Danton
A general introduction to the organization and administration of college, university, and special libraries and their place in the institutions of which they are a part. Problems and practices of library's government, functions, staff, collections, finances, and buildings.

209. Library Work with Children. (2) I and II. Mrs. Durham
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.

210. Analysis of Imaginative Literature for Children. (2) I. Mrs. Durham
Prerequisite: Anthropology 121, or Classics 178, or equivalent.
Historical development and critical analysis of folklore, legends, myths, and modern imaginative literature; their role in the library program for children and young adults.

211. Development of the Book. (2) I. Mr. Mosher
Materials and techniques of book production. Early records and the manuscript period. Development of paper, type, and binding. Letterpress, offset, rotogravure, and other methods of printing.

212. Reference and Government Publications. (4) II. Mr. Held, Mr. Mosher
Prerequisite: course 202.
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.

213. Special Problems in Cataloguing and Classification. (2) II.
Miss Markley
Two hours of lecture and four hours of laboratory per week. 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) I. Mr. Merritt
Prerequisite: course 204.
† Depending on demand, any one of seminars 215, 228, or 233 will be offered in the fall semester.
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.
Scientific and technical literature with emphasis on reference and bibliographical aids. Periodical and serial literature and its use and control through abstracts and indexes. Mr. Shank

218. Advanced Cataloguing. (2) I or II.
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. Miss Markley

219. Advanced Classification. (2) I or II.
Prerequisite: course 201, 214.
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. Miss Markley

220A. Descriptive Bibliography. (2) I or II.
Prerequisite: courses 201, 202, 211, 212, 214, or equivalent (the last three either previously or concurrently).
Historical and analytical bibliography as methods of investigation, based on Mc-Kerrow and Esdaile; methods of bibliographical description, based on Bowers; study of the bibliography of book rarities, with emphasis on American and western imprints. Miss Markley

220B. Subject Bibliography. (2) II.
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. Miss Markley

221. Book Collecting for University Libraries. (2) I.
Prerequisite: courses 204 and 208. Required of all candidates for advanced degrees 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. Mr. Danton

225. History of Libraries. (2) Mr. Danton, Mr. Held
225A. History of Ancient and Medieval Libraries. I, Mr. Danton.
225B. History of Scholarly Libraries. II, Mr. Danton.
225C. History of Popular Libraries. II, Mr. Held.

226. History of Printing. (2)
Prerequisite: course 211 or the equivalent.
226A. Origins of Printing and Publishing in Europe. II.
226B. History of Books and Printing from the Sixteenth Century. II.
226C. History of Printing and Publishing in the United States. II. Mr. Mosher

228. Problems in Reading. (2) I.
Prerequisite: course 215.
Analysis of reading of college students and the general adult population; characteristics and interests of readers, distribution and content of publications, methods of stimulating reading, and the effects of reading; the library and adult education. Mr. Merritt

1 Depending on demand, any one of seminars 215, 228 or 233 will be offered in the fall semester.
2 Depending upon demand, any one of seminars 218, 219, and 220A will be offered in the fall semester and any two during the spring semester.
3 Either 226A or 226B or 226C will be given during the spring semester, 1961–1962.
230. Library Administration. (2) I.  Mr. Wight
Prerequisite: course 203, and 206, 207 or 208.
The basic advanced course in the principles and practice of library administration.
Analysis of the organization and management of modern libraries of various types. Pre-
requisite to courses 232, 233, 234.

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) I.  Mr. Merritt
Prerequisite: 206 and 230.
Government, administration, collection building, and evaluation of the public junior
college library. Theory and examination of current practice through intensive survey of
actual operation.

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,
Detailed application of the principles of public administration to the management and
operation of public libraries. Case study approach through critical analysis of the func-
tions and problems of selected libraries. Assignments adapted to special interests of
students.

238. Library in the Community. (2) I.  Mr. Wight
Analysis of the community for the librarian. Social backgrounds, economic and educa-
tional 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 materials of communication.

245. Bibliographic Organization and Retrieval of Information. (2) II.
Prerequisite: courses 201, 202, 203, 212.  Mr. Meyer
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 arrange-
ment and unarranged headings as devices for information organization and retrieval.

251. Methods of Research in Librarianship. (2) I and II.  Mr. Danton in charge
History and function of research in contemporary society. Value and meaning of re-
search. Techniques of bibliographical, historical, and sociological research, and their
implications for the definition and investigation of library problems. Required of all
candidates for the doctor's degree.

260. Seminar in Comparative Librarianship. (2) I.  Mr. Danton
Library development in the Western World—underlying social and political causes.

265. Seminar in Library Education. (2) II.  Mr. Danton
Origins, development and effects of education for librarianship in Europe and the
United States.

* Not to be given, 1961–1962.
† Depending on demand, any one of seminars 215, 228, 233 will be offered in the fall
semester.
299. Special Study. (1–8) I and II.  The Staff (Mr. Merritt in charge)

Individual direction of student's selection, planning and writing of a dissertation. This course must be taken for a total, in all semesters, of 4 units or more.

LINGUISTICS

(Departmental Office, 2323 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 (Chairman of the Department).
Dell H. Hymes, Ph.D., Associate Professor of Anthropology and of Linguistics.
Sydney M. Lamb, Ph.D., Associate Professor of Linguistics.
Harvey Pitkin, A.B., Acting Assistant Professor of Linguistics.
William F. Shipley, Ph.D., 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 South Asian Languages.
Yakov Malkiel, Ph.D., Professor of Romance Philology.
David W. Reed, Ph.D., Associate Professor of English.
Jesse O. Sawyer, Ph.D., Assistant Professor of Speech.
Gene M. Schramm, Ph.D., Assistant Professor of 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 95.

Departmental Major Adviser: Mr. Shipley.

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; 26 or 27 units of upper division courses in linguistics and allied fields. Eighteen units of this last requirement are to consist of the following courses without substitution: Linguistics 100, 130, 140, 150; Sanskrit 190A–190B. The remaining 8 to 9 units (three courses) must be selected from among the following: Linguistics 145, 160, 170, 180; Anthropology 120; English 110, 131; German 140. Recommended: Anthropology 2A–2B, Linguistics 35.

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.

Prospective candidates for higher degrees should consult the chairman of the department or the Dean of the Graduate Division.

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 409.

Lower Division Course

35. Language and Linguistics. (3) I and II. Mr. Pitkin
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. The languages of the world and their relationships.

Upper Division Courses

100. Principles of Descriptive and Historical Linguistics. (3) I.
Mr. Chrétien

130. Phonetics and Phonemics. (3) I and II. Mr. Shipley, Mr. Pitkin
Prerequisite: upper division status.
Lectures and section work.

140. Linguistic Analysis: Morphology and Syntax. (3) I and II. Mr. Pitkin
Prerequisite: course 130 or equivalent.

145. Types of Linguistic Structure; a Survey of Selected Languages. (3) II.
Prerequisite: course 130 or equivalent.

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.
160. Dialectology. (2) I.  
Prerequisite: course 130 and 140,  
History of dialect studies; structural analysis of dialect variation; field methods in dia­
lectology; function of speech variation in society. 
Mr. Gumperz

170. American Indian Languages. (3) II.  
Miss Haas

180. History of Linguistics. (3) II.  
Mr. Hymes  
Including the relations of linguistics to other fields; particularly literature, philology,  
history, and anthropology.

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) I and II.  
Mr. Chrétien

220A–220B. Linguistics Laboratory. (3–3) Yr.  
Miss Haas, 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 duplication of credit with consent of  
instructor.  
Recording and analyzing a foreign language by working directly with a native speaker.

251. Seminar in Indo-European Comparative Grammar. (3) II.  
Mr. Beeler  
Prerequisite: course 150 or equivalent, and some knowledge of at least two of the older  
Indo-European languages.  
A study of advanced problems in the comparative phonology and morphology of the  
Indo-European languages.

290. Seminar. (2) I and II.  
The Staff (Miss Haas in charge)  
Students may receive credit for more than one seminar. May be repeated without dupli­
cation of credit with consent of instructor.  
(a) Descriptive Linguistics, ———; (b) Historical Linguistics, Mr. Shipley; (c) Applica­
tions of Linguistics, Miss Haas; (d) Statistical Linguistics, Mr. Chrétien; (e) Mechano­
Linguistics, Mr. Lamb; (f) Ethno-Linguistics, Mr. Hymes; (g) American Indian Linguistics,  
Miss Haas; (h) Linguistics of India, Mr. Emeneau; (i) Pacific Linguistics, Mr. Chrétien.

298. Special Study. (1–6) I and II.  
The Staff

299. Directed Research. (1–6) 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).
Introduction to Descriptive and Historical German Grammar (German 140).
Germanic Linguistics (German 260).
Linguistic Structures of South Asian Languages (Near Eastern Languages  
249A–249B).
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).
Romance Dialect Geography (Romance Philology 205).
Comparative Slavic Linguistics (Slavic Languages and Literatures 220).
General Phonetics (Speech 103).

MATHEMATICS

(Department Office, 301 Campbell Hall)

Shiing-Shen Chern, D.Sc., Professor of Mathematics.
René J. De Vogelaere, Ph.D., Professor of Mathematics.
Stephen P. Diliberto, Ph.D., Professor of Mathematics.
Alfred L. Foster, Ph.D., Professor of Mathematics.
Bernard Friedman, Ph.D., Professor of Mathematics (Chairman of the Department).

Henry Helson, Ph.D., Professor of Mathematics.
Leon A. Henkin, Ph.D., Professor of Mathematics.
Gerhard P. Hochschild, Ph.D., Professor of Mathematics.
Harry D. Huskey, Ph.D., Professor of Mathematics and of Electrical Engineering.
Tosio Kato, D.Sc., Professor of Mathematics.
John L. Kelley, Ph.D., Professor of Mathematics.
Bertram Kostant, Ph.D., Professor of Mathematics.
Derrick H. Lehmer, Ph.D., Professor of Mathematics.
Hans Lewy, Ph.D., Professor of Mathematics.
Michel Loève, Docteur ès Sciences, Professor of Mathematics and of Statistics.
Charles B. Morrey, Jr., Ph.D., Professor of Mathematics.
Anthony P. Morse, Ph.D., Professor of Mathematics.
Edmund Pinney, Ph.D., Professor of Mathematics.
Murray H. Protter, Ph.D., Professor of Mathematics.
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.
František Wolf, Ph.D., Professor of Mathematics.
Benjamin A. Bernstein, Ph.D., Professor of Mathematics, Emeritus.
Thomas Buck, Ph.D., Professor of Mathematics, Emeritus.

‡ In residence fall semester only, 1961–1962.
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 (Vice-Chairman of the Department).
Paul L. Chambré, Ph.D., Associate Professor of Mathematics and of Engineering Science.
H. Otto Cordes, Ph.D., Associate Professor of Mathematics.
István Fáry, Ph.D., Associate Professor of Mathematics.
Jacob Feldman, Ph.D., Associate Professor of Mathematics.
Paul Emery Thomas, Ph.D., Associate Professor of Mathematics.
Robert L. Vaught, Ph.D., Associate Professor of Mathematics.
Glen E. Bredon, Ph.D., Assistant Professor of Mathematics.
Lester E. Dubins, Ph.D., Assistant Professor of Mathematics and of Statistics.
Leonard Evens, Ph.D., Assistant Professor of Mathematics.
Paul Fong, Ph.D., Assistant Professor of Mathematics.
Marvin J. Greenberg, Ph.D., Assistant Professor of Mathematics.
Morris W. Hirsch, Ph.D., Assistant Professor of Mathematics.
Adam Koranyi, Ph.D., Assistant Professor of Mathematics.
Antoni A. Kosinski, Ph.D., Assistant Professor of Mathematics.
R. Sherman Lehman, Ph.D., Assistant Professor of Mathematics.
Donald A. Ludwig, Ph.D., Assistant Professor of Mathematics.
Calvin C. Moore, Ph.D., Assistant Professor of Mathematics.
Dana Scott, Ph.D., Assistant Professor of Mathematics.
John W. Woll, Jr., Ph.D., Assistant Professor of Mathematics.
Gertrude I. Heller, Ph.D., Instructor in Mathematics.
James D. Monk, Ph.D., Instructor in Mathematics.
David Shale, Ph.D., Instructor in Mathematics.

Ralph H. Abraham, Ph.D., Lecturer in Mathematics.
William Craig, Ph.D., Professor of Philosophy.
Albert T. Lundell, Ph.D., Lecturer in Mathematics.
Robert R. Phelps, Ph.D., Lecturer in Mathematics.
Michael O. Rabin, Ph.D., Visiting Associate Professor of Mathematics.
John V. Wehausen, Ph.D., Professor of Engineering Science.
Donald Wehn, Ph.D., Lecturer in Mathematics.
James Wells, Ph.D., Visiting Assistant Professor of Mathematics.

2 In residence spring semester only, 1961–1962.
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 95.

Departmental Major Advisers: Mr. Bade, Mr. Hochschild, Mr. Kostant, Mr. Lehmer, Mr. Protter, Mr. Robinson. Adviser for major in teaching of mathematics: Mr. Kelley.

The Major in Mathematics. The major in mathematics consists of Mathematics 1A–1B, 2A–2B, 104, 113A, 135A, 130A or 140, and 12 additional units of upper division mathematics.

Mathematics 105 and 185 are a desirable part of the major program. 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 12 and Mathematics 125A–125B, 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.

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 astronomy, physics, statistics, or other sciences as part of his major in mathematics, as well as other upper division courses in mathematics.

The Major in the Teaching of Mathematics. This major prepares students for the profession of secondary teaching. Enrollment in the major is limited to 30 new students per year. Attention of students in this major is called to the ANNOUNCEMENT OF THE SCHOOL OF EDUCATION; a teaching minor also is required for the secondary teaching credential. No education courses are required for graduation.

The major in teaching of mathematics consists of Mathematics 1A–1B or 3A, 3B, 4A and Philosophy 12, and special sections of 113A–113B, 115A, 130A–130B, 135A, 160, and Statistics 112. Special arrangements for transfer students can be made with the adviser.

Honors with the Bachelor’s Degree for Majors in Mathematics. In addition to completing the established requirements for the major, to graduate with honors, a student must: (a) earn a grade-point average greater than 3 in upper division mathematics courses; (b) complete two of the following three requirements, (1) Mathematics 117, (2) Mathematics 118, (3) a graduate course or seminar; (c) either pass a comprehensive examination at the end of his senior year or write a thesis—the choice to be made by the student. At the discretion of the major adviser, 3 units credit in Mathematics 199 may be given for passing the comprehensive examination or writing the thesis. (d) At the discretion of the major adviser, 6 units of the regular major requirements may be waived for honor students.

Honors, High Honors, and Highest Honors will be awarded on the basis of the examination or thesis and performance in courses which constitute the student’s major.
Note. Students will be placed in Mathematics 1A, H1A and 3A on the basis of the mathematics aptitude test of the College Board Examinations which is required of all entering freshmen. Students who have not taken this test will be required to take a placement examination in elementary algebra which will be given during registration week.

C. Plane Trigonometry. (2) I and II.
Prerequisite: plane geometry, one and one-half years of high school algebra. Students who enter with credit for one term of high school trigonometry will receive no unit credit for course C.

D. Intermediate Algebra. (2) I and II.
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.
The Staff

1A–1B. Calculus with Analytic Geometry, First Course. (4–4) Yr.
Beginning each semester.

Mr. Kelley, Mr. Protter, Mr. Vaught, Mr. Woll
Prerequisite: two years of high school algebra, plane geometry, plane trigonometry. Elements of analytic geometry, introduction to differential and integral calculus with applications. (1A–1B covers the material of 3A–3B and two-thirds of 4A.)

H1A–H1B. Calculus with Analytic Geometry, First Course. (4–4) Yr.
(Formerly numbered 1C–1D.)
Mr. Hirsch
Prerequisite: two years of high school algebra, plane geometry, plane trigonometry. Honors course, corresponding to 1A–1B, 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.

2A–2B. Calculus with Analytic Geometry, Second Course. (4–4) Yr.
Beginning each semester.

Mr. Friedman
Prerequisite: course 1A–1B.
Thorough technique of differential and integral calculus. Analysis of functions of several variables. Partial differentiation, multiple integrals. Differential equations. (Covers the material of one-third of 4A, 4B and two-thirds of 119 and 122.)

H2A–H2B. Calculus with Analytic Geometry, Second Course. (4–4) Yr.
Mr. Cordes
Prerequisite: course H1A–H1B or 1A–1B and permission of instructor. Honors course, corresponding to 2A–2B, 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.

3A. Analytic Geometry and Calculus, First Course. (3) I and II.
Mr. Chambré, Mr. Feldman
Prerequisite: two years of high school algebra, plane geometry, plane trigonometry. Students may not receive credit for 3A after having completed 3R or 16A–16B.
Elements of analytic geometry, introduction to differential calculus.

3B. Analytic Geometry and Calculus, Second Course. (3) I and II.
Mr. Wells
Prerequisite: course 3A or 3R, or 16A–16B.
Continuation of 3A. Introduction to differential and integral calculus, with applications.
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.

4B. Analytic Geometry and Calculus, Fourth Course. (3) I and II.
Prerequisite: course 4A.
Mr. Lehmer
Continuation of 4A. Geometry and analysis of functions of several variables, partial derivatives, multiple integrals.

5. Mathematics for Liberal Arts Students. (3) I and II.
Mr. Lehman
Not open to students who have had 3A or 16A.
Conceptions of modern mathematics for students who have no technical background. The content varies among the following topics: algebra, geometry, set theory, logic, number theory, statistics, mathematical methods in science.

Logic (Philosophy 12.)
This course, given in the Department of Philosophy, is prerequisite to course 125A–125B and is recommended for all mathematics majors.

14A–14B. Calculus and Advanced Calculus. (5–5) Yr. Beginning each semester.
Prerequisite: course 3B.
Mr. Wolf, Mr. Scott
14A covers 5 units of 4A–4B; 14B covers one unit of 4A–4B, 2 units of 119, and 2 units of 122.
14A. Techniques of integration, limits, infinite series and Taylor's formula, methods of approximation, determinants and linear systems, analytic geometry of three dimensions, partial differentiation, multiple integrals.
14B. Ordinary differential equations, series, functions of several variables, integration of vector functions.

16A–16B. Analytic Geometry and Calculus. (3–3) Yr. Beginning each semester.
Mr. Dubins
Prerequisite: two years of high school algebra; plane geometry, plane trigonometry. Students may not receive credit for 16A taken concurrently with or following 1A, 3A or 3R, nor for 16B taken concurrently with or following 3B. Students may not remove deficiencies in 1A, 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: course 4B. Course 101A not prerequisite to 101B. Designed for students who are preparing to teach mathematics in secondary schools.
Selected topics in elementary algebra and geometry, treated from an advanced standpoint.

104. Advanced Calculus. (3) I and II.
Mr. Feldman, Mr. Koranyi, Mr. Phelps, Mr. Robinson, Mr. Wehn
Prerequisite: course 2B or 4B or consent of instructor.
Point sets on the line and in Euclidean spaces, metric spaces, spaces of functions, differentiation, Riemann integration, interchange of order of limit operations, methods of successive approximations, existence theorems.

* Not to be given, 1961–1962.
105. Integration. (3) II.
Prerequisite: course 104.
Functions of bounded variation, Riemann-Stieltjes integration, measure theory, Lebesgue-Stieltjes integration, Fubini and Radon-Nikodym theorems.

Mr. Wolf

111. Introduction to Linear Algebra. (3) I and II.
Prerequisite: one year of calculus. For nonmathematicians, not acceptable for the major in mathematics.
Vector spaces, linear transformations, matrices, characteristic values, quadratic forms.

Mr. Abraham, Miss Heller

112. Linear Geometry. (3) I and II.
Prerequisite: One semester of calculus.
Linear equations, matrices, determinants, groups of transformations, analytic affine and Euclidean geometry of 2 and 3 dimensions, quadratic forms and the principal axis theorem, analytic projective geometry.

Mr. Hochschild

Discrete Probability (Statistics 112). (3) I and II.

Mr. Shepp

Introduction to the Theory of Statistics (Statistics 113). (3) I and II.

Mr. Freedman

113A. Abstract Algebra. (3) I and II.
Prerequisite: one year of calculus or course 112.
Sets, equivalence relations, integral domains, mathematical induction, rings, fields, field of quotients, unique factorization for integers and polynomials, real and complex numbers, elementary group theory.

Mr. Bredon, Mr. Moore, Mr. Rosenlicht, Mr. Wehn

113B. Linear Algebra. (3) II.
Prerequisite: course 113A or 112.
Vector spaces and linear transformations, matrices, rank, determinants, duality, bilinear and quadratic forms, unitary spaces, similarity and unitary similarity, canonical forms.

Mr. Evens, Mr. Woll

*114. Introduction to the Theory of Potential. (3) II.
Prerequisite: 2B or 14B or equivalent.
Newtonian and vector potential, differential operators, problems related to Maxwell’s equations.

Prerequisite: one year of calculus.
Divisibility, congruences, theory of prime numbers, Diophantine analysis, partitions.

Mr. Robinson

117. Analysis of Mathematical Problems. (3) I.
Prerequisite: upper division standing in mathematics and consent of 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.

Mr. Lewy

118. Analysis of Mathematical Problems. (3) II.
Prerequisite: upper division standing in mathematics and consent of 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.

* Not to be given, 1961–1962.
119. Differential Equations. (3) I and II.  Mr. Berger, ———
(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 courses 110B or 14B.

§120A–120B. Advanced Calculus for the Applied Sciences. (3–3) Yr.  Mr. Chambré
Prerequisite: course 14B or 2B. Not recommended for mathematics majors.
120A. Boundary value problems and orthogonal functions.
120B. Partial differential equations of mathematical physics. Laplace transforms.

*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. Evens, Mr. Fong
(Formerly numbered 122A.)
Prerequisite: course 4B. Beginning with the first Summer Sessions, 1959, only 1 unit of credit will be allowed for students who have credit for courses 110A or 14B.

125A–125B. Mathematical Logic. (3–3) Yr.  Mr. Craig
Prerequisite: one year of calculus or Philosophy 12 or consent of instructor.

128A. Numerical Analysis. (3) I and II.  Mr. Bremermann, Mr. Lehman
Prerequisite: courses 2A–2B or 4A–4B, and 119 or 14B.
Interpolation, polynomial approximation of functions, operational calculus, numerical integration and summation, numerical solution of ordinary differential equations. Emphasis is on material appropriate for programming large computers.

128B. Numerical Analysis. (3) II.  Mr. Huskey
Prerequisite: courses 2A or 4A–4B, 111 or 113B, 119. 128A is not prerequisite for 128B.

130A–130B. Projective Geometry. (3–3) Yr.  Mr. Helson, Mr. Hirsch
(130A formerly numbered 9; 130B formerly numbered 112A.)
Prerequisite: course 1A–1B or 3A–3B.

135A–135B. Foundations of Mathematics. (3–3) Yr. Beginning each semester.  Mr. Kelley, Mr. Kosinski
Prerequisite: one year of calculus or consent of instructor. Recommended: Philosophy 12A.

* Not to be given, 1961–1962.
§ To be offered one year only, 1961–1962.
Elements of set theory: operations on sets; relations, functions, set theoretical equivalence; cardinals, ordinals; ordering, well ordering; introduction to axiomatic foundations. Elements of theoretical arithmetic; natural numbers; successive extensions—integers, rationals, real numbers; basic arithmetical operations; applications of continuity principle.

140. Metric Differential Geometry. (3) I and II.  
Mr. Chern  
Prerequisite: course 104 or consent of instructor.  
Frenet formulas for curves; first and second fundamental forms of a surface, principal curvatures, geometry on a surface; some global theorems on curves and surfaces.

145. Theory of Boolean Algebras. (3) II.  
Mr. Vaught  
Prerequisite: course 125A.  
Postulates, treatment as rings or lattices; relation to sentential calculus and calculus of classes; elementary development from the axioms; infinite operations, atoms; subalgebras, homomorphisms, direct products; representation theorem and its connection with completeness theorems of logic.

Introduction to Continuous Probability (Statistics 155). (3) II.  
Mr. Shepp

160. History of Mathematics. (3) II.  
Mr. Seidenberg  
Prerequisite: course 1B or 4A and 113A or 130A.  
History of algebra, geometry, analytic geometry, and calculus from ancient times through the seventeenth century and selected topics from more recent mathematical history. Recommended for the teaching major.

185. Introduction to the Theory of Functions of a Complex Variable. (3) I and II.  
Miss Heller, Mr. Koranyi, Mr. Ludwig, Mr. Wells  
Prerequisite: course 104 or consent of instructor.  

190A–190B. Survey of Algebra and Analysis. (3–3) Yr.  
Mr. Bade, Mr. Bredon  
For upper division and graduate students in social sciences. A student 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  
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 163.)

202. Foundations of Analysis. (3) I and II.  
Mr. Loève  
Prerequisite: course 104 and 135A or consent of instructor.  
Set theory, the real number system, topological spaces, metric spaces, compactness, completeness, function spaces.

Mr. Shepp, Mr. Neyman

203. Measure and Integration. (3) I and II.  
Mr. Shepp  
Prerequisite: course 105 or consent of 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.
Prerequisite: course 105, 185, or equivalent.
Mr. Rosenlicht
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. Linear Spaces. (3) I.
Prerequisite: course 105 and 185.
Elementary theory of Banach and Hilbert spaces; linear functionals and operators; weak convergence; $L^p$ spaces and $C$; spectral theorem for bounded self-adjoint operators.

Mr. Helson

207. Linear Operations. (3) II.
Prerequisite: course 206 or consent of instructor.
Completely continuous operators, differential operators, unbounded symmetric operators, perturbation theory and additional topics selected by the instructor.

Mr. Bade

208. Functional Analysis. (3) II.
Prerequisite: course 206.
Locally convex linear topological spaces; distributions; Banach algebras; Fourier transforms; Riesz theory of compact operators.

212. Several Complex Variables. (3) II.
Prerequisite: course 205A.
Power series and analytic functions of several variables; analytic sets and ideals of holomorphic functions; analytic continuation and envelopes of holomorphy; analytic spaces; global problems and sheaf theory.

Mr. Bremermann

215A. Algebraic Topology. (3) I and II.
Prerequisite: course 113B and 202.
Fundamental group, covering spaces; simplicial complexes, homology and cohomology groups; homotopy; applications to fixed point theorems and classification problems.

Mr. Lundell, Mr. Thomas

215B. Homotopy Theory. (3) I.
Prerequisite: course 215A.
Homotopy groups, fiber spaces, loop spaces; relations between homotopy and homology, obstruction theory; theorems of Hopf, Hurewicz and Whitehead.

Mr. Kosinski

217. Special Functions and Asymptotic Integration. (3) I.
Prerequisite: course 185.
Properties of the Bessel, Legendre, and hypergeometric functions and the asymptotic evaluation of integrals by the methods of stationary phase and steepest descents.

Mr. Pinney

Prerequisite: course 111 or 113B, and 185 (which may be taken concurrently).

Mr. Diliberto

220A–220B. Higher Mathematics for Physical Sciences. (3–3) Yr.
Prerequisite: course 2B or 14B, 104, and 185, or consent of instructor. 185 may be taken concurrently. Primarily for students in engineering.

Mr. Ludwig

* Not to be given, 1961–1962.
220C-220D. Higher Mathematics for Physical Sciences. (3–3) Yr.
Beginning each semester.
Prerequisite: courses 2B or 14B, 104 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 105, 185 or 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.
Prerequisite: course 105, 185, 206, or equivalent (206 not required for 1961–1962).
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.

228A–228B. Advanced Numerical Analysis. (3–3) Yr.
Prerequisite: course 128A–128B or consent of instructor. 228A is not prerequisite to 228B.
228B. Iteration methods, algorithms, relaxation and over-relaxation methods, Newton’s method, iteration of higher order, iteration with fixed initial condition. Systems of linear and nonlinear equations, linear and nonlinear eigenvalue problems. Generality of methods emphasized, practical aspects will not be neglected.

*230A–230B. Algebraic Geometry. (3–3) Yr.

*235A–235B. Set Theory. (3–3) Yr.
Prerequisite: courses 125A and 135A–135B.

240A. Differential Geometry. (3) I and II.
Prerequisite: course 104, 113B; 202 (taken concurrently).
Multilinear algebra, differentiable manifolds, tensor bundles, exterior forms; theorems of Stokes and Frobenius; imbedding theorem, connections, curvature, introduction to Riemannian geometry.

240B. Riemannian Geometry. (3) II.
Prerequisite: course 215A and 240A.
Affine connections, curvature, manifolds of constant curvature, completeness. Additional topics selected by the instructor.

* Not to be given, 1961–1962.
241. Complex Manifolds. (3) I.  
Prerequisite: course 185 and 240A. 
Compact Riemann surfaces, Kahler manifolds; sheaves; theorems of Dolbeault and Hodge.

Prerequisite: course 113A, 113B, 125A–125B, and 135A.  

250A. Groups, Rings and Fields. (3) I and II.  
Prerequisite: course 113B.  
Group theory through the Jordan-H"older-Schreier theorem, homomorphism theorems for rings and modules, unique factorization domains, structure of modules over principal ideal domains, field theory through Galois theory.

250B. Topics in Algebra. (3) II.  
Prerequisite: course 250A.  
Multilinear algebra and additional topics selected from the following: field theory, valuation theory, ring theory, homological algebra.

251. Ring Theory. (3) II.  
Prerequisite: course 250A.  
Topics chosen from Noetherian rings, rings with descending chain condition, theory of the radical, homological methods.

252. Representation Theory. (3) I.  
Prerequisite: course 250A.  
Structure of finite dimensional algebras, applications to representations of finite groups, the classical linear groups.

253. Homological Algebra. (3) II.  
Prerequisite: course 250A.  
Modules over a ring, homomorphisms and tensor products of modules, functors and derived functors, homological dimension of rings and modules.

254. Algebraic Number Theory. (3) II.  
Prerequisite: course 250A.  
Valuation theory in number fields and relation to ideal theory, local fields, unit theorem and finiteness of class number, ramification theory.

Prerequisite: course 125A, 130A and 135A.  

Mr. Barankin

259. Transformation Groups. (3) II.  
Prerequisite: course 215A; 240A (taken concurrently) or consent of instructor.  
Topological groups, Haar measure; general theory of topological transformation groups; the existence of slices and applications; the Smith theory of periodic transformations.

260. Topological Groups. (3) II.  
Prerequisite: course 250A and 202.  
Haar measure, locally compact Abelian groups, compact groups.

* Not to be given, 1961–1962.
261A–261B. Lie Groups. (3–3) Yr.  
Prerequisite: course 240A.  
Mr. Kostant
Lie groups and Lie algebras, general structure theory; compact, solvable, complex, and semisimple groups; classification of simple groups, representation theory.

265. Differential Topology. (3) I.  
Prerequisite: course 215A and 240A.  
Mr. Hirsch
The imbedding theorem; characteristic classes; Morse theory; additional topics from cobordism, immersion theory, singularities of maps, and the structure of manifolds.

Mr. Loève
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.

*275. Special Topics in Applied Mathematics. (3) I.  
Operator theory, boundary-value problems, and integral equations applied to problems arising from electromagnetic theory, quantum theory, and statistical mechanics.

276. Special Topics in Topology. (3) II.  
Mr. Spanier
Prerequisite: course 215A.
Topics of current interest in topology such as: homotopy theory, fiber bundles, sheaves, cohomology operations, theory of manifolds.

290. Seminars. (2–6) I and II.  
The Staff
Topics in foundations of mathematics, theory of numbers, numerical calculation, analysis, geometry, topology, algebra, and their applications, by means of lectures and informal conferences; work based largely on original memoirs. During 1961–1962, there will be, in particular, lecture seminars on the following subjects, in charge of the persons indicated:
(b), I and II, Mr. Bade; (c), I and II, Mr. Cordes; (b), I and II, Mr. Hochschild; (1), I and II, Mr. Lehmer; (p), I and II, Mr. Pinney; (s), I, Mr. Scott.

295. Individual Research Leading to Higher Degrees. (2–6) I and II.  
The Staff
Mathematical Colloquium. (No credit) I and II.  
The Staff (Mr. Hirsch in charge)
Meetings for the presentation of original work by members of the staff and graduate students.

Logic Colloquium. (No credit) I and II.  
The Staff (Mr. Scott in charge)
Related Courses in Other Departments
Logic (Philosophy 12).
Statistics. See Department of Statistics.

**MILITARY SCIENCE**

(Department Office, 149 Harmon Gymnasium)

Andrew Blase, Lieutenant Colonel, Artillery; Associate Professor of Military Science.

* Not to be given, 1961–1962.
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 Dean of Students 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.

The A part of a course is not a prerequisite for the B part of a course in either basic or advanced military science.

1A. Military Science I. (2) I. The Staff (Mr. Bailey in charge)
Organization of the Army and R.O.T.C.; individual weapons and marksmanship; leadership laboratory; appropriate academic or military subjects.

1B. Military Science I. (2) II. The Staff (Mr. Bailey in charge)
U.S. Army and National security; leadership laboratory; appropriate academic or military subjects.
21A. Military Science II. (2) I.  
The Staff (Mr. Mann in charge)  
Map and aerial photograph reading; American military history; leadership laboratory; appropriate academic or military subjects.

21B. Military Science II. (2) II.  
The Staff (Mr. Gray in charge)  
Introduction to operations and basic tactics; American military history; leadership laboratory; appropriate academic or military subjects.

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 junior 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 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.

The student is furnished an officer-type uniform 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 of 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 the Chancellor at Berkeley for scholastic excellence and outstanding qualities of leadership may be designated “Distinguished Military Students.” Such distinguished students may, upon graduation and, upon application, be considered for direct commission in the Regular Army.

For further information about the Reserve Officers’ Training Corps, consult the Professor of Military Science in 149 Harmon Gymnasium.

131A. Military Science III. (3) I. The Staff (Mr. Gray in charge)
Prerequisite: course 21A and 21B, or equivalent.
Leadership; military teaching principles; branches of the Army; leadership laboratory; one all-day field trip; appropriate academic or military subjects.

131B. Military Science III. (3) II. The Staff (Mr. Gray in charge)
Prerequisite: course 21A and 21B, or equivalent.
Small unit tactics and communications; leadership laboratory; precamp orientation; one all-day field trip; appropriate academic or military subjects.

141A. Military Science IV. (3) I. The Staff (Mr. Houlson in charge)
Prerequisite: course 131A and 131B.
Command and staff; estimate of situation and combat orders; military intelligence; military team; training management; logistics; troop movement; leadership laboratory; appropriate academic or military subjects.

141B. Military Science IV. (3) II. The Staff (Mr. Houlson in charge)
Prerequisite: course 131A and 131B.
Supply and evacuation; motor transportation; leadership; military law; Army administration; U.S. Role in World Affairs; leadership laboratory; appropriate academic or military subjects.

Music
(Department Office, 104 Morrison Hall)

David D. Boyden, M.A., Mus.D. (h.c.), Professor of Music.
Charles C. Cushing, M.A., Professor of Music.
William D. Denny, M.A., Professor of Music (Vice-Chairman of the Department).
Vincent H. Duckles, Ph.D., Professor of Music.
Arnold Elston, Ph.D., Professor of Music.
Andrew W. Imbrie, M.A., Professor of Music.
Joseph W. Kerman, Ph.D., Professor of Music (Chairman of the Department).
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.
Edgar H. Sparks, Ph.D., Professor of Music.
Albert I. Elkus, M.L., L.L.D., Professor of Music, Emeritus.
Lawrence H. Moe, Ph.D., Associate Professor of Music and University Organist.
Seymour J. Shifrin, M.A., Associate Professor of Music.
Daniel Heartz, Ph.D., Assistant Professor of Music.
Alan Curtis, M.M., Instructor in Music.

THE GRILLER QUARTET of the University of California:

James Berdahl, M.A., Lecturer in Music and Director of Bands.
Margaret E. Cartwright, A.B., Lecturer in Music for the spring semester.
Jacqueline R. Clark, A.B., Lecturer in Music.
Mary Groom Jones, Lecturer in Music.
George H. Kyme, Ph.D., Lecturer in Music and Supervisor of the Teaching of Music.
John L. Mortarotti, M.A., Lecturer in Music for the spring semester.
Marjorie Gear Petray, A.B., Lecturer in Music.
Abe Sherman, A.B., Lecturer in Music.
E. Rollin Silfies, M.A., Lecturer in Music for the fall semester.
John M. Swackhamer, A.B., Lecturer in Music.

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 95.

An advisory examination in piano playing will be given during registration week for entering students. Those who are deficient will be advised concerning further studies (see courses 405A, 405B, 405C, 405D). Students are urged to study at least one other instrument (see courses 430A—430B).

Undergraduate students transferring from other colleges should consult with the adviser for music majors before enrolling in any music course.

Adviser for Music Majors: Mr. Denny.

The Major in Music. 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.

First Year. Required: I. Courses A, 2A, 3A; II. Courses B, 2B, 3B.

Second Year. Required: I. Courses C, 2C, 3C; II. Courses D, 2D, 3D.

Third and Fourth Years. Required:


History and Literature. Course 121A–121B, and one additional course from this group.

Performance. Two semester courses in the 100 series from this group.

b. Additional courses from any of the three groups to complete a total of 24 units in the 100 series.

c. Ability in piano playing comparable to that achieved in course 405D.

Students should 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.

Advisor for Music Education Majors: Mr. Sparks.

Major in Music Education. 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.

Required. Course A–B, C–D, 2A–2B, 2C–2D, 3A–3B, 3C–3D, and Psychology 1A. (Courses 2A–2B, 2C–2D may be taken in the sophomore and junior years.) Course 101A–101B, 108, 112A–112B, 121A–121B, two semesters of 144, and two other courses selected from the series 140–149; Education 100A–100B. The program also allows the student substantially to complete a teaching minor of 20 units before graduation.

Required. Major instrument or voice: course 429A–429B, 429C–429D.
Minor instrument or voice: minor piano, course 405A–405B, 405C–405D (required of all students except piano majors); or other minor instrument, course 430A–430B, 430C–430D; or the minor in voice, course 328A–328B. The foregoing courses should be completed in the freshman and sophomore years. Instrumental and vocal methods: course 328A–328B, 4 to 6 units of course 329A, 329B, 329C, 329D, 329E, and 330. A limited number of methods courses may be deferred until the graduate year at the discretion of the adviser.

The Graduate Year. In addition to required courses in education, the student will normally take 12 units of courses in the fields of the teaching major and the teaching minor.

Students who, after the sophomore year, decide to become candidates for a general secondary credential, may qualify by completing certain required courses. See the Music Education Adviser. For further information, including grade-point requirements, see the Announcement of the School of Education.

Honors Program. Adviser: Mr. Shifrin. Honor students majoring in music who have received grade A in all freshman music courses may take Music 121A–121B in the sophomore year in place of 2C–2D. Such students are then required to take 107A–107B to complete the major. The Honors Seminar H195 is open to senior honor students, on the basis of an interview with the adviser. Students who successfully complete this program will be recommended for honors at graduation.

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. The department requires a reading knowledge of French, German, and Latin for the Ph.D. degree; the student should acquire such knowledge as early as possible in his graduate years.

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.

27A–27B. Introduction to Musical Literature. (3–3) Yr. Mr. Heartz
Two lectures, one section meeting, and one listening hour per week. Course 27A or consent of instructor is prerequisite to course 27B.

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.

41. University Symphony Orchestra. (2) I and II. Mr. Denny, Mr. Lawton
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. Mr. Curtis, ---
Two to four class hours per week.
Study and interpretation of chamber music for strings and for strings, winds, and piano.

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 instructor.
A continuation of course 10 for general students who wish to attain additional facility.

127A. Introduction to Opera. (3) I. Mr. Kerman
Prerequisite: course 27A or consent of 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. Sparks
Prerequisite: course 27A or consent of instructor.

127C. Introduction to Contemporary Music. (3) I. Mr. Elston
Prerequisite: course 27A or consent of instructor.

127D. Bach and Handel. (3) II. Mr. Curtis
Prerequisite: course 27A or consent of instructor.

127G. Masterworks of Choral Literature. (3) II. Mr. Lawton
Prerequisite: course 27A or consent of instructor.

Performance
For particulars, see lower division performance courses.
All courses in this group may be repeated once without duplication of credit.

141. Advanced University Symphony Orchestra. (2) I and II.
Prerequisite: consent of instructor. Mr. Denny, Mr. Lawton
142. University Chamber Band. (1) I.
   Prerequisite: consent of instructor.

143. Advanced University Concert Band. (2) II.
   Prerequisite: consent of instructor.

144. Advanced University Chorus. (2) I and II.
   Prerequisite: 4 units in course 44.
   Primarily concerned with major works for chorus and orchestra.

145. Repertory Chorus. (2) I and II.
   Prerequisite: consent of instructor
   Primarily concerned with lesser-known significant choral literature.

146. Advanced Chamber Music Ensemble. (1 or 2) I and II.
   Prerequisite: consent of instructor.

148. Advanced Piano Ensemble. (1) I and II.

149. Collegium Musicum. (1 or 2) I and II.
   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.
   Elements of music, with ear training, sight singing, and dictation.
   The Staff (Mrs. Petray in charge)

C-D. Musicianship. (1-1) Yr.
   Prerequisite: course A-B or consent of instructor.
   A continuation of course A-B, which is prerequisite.
   Mrs. Petray, Mr. Sherman

2A-2B. The Masterworks of Music. (1-1) Yr.
   Prerequisite: the ability to read music or consent of instructor.
   Guided listening and discussion.
   Mr. Curtis, Mr. Sparks

2C-2D. The Masterworks of Music. (2-2) Yr.
   Prerequisite: courses 2A-2B and 3A-3B, or consent of instructor.
   A continuation of course 2A-2B.
   Mr. Sparks

3A-3B. Harmony. (3-3) Yr.
   Mr. Elston (in charge), Mr. Imbrie, Mr. Lewin,
   Mr. Shifrin, Mr. Swackhamer
   Prerequisite: course A-B and 2A-2B (may be taken concurrently), or consent of
   instructor.
   Exercises in writing and at the keyboard.

3C-3D. Harmony. (3-3) Yr.
   Mr. Cushing (in charge), Mr. Curtis, Mr. Denny,
   A continuation of course 3A-3B, which is prerequisite.

* Not to be given, 1961-1962.
Upper Division Courses

Theory

101A–101B. Counterpoint. (3–3) Yr.
Mr. Denny (in charge), Mr. Cushing, Mr. Lewin, Mr. Nin-Culmell
Prerequisite: course 3D.
101A. Modal Counterpoint.
101B. Tonal Counterpoint.

102A. Keyboard Harmony. (2) I.
Mr. Heartz
Prerequisite: course 3D, and 405A, 405B, 405C, 405D or equivalent.

102B. Score Reading. (2) II.
Mr. Heartz, Mr. Nin-Culmell
Prerequisite: course 3D.

105A–105B. Principles of Composition. (3–3) Yr.
Mr. Cushing
Prerequisite: course 101B.

106A–106B. Canon and Fugue. (3–3) Yr.
Mr. Nin-Culmell
Prerequisite: course 101B.

107A–107B. Studies in Musical Analysis. (3–3) Yr.
Mr. Imirie
Prerequisite: course 3D.
Structure in relation to harmonic, polyphonic, rhythmic, and thematic treatment.

108. Instrumentation. (3) I.
Mr. Nin-Culmell
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.
Mr. Denny
Prerequisite: course 108.

111. Band Instrumentation. (2) II.
Mr. Berdahl
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.
Mr. Lawton,
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.
Mr. Boyden
Prerequisite: course 2D and 3D, or consent of instructor.
A study of the development of music from antiquity to the present; lectures, listening, technical analysis, and written reports.

* Not to be given, 1961–1962.
Historical Periods

Courses in this group will be given in rotation. Prerequisite: course 2D and 3D, or consent of instructor.

*114A. Survey of Medieval Music (to 1430). (3) I.  
Mr. Lowinsky

*115A. Survey of Renaissance Music (1430–1600). (3) II.  
Mr. Lowinsky

Prerequisite: course 114A or consent of instructor.

Baroque Period (1600–1750)

*116A. Survey of Baroque Music. (3) I.  
Mr. Boyden

A survey of musical literature from Monteverdi to Handel and J. S. Bach.

116B. Keyboard Music of the Baroque Period. (3) I.  
Mr. Lowinsky

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 (1730–1827)

*117A. Survey of Classic Music. (3) I.  
Mr. Kerman

Music of the early classic schools and of Haydn, Mozart, and Beethoven.

*117B. The Operas of Mozart. (3) II.  
Mr. Heartz

*117C. The String Quartets of Beethoven. (3) II.  
Mr. Sparks

117D. Haydn. (3) II.  
Mr. Moe

Romantic Period (1820–1900)

*118A. Survey of Romantic Music. (3) II.  
Mr. Elston

From Weber and Schubert to the end of the nineteenth century.

118B. Piano Music of the Romantic Period. (3) II.  
Mr. Lowinsky

118C. The Songs of Schubert. (3) I.  
Mr. Kerman

*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.

* Not to be given, 1961–1962.
A critical and analytical study of works by Milhaud, Strawinsky, Bartók, Sessions, and Schönberg.

**Forms and Mediums**

**120A. Choral Literature: Josquin des Prez to Handel. (3) I.** Mr. Lawton

**120B. Choral Literature: Bach to the Present Day. (3) I.** Mr. Lawton

**National Schools**

**130. The Music of Spain. (3) II.** Mr. Nin-Culmell

From the Middle Ages to the present.

**Honors and Special Studies Courses**

**H195. Honors Seminar. (3) II.** Mr. Shifrin

**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 163

**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. Lewin


**203. Seminar in Composition.** Mr. Elston, Mr. Shifrin

203A. Technical Projects. (2) I and II. Mr. Elston
203B. Free Composition. (2) I and II. Mr. Shifrin

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. Duckles, Mr. Sparks

**213A–213B. Seminar: Music of the Renaissance. (3–3) Yr.** Mr. Kerman
213A: II.

**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. Heartz

* Not to be given, 1961–1962.
216. Seminar: Baroque Music. (3) I. Mr. Moe

220. Seminar: Problems in Criticism. (3) II. Mr. Kerman
Analysis of important critical writings in and out of the field of music, in order to clarify the rôle of criticism beside aesthetics, musicology, analysis, and reportage. Critical study of selected compositions.

230. Studies in Musical Source Materials. (3) II. Mr. Duckles
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 and II. Mr. Lowinsky

298. Special Studies. (2-4) I and II. The Staff (Mr. Kerman 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.

329. Instrumental Methods.
Mr. Berdahl, Mr. Kyme, Mr. Lord, Mr. Mortarotti, Mr. Silfies

329A. Stringed Instruments. (1) I and II. Mr. Kyme, Mr. Mortarotti

329B. Brass Instruments. (1) I. Mr. Lord

329C. Woodwind Instruments. (1) II. Mr. Berdahl

329D. Percussion Instruments. (1) I. Mr. Silfies

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. Miss Cartwright
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.

Professional Courses

405A–405B. Elementary Piano. (1–1) Yr. Beginning each semester. Mr. Sparks in charge
Open to music majors, music education majors, and candidates for the General Secondary Credential with a minor in music, with consent of the instructor in charge.

405C–405D. Elementary Piano. (1–1) Yr. Beginning each semester. Mr. Sparks in charge
Prerequisite: course 405B.
Open to music majors, music education majors, and candidates for the General Secondary Credential with a minor in music, with consent of instructor in charge.

* Not to be given, 1961–1962.
† See the Announcement of the School of Education.
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.
270A–270B. Natural Resource Economics Research.
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 135. Social Change in Underdeveloped Countries.

* Not to be given, 1961–1962.
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).
James B. LeValley, Commander, U.S.N., Associate Professor of Naval Science.
John M. Andersen, Lieutenant Commander, U.S.N., Assistant Professor of Naval Science.
Wayne C. Bender, Lieutenant (J.G.), U.S.N., Assistant Professor of Naval Science.
William B. Fields, Lieutenant, U.S.N., Assistant Professor of Naval Science.
Hugh T. Kennedy, Major, U.S.M.C., Assistant Professor of Naval Science.
Edward J. Murphy, Jr., Lieutenant, U.S.N.R., Assistant Professor of Naval Science.
Robert P. Soens, Lieutenant (S.C.), U.S.N., Assistant Professor of Naval Science.

Courses 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. Candidates must be able to complete the Naval R.O.T.C. curriculum, without serious interference from or with other academic work required for the bachelor’s degree.

Students in the Naval R.O.T.C. 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.
Mr. Andersen
The naval service; naval leadership; basic seamanship; characteristics of naval ships; naval justice; national defense organization; naval communications; concepts of seapower; discipline; logistics.

1B. Evolution of Seapower. (3) II.
Mr. Fields
Seapower and its influence upon global history; elements of naval strategy and tactics; amphibious doctrine; geopolitics as applied to naval warfare; history of the U. S. Navy.

2A. Naval Weapons. (3) I and II.
Mr. Fields
Weapons systems, capabilities and limitation, gun systems, antisubmarine warfare systems, guided missiles, nuclear weapons and space technology
101A. Naval Engineering. (3) I. Mr. Bender
Nuclear, steam turbine and 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. Mr. Bender
Terrestrial navigation (navigation instruments and equipment; dead reckoning; piloting; Loran); celestial navigation (the theory and technique of surface navigation).

102A. Naval Operations. (3) I. Mr. Murphy
To include tactical communications and instructions; maneuvering board; rules of the nautical road; meteorology.

102B. Naval Leadership. (3) II. Mr. Murphy
Prerequisite: Psychology 33.

103M. Evolution of the Art of War. (3) I. Mr. Kennedy
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. Kennedy
Modern strategical and tactical principles, using contemporary historical events as illustrative material.

105M. Amphibious Warfare. (3) I. Mr. Kennedy
Introduction to 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. Kennedy
Examination of amphibious operations of World War II. The last half of this course prepares the student for his first active duty and includes naval justice and leadership.

107S. Navy Supply System. (3) I. Mr. Soens
Open to junior students only.
Organization for national security; policy, military, management and technical controls over Navy logistic organizations, naval finance and accounting systems, controls and reports.

108S. Supply Management Afloat. (3) II. Mr. Soens
Prerequisite: course 107S.
The organization, management and control of logistics afloat, management analysis and controls of accounting system afloat.

109S. Retail and Cost Management. (3) I. Mr. Soens
Open to senior students only.
Navy Supply Corps programs in retail and cost management operations; requirements planning and analysis of controls. Case studies and literature serve to aid in implementation of managerial objectives.

*NEAR EASTERN LANGUAGES*

(Department Office, 1229 Dwinelle Hall)

Walter J. Fischel, Ph.D., *Professor of Semitic Languages and Literature.*
Walter B. Henning, Ph.D., *Professor of Iranian Studies.*
William Popper, Ph.D., LL.D., Professor of Semitic Languages, Emeritus.
William M. Brinner, Ph.D., Associate Professor of Near Eastern Languages.
Jacob J. Finkelstein, Ph.D., Associate Professor of Assyriology and Associate Curator of Mesopotamian Archaeology, Museum of Anthropology (Chairman of the Department of Near Eastern Languages).
John J. Gumperz, Ph.D., Associate Professor of South Asian Languages and of Linguistics.
Klaus Baer, Ph.D., Assistant Professor of Egyptology and Assistant Curator of Egyptian Archaeology, Museum of Anthropology.
Mounah A. Khouri, M.A., Acting Assistant Professor of Arabic.
Gene M. Schramm, Ph.D., Assistant Professor of Semitic Languages.

Paul G. Essabah, Ph.D., Lecturer in Armenian.
Bh. Krishnamurti, Ph.D., Visiting Assistant Professor of Dravidian Languages.
Vidya N. Misra, M.A., Lecturer in South Asian Languages for the fall semester.
Gerard G. Salinger, Ph.D., Lecturer in Near Eastern Languages.
S. H. Vatasyayan, M.A., 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.

Departmental Major Advisers: Undergraduate: (a) South Asian Languages, Mr. Gumperz; (b) other fields, Mr. Baer. Graduate: Mr. Schramm.

The Major. A student may elect a major emphasizing Assyriology, Egyptology, Hebrew, Arabic, South Asian Languages, Iranology, Armenology, Semitic Languages, or Islamic Studies. A major course of studies may be completed by fulfilling the following requirements: 26 upper division units, of which 16 must be in one language or 20 in a combination of languages, as approved by the major adviser. With the consent of the department, certain language courses taken in other departments may account for 6 of these units, as in the case of Classics 190A–190B (Sanskrit) for students majoring in Iranology, Armenology, or South Asian Languages with emphasis on Hindi. The balance of the required 26 upper division units may be chosen from departmental offerings in Near Eastern or South Asian Civilizations, or in courses of other departments, as approved by the major adviser, such as History 197A–197B (The History of India) for majors in South Asian Languages.

Lecture Courses

Lower Division Courses

*1A–1B. Languages and Cultures of the Near East. (2–2) Yr. Mr. Brinner
The growth, structure, and differentiation of ethnic, religious, and language groups in the Arab states, Israel, Turkey, and Iran.

* Not to be given, 1961–1962.

*15A–15B. Hebrew Civilization. (2–2) Yr. Mr. Fischel
Course 15A is not prerequisite to 15B.  
15A. From the Patriarchal Age to the Roman Period.  
15B. From the Roman Period to the European Renaissance.

Upper Division Courses

*163A–163B. History of Persian Literature. (2–2) Yr. Mr. Henning
Course 163A is not prerequisite to 163B.  
163A. Classical Persian literature from Firdawsi to the beginning of the Safavid era.  
163B. Modern Persian literature.

164A–164B. Civilization of Ancient Iran. (2–2) Yr. Mr. Henning
The civilization of the Iranian nations from the beginning to the rise of Islam.

165A–165B. Armenian Civilization. (2–2) Yr. Mr. Essabal
From the earliest times to the present.

170. Religion and Cosmology of Ancient Mesopotamia. (2) I. Mr. Finkelstein
Discussion of original sources bearing on the religious beliefs and practices of the ancient Mesopotamians.

171. Ancient Western Asia. (3) II. Mr. Finkelstein
Civilization of Mesopotamia and adjacent regions from its origins to the period of the Persian Empire.

172A–172B. History and Culture of Ancient Egypt. (3–3) Yr. Mr. Baer

180A–180B. Islamic Civilization. (3–3) Yr. Mr. Fischel
Rise and spread of Islam from the time of Muhammad to the height of the Ottoman Empire.

190. Modern South Asian Literatures. (2) II. Mr. Vatsyayan
Modern literatures of India, Pakistan, and Ceylon in translation.

191. Indian Civilization. (3) II. Mr. Vatsyayan
From classical times to the present.

192. Language Dynamics in South Asia. (2) I. Mr. Gumperz
Prerequisite: consent of instructor.  
Development of modern South Asian vernaculars. Political and social functions of speech diversity in modern India.

Languages, Literatures, and Linguistics
Lower Division Courses

10A–10B. Elementary Hebrew. (4–4) Yr. Mr. Mitchell

20A–20B. Elementary Arabic. (4–4) Yr. Mr. Khouri

*Not to be given, 1961–1962.
30A–30B. Elementary Modern Persian. (4–4) Yr. Mr. Henning in charge

35A–35B. Elementary Modern Turkish. (3–3) Yr. Mr. Salinger

36A–36B. Elementary Modern Armenian. (4–4) Yr. Mr. Essabal

(Formerly numbered 32A–32B.)

40A–40B. Elementary Spoken Hindi-Urdu. (4–4) Yr. Mr. Gumperz in charge

45A–45B. Elementary Telugu. (4–4) Yr. Mr. Krishnamurti

46A–46B. Elementary Tamil. (4–4) Yr. Mr. Krishnamurti

An introduction to modern literary Tamil.

Upper Division Courses

*†100A–100B. Elementary Egyptian. (3–3) Yr. Mr. Baer
Middle Egyptian grammar and texts.

†101A–101B. Intermediate Egyptian. (2–2) Yr. Mr. Baer
Prerequisite: course 100A–100B.
Readings in Middle Egyptian hieroglyphic and hieratic texts. Introduction to Old Egyptian.

†102A–102B. Elementary Coptic. (3–3) Yr. Mr. Baer
Prerequisite: 6 units of Greek, or equivalent.

103A–103B. Elementary Akkadian. (3–3) Yr. Mr. Finkelstein

*†104A–104B. Akkadian Letters and Legal Documents. (2–2) Yr. Mr. Finkelstein
Prerequisite: course 103A–103B.
Texts from Mesopotamia and adjacent areas in the second millennium B.C. May be repeated for additional credit.

105A–105B. Elementary Sumerian. (2–2) Yr. Mr. Finkelstein
Prerequisite: course 103A–103B.

110A–110B. Intermediate Hebrew. (4–4) Yr. Mr. Mitchell
Prerequisite: course 10A–10B or equivalent.

*†111A–111B. Biblical Hebrew Texts. (2–2) Yr. Mr. Fischel
Prerequisite: course 110A–110B or equivalent.

†112A–112B. Modern Hebrew Literature. (2–2) Yr. Mr. Schramm
Prerequisite: course 110A–110B or equivalent.

†113A–113B. Early Postbiblical Hebrew Texts. (2–2) Yr. Mr. Fischel
Prerequisite: course 110A–110B or equivalent.

*†114A–114B. Medieval Hebrew Literature. (2–2) Yr. Mr. Schramm
Prerequisite: course 110A–110B or equivalent.

* Not to be given, 1961–1962.
† Offered in alternate years.
116A–116B. Aramaic. (3–3) Yr.
Prerequisite: course 110A–110B or consent of the instructor.
Mr. Schramm

120A–120B. Intermediate Arabic. (4–4) Yr.
Prerequisite: course 20A–20B or equivalent.
Mr. Salinger

121A–121B. Readings in Classical Arabic. (2–2) Yr.
Prerequisite: course 120A–120B or equivalent.
May be repeated for additional credit.
Mr. Salinger

122A–122B. Readings in Modern Arabic. (2–2) Yr.
Prerequisite: course 120A–120B or equivalent.
May be repeated for additional credit.
Mr. Khouri

130A–130B. Intermediate Modern Persian. (2–2) Yr.
Prerequisite: course 30A–30B or equivalent.
Mr. Henning in charge

131A–131B. Middle Persian. (2–2) Yr.
Prerequisite: course 130A–130B or equivalent.
Manichaean Middle Persian texts, with an introduction to Pahlavi.
Mr. Henning

(Formerly numbered 132A–132B.)
Prerequisite: course 36A–36B or consent of instructor.
Mr. Essabal

140A–140B. Readings in Hindi. (4–4 Yr.
Prerequisite: course 40A–40B or equivalent.
Graded readings in modern Hindi prose.
Mr. Vatsyayan in charge

141A–141B. Advanced Readings and Composition in Hindi. (1–4; 1–4) Yr.
Prerequisite: course 140A–140B.
Texts selected according to individual requirements. May be repeated for additional credit.
Mr. Vatsyayan

142A–142B. Readings in Urdu. (4–4 Yr.
Prerequisite: course 40A–40B or equivalent.
Graded readings in modern Urdu prose.
Mr. Gumperz in charge

143A–143B. Advanced Readings and Composition in Urdu. (1–4; 1–4) Yr.
Prerequisite: course 30A–30B and 142A–142B or equivalent.
Texts selected according to individual requirements. May be repeated for additional credit.
Mr. Gumperz in charge

144A–144B. Hindi Prose Styles. (2–2) Yr.
Prerequisite: course 40A–40B.
Literary and conversational prose styles and their function in modern Indian society.
Mr. Gumperz

145A–145B. Intermediate Telugu. (4–4) Yr.
Prerequisite: course 45A–45B or equivalent.
Mr. Krishnamurti

149A–149B. Studies in South Asian Languages. (2–2) Yr.
Prerequisite: consent of instructor.
Directed study in South Asian languages other than Hindi-Urdu for nonmajors. Subject to availability of staff.
The Staff

199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff

* Not to be given, 1961–1962.
Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

201A–201B. Later Stages of Egyptian. (2–2) Yr. Mr. Baer
Prerequisite: course 101A–101B and 102A–102B.
Introduction to late Egyptian and Demotic.

204A–204B. Advanced Akkadian. (2–2) Yr. Mr. Finkelstein
(Formerly numbered 251A–251B.)
Major literary compositions.

205A–205B. Advanced Sumerian. (2–2) Yr. Mr. Finkelstein
(Formerly numbered 252A–252B.)
Readings in early historical texts.

210A–210B. Semitic Linguistic Structures. (2–2) Yr. Mr. Schramm
Prerequisite: Linguistics 130 and 140, plus 12 upper-division units of a Semitic language.

211A–211B. Advanced Biblical Hebrew. (2–2) Yr. Mr. Schramm
(Formerly numbered 224A–224B.)
Prerequisite: course 110A–110B.
Reading and grammatical analysis of prophetic or poetical books of the Bible, such as Amos, Isaiah, Jeremiah, or Psalms.

213A–213B. Postbiblical Hebrew. (1–1) Yr. Mr. Fischel
(Formerly numbered 227A–227B.)
Prerequisite: course 110A–110B or 112A–112B.
Reading of unvocalized postbiblical texts such as the Mishnah, Midrash, Piyyutim, or modern Hebrew literature.

220A–220B. Advanced Arabic. (2–2) Yr. Mr. Khouri
(Formerly numbered 232A–232B.)
Prerequisite: 12 units of upper division work in Arabic.
Reading of the Koran, poetry, or modern literary works.

230A–230B. Advanced Persian. (2–2) Yr. Mr. Henning
Prerequisite: course 130A–130B.
Classical poetry, with special attention to the epics.

236A–236B. Classical Armenian. (2–2) Yr. Mr. Essabahl
Prerequisite: working knowledge of modern Armenian or of one of the early Indo-European languages, e.g. Latin, Greek, or Sanskrit.

249A–249B. Linguistic Structures of South Asian Languages. (2–2) Yr. Mr. Krishnamurti
(Formerly numbered 275A–275B.)
Prerequisite: Linguistics 130 and 140.
Structure and typology of selected South Asian languages. May be repeated for additional credit.

280A–280B. Bibliography and Historiography of Islamic Studies. (2–2) Yr. Mr. Fischel
(Formerly numbered 200A–200B.)
Prerequisite: course 180A–180B.
A survey of the methods of research in Islamic studies, bibliographical tools and resources, recent literature, and so forth.

290A–290B. Special Study. Yr. The Staff
Credit according to work accomplished.

* Not to be given, 1961–1962.
† Offered in alternate years.
NUTRITION AND HOME ECONOMICS

(Department Office, 119 Home Economics Building)

George M. Briggs, Ph.D., Professor of Nutrition (Chairman of the Department).

Judson T. Landis, Ph.D., Professor of Family Sociology.

Catherine Landreth, Ph.D., Professor of Home Economics and Lecturer in Psychology.

Jessie V. Coles, Ph.D., Professor of Home Economics, Emeritus.

Helen L. Gillum, Ph.D., Professor of Nutrition, Emeritus.

Agnes Fay Morgan, Ph.D., Professor of Nutrition, Emeritus.

Ruth Okey, Ph.D., Professor of Nutrition, Emeritus.

Bessie B. Cook, Ph.D., Associate Professor of Nutrition.

Richard L. Lyman, Ph.D., Associate Professor of Nutrition.

Mary Ann Morris, Ph.D., Associate Professor of Home Economics.

Barbara M. Kennedy (Barbara Kennedy Johnson), Ph.D., Assistant Professor of Nutrition.

Mary Ann Williams, Ph.D., Assistant Professor of Nutrition.

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.

Henrietta Henderson, B.S., Cert.Diet., Lecturer in Hospital Dietetics.

Ruth L. Huenemann, D.Sc., Lecturer in Public Health Nutrition and Associate Professor of Public Health Nutrition.

Virginia R. McMasters, M.S., Lecturer in Institution Management.

Helen V. Park, Lecturer in Home Economics.

Lars Soderhjelm, A.B., M.D., Lecturer in Human Nutrition.

Departmental Adviser: Mr. Briggs.

The Department of Nutrition and Home Economics offers the following curricula and majors: Curriculum A (Major: Preteaching, Extension, and General Home Economics); Curriculum B (Majors: Nutrition, Dietetics, Foods, Textile Science); Curriculum C (Majors: Child Development, Clothing Design, Family Economics, Family Sociology). Students are advised that the Class of 1962 will be the last to be graduated in curricula A and C in their present forms. See the PROSPECTUS OF THE COLLEGE OF AGRICULTURE, available without charge, for details. Majors in nutrition, dietetics, and foods, offered under Curriculum B, will continue substantially as indicated below:

Majors in Nutrition, Dietetics, and Foods. To obtain a B.S. degree in these majors, the following five items must be satisfied:

1. General University requirements (see pages 37, 51, 52).
2. College of Agriculture requirements (see page 63).
3. Curriculum B requirements: (a) General—Bacteriology, 4 units. Chemistry, 13 units. Economics, 3 units. English and/or speech, 6 units. Physics, 3 units. Psychology, 3 units. (b) Home economics or related fields—Lower division home economics, 6 units. Upper division home economics or allied subjects, selected with the approval of the major adviser, 27 units. (c) Electives (restricted)—Art, foreign language, history, music, and/or philosophy, 9 units. Botany, physiology, public health, and/or zoology, 4 units.

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 units.

5. Certain courses are required for the majors, and where applicable, may be used in partial satisfaction of 3 above. For details, see the Prospectus of the College of Agriculture, available without charge.

Honors. Information concerning honors may be obtained from the Dean's Office, College of Agriculture.

HOME ECONOMICS

Lower Division Courses

6. Introduction to Textiles. (3) II.
Lectures and laboratory. Prerequisite: Chemistry IA and 8.
Miss Morris

7. Elementary Clothing Study. (3) I and II.
Lecture and laboratory. Prerequisite: Decorative Art 6A–6B.
Miss McClelland

Upper Division Courses

Child Development and Family Relationships

132. Child Psychology. (3) II.
Miss Landreth
Prerequisite: Psychology IA and 5. Not open to students who are taking or have taken Psychology 112.
Factors concerned in the motor, sensory, language, mental, emotional, and social development of young children.

135. Techniques with Young Children. (3) I and II.
Miss Landreth
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 the Family. (3) I and II.
Mr. Landis
Contemporary family life, with attention to personality development and mental health; psychological interpretations of social and sexual roles; cultural contrasts and marriage; dynamics of marriage interaction and parent-child relationships.

138. The Contemporary American Family. (3) II.
Mr. Landis
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) I.
Mr. Landis
Various social factors, social groupings, and social contexts in relation to the social development of the child.

* Not to be given, 1961–1962.
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.

140L. Home Management Laboratory. (1–3) II. 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.
Prerequisite: Economics 1A. Not open to students who are taking or have taken Agricultural Economics 130 or Business Administration 160.

142. Social Problems of Families. (3) II.
Prerequisite: Economics 1A–1B and either Economics 2 or Psychology 5.

144. Family Finance. (3) I.
Prerequisite: Economics 1A.

Home Furnishing

152. Home Furnishing. (3) II. Miss Park
Lecture and laboratory. Prerequisite: Decorative Art 6A–6B, 130A–130B. 130B may be taken concurrently.
Materials involved in furnishing the home; current trends and availability.

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) II. Miss Morris
Lectures and laboratory. Prerequisite: course 6; Economics 1A–1B.
Organization of the textile industry; production and consumption of textile products; and the principles involved in the maintenance of textile products.

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 McClelland
Lecture and laboratory. Prerequisite: course 7.
Design, draping, and construction of costumes; past and current fashion trends.

Special Study Course Applying to All Majors

199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Miss Morris in charge)

* Not to be given, 1961–1962.
Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

200A–200B. Research in Home Economics. (2–6; 2–6) Yr.
   The Staff (Miss Morris 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

262. Seminar in Textiles. (2) II.
   Miss Morris
   Prerequisite: graduate standing in textiles and clothing.

NUTRITION†

Lower Division Courses

1. Foods as Sources of Nutrients. (4) I.
   Miss Kennedy
   Lectures and laboratory. Prerequisite: Chemistry 1A, 8. (Not open to students who have credit for Nutrition 1A.)
   Composition of foods; chemical and physical changes in preparation and preservation.

2. Experimental Food Study. (3) II.
   Miss Kennedy
   Lecture and laboratory. Prerequisite: course 1. Not open to students who have credit for Nutrition 1B. Primarily for majors in foods and dietetics.
   Chemical and physical changes involved in food preparation, preservation, and storage as they affect acceptability.

10. Elementary Nutrition. (2) II.
   Mrs. Cook
   Principal nutrients in foods, their utilization by the body; the needs of individuals at different stages of life.

Upper Division Courses

Food Economics and Technology

*100. Food Economics. (3) I.
   Lectures and laboratory or field work. Prerequisite: course 1; 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 1, Chemistry 1B, 8; or Chemistry 1B and 8 with grades of at least B.
   Quantitative analysis applied to food materials.

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 for foods. Examination for deterioration and adulteration.

* Not to be given, 1961–1962.
† For additional courses, see Food Technology, page 346.
**108. Introduction to Food Research. (2) II.** Miss Kennedy  
(Formerly numbered 109.)  
Prerequisite: course 101A.  
A proseminar on current research in the chemistry of food composition, preparation, and control.

**108L. Introduction to Food Research Laboratory. (2) II.** Miss Kennedy  
(Formerly numbered 108.)  
Prerequisite: course 108, to be taken concurrently.

**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 Curricula A and B of the Department of Nutrition and Home Economics, and not open to students who have credit for course 10.  
Essential nutrients and their functions in nutrition; how to determine and satisfy the food needs of normal individuals.

**112A–112B. Nutrition and Dietetics. (3–3) Yr.** Mrs. Cook  
Lectures and laboratory. Prerequisite: course 1 and 2; Chemistry 1A, 8; Physiology 1.  
Food requirements of normal individuals, special needs imposed by growth, pregnancy, lactation, and disease; 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).  
Introduction to quantitative chemical methods used in nutrition research.

**115. Therapeutic Dietetics. (3) II.**  
Lectures and laboratory. Prerequisite: course 118A–118B, 118C–118D (118B, 118D may be taken concurrently).  
Planning and computation of dietaries for normal and pathological conditions.

**118A–118B. Human Nutrition. (2–2) Yr.** Mr. Lyman  
Prerequisite: course 101A, 114, and Biochemistry 102; or Biochemistry 100A–100B and 101A–101B.  
Experimental techniques and results as applied to the principles of nutrition.

**118C–118D. Human Nutrition Laboratory. (2–2) Yr.** Mr. Lyman, Mrs. Ostwald  
Prerequisite: course 118A–118B (may be taken concurrently) or equivalent.  
Quantitative laboratory techniques used in research in nutrition.

**121A–121B. Problems of Quantity Food Service. (4–4) Yr.** Mrs. McMasters  
Lectures and laboratory. Prerequisite: course 1 and 2. Recommended: Business Administration 1A or 10 and Business Administration 151 or Psychology 185.  
121A. Quantity preparation of food: acceptability, retention of nutrients, economy.  
121B. Organization and management of quantity food service.

**Special Study Courses Applying to All Majors**

**198. Directed Group Study. (1–5) I and II.** The Staff (Mr. Briggs in charge)  
Prerequisite: consent of instructor.

* Not to be given, 1961–1962.
199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. Briggs in charge)

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 163.)

201A–201B. Seminar in Nutrition. (2–2) Yr. Mr. Briggs
May not be repeated for credit.

219. Vitamin Analysis. (3) II. Miss Williams
(Formerly numbered 119.)
Lecture and laboratory.
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.

290. Advanced Seminars in Nutritional Sciences. (1–4) I and II. The Staff
Areas of study in the various seminars may vary each semester but will include discussions of recent research in experimental nutrition, human nutrition, foods, and dietetics.

299. Research in Food and Nutrition. (1–9) I and II.
The Staff (Mr. Briggs in charge)

Professional Courses

126. 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.

127. 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.

OPTOMETRY
(Department Office, 101 Optometry Building)

Meredith W. Morgan, Jr., 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.
Kenneth B. Stoddard, Ph.D., Professor of Physiological Optics and Optometry, Emeritus.
Jack T. Hobson, B.S., Assistant Professor of Optometry, Emeritus.
Elwin Marg, Ph.D., Associate Professor of Physiological Optics and Optometry.
Gerald Westheimer, Ph.D., Associate Professor of Physiological Optics and Optometry.
R. Stuart Mackay, Ph.D., Associate Clinical Professor of Optometry.
Henry B. Peters, M.A., Associate Clinical Professor of Optometry.
Merton C. Flom, Ph.D., Assistant Professor of Physiological Optics and Optometry.
Richard M. Hill, M.Opt., Assistant Professor of Physiological Optics and Optometry.
Marshall B. Atkinson, M.D., Assistant Clinical Professor of Ophthalmology.
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.
Allan N. Freid, M.Opt., Clinical Instructor in Optometry.
Robert F. Harrigan, B.S., Clinical Instructor in Optometry.
Monroe J. Hirsch, Ph.D., Clinical Instructor in Optometry.
Kenton Jackson, M.Opt., Clinical Instructor in Optometry.
Frank V. Johnson, Jr., M.Opt., Clinical Instructor in Optometry.
Kermit Kors, M.Opt., Clinical Instructor in Optometry.
Robert W. Lester, A.B., 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 95.

Upper Division Courses

Prerequisite. Physics 2A–2B, 3A–3B, Chemistry 1A, 8, Mathematics 3A.
Bacteriology 2 and 4 or 1 and 4, Physiology 1, IL†, Psychology 1A, 33‡; together with all prerequisite courses in the Department of Optometry.

101. Advanced Geometrical Optics. (3) II. Mr. Westheimer
Prerequisite: Physics 108A–108B.
Laws of optics, ray tracing, design of ophthalmic instruments and lenses.

102A–102B. Theoretical Optometry. (3–4) Yr. Mr. Westheimer, Mr. Hill
One unit of laboratory will be given the second semester.
The eye as an optical instrument; the states of refraction as optical and biological variants, correlated visual sensations, and optical methods of correction.

† Physiology 1, IL, 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.

Unless a course in human anatomy, which is the full equivalent of Anatomy 25 at the University of California, is offered in one of the above sequences, Anatomy 25 must be included in the junior year program of the School of Optometry.

‡ Psychology 1B may be substituted for Psychology 33.
103A–103B. Advanced Theoretical Optometry. (3–3) Yr.
Prerequisite: course 102A–102B.
Extension of course 102A–102B to binocular vision: binocular accommodation, ocular movements, fusion, and the anomalies of binocular vision.

Mr. Marg, Mr. Morgan

Professional Courses

401A–401B. Ophthalmic and Mechanical Optics. (2–2) Yr.
Lectures and laboratory.
Mr. Peters, Mr. Brandreth
Lectures: development of lenses and spectacles, and the properties of available ophthalmic lenses. Laboratory: lens surfacing, edging, beveling, mounting and neutralization, and frame fitting and adjustment.

404A–404B. Practical Optometry. (3–3) Yr. Mr. Harrigan, Mr. Flom
Prerequisite: course 102A–102B and 401A–401B.
Instruments and techniques used in the examination and treatment of the eyes and vision, interpretation of examination results, and the prescribing of lenses and/or orthoptics.

406A–406B. Optometry Clinic. (2–2) Yr. The Staff (Mr. Harrigan in charge)
Prerequisite: course 102A–102B, 401A–401B and Physiology 115.
Complete physical eye examinations of clinic patients. The prescribing of ophthalmic devices for the alleviation of abnormal visual conditions.

407A–407B. Introduction to Pathology of the Eye. (1–2) Yr.
Prerequisite: Physiology 115.
Lectures and demonstrations: introduction to pathology, systemic diseases which have ocular manifestations and the identification of pathological conditions of the eye.

499. Special Study for Advanced Undergraduates. (1–4) I and II.
The Staff (Mr. Morgan in charge)

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

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. Morgan in charge)
The examination and treatment with lenses and/or orthoptics of patients with visual anomalies.

212A–212B. Advanced Clinical Procedures. (3–3) Yr.
Mr. Morgan, Mr. Peters
Lectures and class assignments on aniseikonia, strabismus and other binocular anomalies; occupational, school and subnormal vision; contact and telescopic lenses; and allied subjects.

214A–214B. Seminar in Clinical Problems. (2–2) Yr. Mr. Morgan, Mr. Flom

216A–216B. Advanced Pathology of the Eye. (2–2) Yr.
Mr. Atkinson
A more detailed consideration of the topics covered in course 407A–407B with particular reference to the determination of diseases of the visual system in clinical patients.

217. Optometric Law, Economics and Practice. (1) II.
Mr. Sarver
PHYSIOLOGICAL OPTICS

Upper Division Courses

105A–105B. Physiological Optics. (3–3) Yr. Mr. Walls, Mr. Marg
Prerequisite: course 105A, consent of instructor; 105B. Physics 108A–108B and Physiology 105A.
105A. The psychophysics and physiologic psychology of the light, form and color senses.
105B. Neurophysiology of the visual system; radiation and illumination.

106A–106B. Laboratory in Physiological Optics. (1–1) Yr.
Laboratory to accompany 105A–105B. Mr. Walls, Mr. Marg

109. Physiological Optics. (3) I. 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 163.)

201A–201B. Seminar in Physiological Optics. (2–2) Yr. Mr. Walls, Mr. Marg, Mr. Westheimer

203. Space Perception and Binocular Vision. (2) I. Mr. Flom

205. The Evolution of the Visual System. (1) II. Mr. Walls

299. Research. (2–8) I and II. The Staff (Mr. Morgan in charge)

Related Courses in Other Departments

Morphology and Physiology of the Visual System (Physiology 115).
Mammalian Physiology (Physiology 110A–110B).
Geometrical Optics (Physics 108A).
Physical Optics (Physics 108B).
General Human Anatomy (Anatomy 25).

‡ ORIENTAL LANGUAGES

(Department Office, 102 Durant Hall)

Peter A. Boodberg, Ph.D., Agassiz Professor of Oriental Languages and Literature.

Denzel Carr, Ph.D., Professor of Oriental Languages.
†Shih-Hsiang Chen, B.Litt., Professor of Chinese.

Edward H. Schafer, Ph.D., Professor of Oriental Languages (Chairman of the Department).

Yuen Ren Chao, Ph.D., Litt.D., Agassiz Professor of Oriental Languages and
Literature, Emeritus.
Ferdinand D. Lessing, Ph.D., L.L.D., Agassiz Professor of Oriental Languages
and Literature, Emeritus.
Michael C. Rogers, Ph.D., Associate Professor of Oriental Languages.
Donald H. Shively, Ph.D., Associate Professor of Oriental Languages.
Cyril Birch, Ph.D., Assistant Professor of Oriental Languages.

Elizabeth Huff, Ph.D., Lecturer in Oriental Languages.
Susumu W. Nakamura, M.A., Lecturer in Oriental 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 95.

Departmental Major Advisers: Mr. Birch (Chinese); Mr. Nakamura (Japan-
ese).

The Major. Required: (1) 16 units of lower division language courses; (2)
course 100 (2 units), and 22 other units of upper division courses, of which
at least 18 units must be in one language; the remainder, with the consent of
the adviser, may be in lecture courses; (3) 4 to 6 units either lower or upper
division, in an Oriental language other than the one emphasized in (2); these
units may count toward requirement (1) or (2).

Undergraduate students expecting to proceed to the M.A. or Ph.D. degree
in Oriental Languages with emphasis on Chinese must take courses 104 and
104E (at least 3 units) and, in their senior year, 133A–133B.

Recommended: (1) A reading knowledge of French, German, or Russian.
(2) 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),
164 (The Art of Greater Iran); Geography 125A (Geography of Southeast
Asia), 125B (Geography of East Asia); History 19A–19B (Introduction to
the History of Asia), 191A–191B (Social History of Asia), 194A–194B (History
of China), 195A–195B (History of Japan), 190C (Historical Problems in Asian
Interrelationships), 193C (Chinese Civilization of the Middle Dynasties), 194C
(Problems in the Intellectual History of Modern China), 195C (Problems in
Japanese Intellectual History); Linguistics 35 (Language and Linguistics),
130 (Phonetics and Phonemes), 140 (Linguistic Analysis), 145 (Types of
Linguistic Structure); Sociology 166 (Oriental Societies), 167 (Nomadic So-
cieties).

Honors Program. An undergraduate student who has completed 16 units of
language courses in the department, and has an over-all grade-point average
of 3.0, may apply to the departmental chairman for admission as a candidate for honors with the bachelor's degree. If accepted, his curriculum will then differ from that of other candidates for the A.B. in that he will be permitted to take from 1 to 6 units of Oriental Languages H195 (Honors course) which will count towards the major, in lieu of other language courses that he might offer for the degree. While enrolled in this course he will do independent and advanced work under the guidance of appropriate members of the staff. At the same time he will prepare himself to take a comprehensive examination in the last semester of his senior year. If he completes his assignments in H195 and the comprehensive examination with distinction he will be recommended for Honors, High Honors, or Highest Honors at graduation, in accordance with the degree of distinction.

Lower Division Courses

1. Elementary Mandarin. (4) I. Mr. Chao, Mr. Chen
   Class meets five hours a week.

2. Elementary Mandarin (continued). (4) II. Mr. Chao, Mr. Birch
   Class meets five hours a week. Prerequisite: course 1.

3. Elementary Classical Chinese. (4) I. Mr. Boodberg
   Class meets five hours a week.

4. Elementary Classical Chinese (continued). (4) II. Mr. Boodberg
   Class meets five hours a week. Prerequisite: course 3.

6. Mandarin Texts. (4) I. Mr. Birch
   Class meets five hours a week. Prerequisite: course 2.
   Readings in 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
   Class meets five hours a week.

18. Readings in Indonesian. (2) II. Mr. Carr
    Prerequisite: course 8, or the equivalent.

19. Elementary Modern Japanese (continued). (4) II. Mr. Shively, Mr. Nakamura
    Class meets five hours a week. Prerequisite: course 9 or the equivalent.

23. Introduction to Chinese Philology. (2) I. Mr. Schafer
    Prerequisite: course 4.
    Basic conceptions of philology and textual criticism for students of Classical Chinese.

39. Intermediate Modern Japanese. (4) I. Mr. Nakamura
    Prerequisite: course 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 readings on the great classics of Eastern Asia, in English translation. Course 38A is not prerequisite to 38B.

Upper Division Courses

Sixteen units of lower division language courses are prerequisite to all upper division language courses.

100. Languages of Eastern Asia. (2) II. Mr. Carr
Required of all majors in Oriental Languages.
A survey course on the nature and distribution of the main languages of Eastern Asia.

103. Chinese Narrative Prose. (3) I. Mr. Schafer
Prerequisite: course 4.

104. Studies in Ancient Chinese Literature: Philological Analysis of Texts. (2) I and II. Mr. Boodberg
Prerequisite: course 23. To be taken concurrently with course 104E. May be repeated for credit.
Topics and texts will vary from semester to semester.

106. Contemporary Chinese Writers. (3) II. Mr. Birch
Prerequisite: course 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 for credit.

113. Chinese Classics. (3) II. Mr. Schafer
Prerequisite: course 103 or 104 or 143.

*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
Prerequisite: Linguistics 35.

* Not to be given, 1961–1962.
124A-124B. Readings in Modern Chinese. (3–2) Yr. Mr. Chen, Mr. Birch
Prerequisite: course 6. Course 124A is not prerequisite to 124B.
124A. Texts on social and political topics. Mr. Birch
*124B. Texts of literary and philosophical interest. Mr. Chen

128. Classical Malay Literature. (2) II. Mr. Carr
Prerequisite: course 18.
Reading of Sejarah Melayu and other standard texts in Roman and Arabic characters.

Prerequisite: course 119. Course 129A is not prerequisite to 129B. Mr. Shively

*129C–129D. Japanese Historical Texts and Kambun. (3–3) Yr. Mr. Shively
Prerequisite: course 119; 129A–129B is not prerequisite to 129C–129D. Course 129C is not prerequisite to 129D.

129E. Readings in the Scholarly Literature of the Tokugawa Period.
(3) II.
Prerequisite: course 119 and 129C.

133A–133B. Chinese Bibliography. (2–2) Yr. Miss Huff
Prerequisite: course 103, or 104, or 143.
Open to seniors.

134A–134B. Cantonese. (2–2) Yr. Mr. Chao
Not open to students with previous experience in standard Cantonese.

*135. Phonology of Ancient Chinese. (3) I. Mr. Chao

139. Japanese Grammar. (2) I. Mr. Carr
Prerequisite: course 119.

143. Readings in Medieval Chinese. (3) II. Mr. Schafer
Prerequisite: course 4.

149A–149B. Advanced Colloquial Japanese. (2–2) Yr. Mr. Nakamura
Prerequisite: course 39. Course 149A is not prerequisite to 149B.
Training in the active use of colloquial Japanese. Lectures in Japanese on elements of Japanese culture will be given in the second semester.

154. Mongolian. (2) I and II. Mr. Rogers
May be repeated for credit.

164. Tibetan. (2) I. Mr. Nakamura
May be repeated for credit.

*187. Philological Laboratory. (2) II. Mr. Carr
Philological analysis of an Oriental Language, using textual material.
The current subject is Javanese.

(2–2) Yr. Mr. Chen
Prerequisite: course 103, or 104, or 143.
Course 191A is not prerequisite to 191B.
191A. Verse.
191B. Belles-lettres.

* Not to be given, 1961–1962.
(2–2) Yr.  
Prerequisite: course 103, or 104, or 143.  
Mr. Chen

191C. The Short Story and Essay.  
191D. The Novel.  
Course 191A–191B is not prerequisite to 191C. Course 191C is not prerequisite to 191D.

194. Sino-Altaica. (3) II.  
Prerequisite: 16 units of Chinese language courses.  
Problems in texts pertaining to the history of the Chinese frontier with special reference to China’s early relations with Altaic-speaking peoples.  
Mr. Boodberg

H195. Honors Course. (1–6) I and II.  
The Staff (Mr. Schafer in charge)  
Limited to senior honors candidates in Oriental Languages.

198. Preceptorial and Reading Course. (1 or 2) I and II.  
Prerequisite: junior standing.  
The Staff (Mr. Schafer in charge)

199. Special Individual Study. (1–5) I and II.  
Mr. Chen in charge

Open only to majors in Oriental Languages.

Lecture Courses
Prerequisite: junior standing. Knowledge of an Oriental language not required.

104E. Studies in Ancient Chinese Literature: Interpretation. (1) I and II.  
May be repeated for credit.  
Mr. Boodberg

Topics will vary from semester to semester.

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.

132. History of Japanese Literature. (3) I.  
Mr. Shively

From the beginning to modern times, emphasizing Chinese, Buddhist, and Western influences.

*142C. Civilizations of Eastern Asia: China. (3) I.  
Emphasis on material culture, technology, and science.  
Mr. Schafer

142K. Civilizations of Eastern Asia: Korea. (2) II.  
Mr. Rogers

The development of Korean civilization; emphasis on Chinese influence.

154E. The Mongols, Their Language and Literature. (1) II.  

*163. Readings in Pacific Literature in English Translation. (2) II.  
Mr. Carr

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.  
Mr. Birch

Fiction and drama from early times to the present with assigned readings in English translation.

* Not to be given, 1961–1962.
Graduate Courses

Graduate students should already have begun the study of French or German, and will be expected to enroll in courses in these languages continuously until they pass their qualifying examinations for advanced degrees. All courses may be repeated for credit with consent of the instructor.

206. Seminar in Chinese Fiction. (2) II. Mr. Birch
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.

213. Seminar in Philological Analysis of Chinese Sources of the Post-Han Period. (2) I and II. Mr. Boodberg

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.

217A–217B. Seminar in Philological Analysis of Koryŏ and Yi Dynasty Sources. (2–2) Yr. Mr. Rogers

219. Proseminar in Bibliography and Methods in Japanese Studies. (2) II. Mr. Shively

229. Seminar in Japanese Literature. (2) I. Mr. Shively

235. Seminar in Chinese Dialectology. (2) II. Mr. Chao

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)

† PALEONTOLOGY
(Department Office, 193 Earth Sciences Building)

J. Wyatt Durham, Ph.D., Professor of Paleontology and Curator of Mesozoic and Cenozoic Invertebrates in the Museum of Paleontology.
Joseph T. Gregory, Ph.D., Professor of Paleontology and Curator of Lower Vertebrates in the Museum of Paleontology (Chairman of the Department).
Robert M. Kleinpell, Ph.D., Professor of Paleontology and Curator of Mesozoic and Tertiary Foraminifera in the Museum of Paleontology.

* Not to be given, 1961–1962.
Ruben A. Stirton, Ph.D., Professor of Paleontology, Curator of Mammals, and Director of the Museum of Paleontology.

Charles L. Camp, Ph.D., Professor of Paleontology, Emeritus, and Curator of Amphibians and Reptiles in the Museum of Paleontology, Emeritus.

Ralph W. Chaney, Ph.D., Professor of Paleontology, Emeritus, and Curator of Paleobotanical Collections in the Museum of Paleontology, Emeritus.

Zach M. Arnold, Ph.D., Associate Professor of Paleontology, Curator of Pleistocene and Recent Microorganisms, and Associate Director of the Museum of Paleontology (Vice-Chairman of the Department).

Wayne L. Fry, Ph.D., Associate Professor of Paleontology and Curator in Paleobotany in the Museum of Paleontology.

*Donald E. Savage, Ph.D., Associate Professor of Paleontology and Curator of Higher Vertebrates in the Museum of Paleontology.

William B. N. Berry, Ph.D., Assistant Professor of Paleontology and Curator of Paleozoic Invertebrates in the Museum of Paleontology.

**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 95.

Departmental Major Adviser: Mr. Fry.

Graduate Adviser: Mr. Arnold.

The Major. Undergraduate majors are designed to provide a broad acquaintance with the field of paleontology and related sciences suitable as a foundation for advanced study. Either geological or biological aspects may be emphasized.

The major shall include: Paleontology 1, 3; Geology 5; Zoology 1A or Botany 1; Chemistry 1A; and either German or French as a foreign language. Majors with geological emphasis require Physics 2A and Geology 6; vertebrate paleontology requires Zoology 1B.

All majors must include Paleontology 111, 112, 120, and a year sequence of related advanced courses in paleontology. Majors with geological emphasis shall include Geology 103 and 101; Geology 105 is strongly recommended. Majors with biological emphasis shall include either Genetics 100 or 103A-103B or Zoology 114; one of the following: Botany 103, Zoology 106, or Zoology 108; and 4 additional upper division units in zoology or botany related to the field of concentration. A list of recommended courses in related fields will be provided by the adviser upon request.

Either an advanced course in field geology or a course at a marine biological station or biological camp is recommended during the summer between junior and senior years.

A reading knowledge of French and German is essential for efficient advanced work and is required of candidates for the Ph.D. degree.

Honors Program. Candidates for honors with the major in paleontology are required to complete course H195.

* Absent on leave, 1961-1962.
Lower Division Courses

1. General Paleontology: History of Life. (3) I and II.
   Mr. Arnold, Mr. Stirton
   Two lectures and one two-hour laboratory period per week; field trip.
   Methods of interpreting 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.
   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. Stirton
    Two lectures per week; one or more field excursions half day Saturday. Not open to students who have credit in course 1.
    General principles of the history of life.

Upper Division Courses

111. Invertebrate Paleontology. (4) I.
    Mr. Berry
    Two lectures and two three-hour laboratory periods per week. Prerequisite: course 1, or Zoology 1A.
    Paleobiology, morphology, and systematics of the invertebrates.

112. Stratigraphic Paleontology. (4) II.
    Mr. Kleinpell, Mr. Berry
    Two lectures and two three-hour laboratory periods per week. Prerequisite: course 111 or equivalent.
    Elements of biostratigraphy and the stratigraphic sequence of fossils.

114A. Micropaleontology. (3) I.
    Mr. Kleinpell
    One lecture and two three-hour laboratory periods per week. Prerequisite: course 112.
    Principles of biostratigraphic correlation with emphasis on the Foraminifera.

114B. Micropaleontology. (3) II.
    Mr. Arnold
    One lecture and two three-hour laboratory periods per week. Prerequisite: course 112 or consent of instructor.
    Paleobiology of microorganisms 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
    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 instructor.
    Advanced study of plants represented in the geologic record. Content to be varied in alternate years: (1) Paleobotany for students with comprehensive knowledge of the earth sciences; (2) Paleobotany for students with comprehensive training in botany (to be given 1961–1962).

* Not to be given, 1961–1962.
121. Flora of the Past. (3) II. Mr. Fry
One lecture and two three-hour laboratory periods per week.

125. History of the Lower Vertebrates. (4) I. Mr. Gregory
Two lectures and two three-hour laboratory periods per week. Prerequisite: course 3 or Zoology 106.

126. Evolution and Classification of the Mammals. (4) I. Mr. Stinton
Two lectures, proseminar, and two three-hour laboratory periods per week. Prerequisite: course 3 or Zoology 106.

127. History and Paleoeoecology of Higher Vertebrates. (4) II.
Two lectures and two three-hour laboratory periods per week. Prerequisite: course 126.

136. Paleozoic and Early Mesozoic of North America. (4) II. Mr. Berry
Three lectures and one laboratory period per week, field trips. Prerequisite: course 111 and 112.

139. Cenozoic History of the West Coast of North America. (4) II. Mr. Kleinpell
Three lectures and one three-hour laboratory period per week. Assigned readings. Prerequisite: course 114A.

Emphasis on correlation, sequence, and relationships of foraminiferal faunas.

170. History of Paleontology. (2) II. Mr. Gregory
Two lectures per week. Prerequisite: consent of instructor.
Discovery and development of ideas, principles, and methods; modern trends and theories.

H195. Honors Thesis. (5) I and II. The Staff (Mr. Fry in charge)
Restricted to candidates for honors with the bachelor's degree.
Preparation of a satisfactory report on original research. In evaluating the report emphasis will be placed on composition and style as well as scientific content.

199. Special Study for Advanced Undergraduates. (1-5) I and II.
The Staff (Mr. Gregory in charge)
Restricted to senior honors students in paleontology.
Special problems or reading assignments.

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

237. 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, 112, and consent of instructor.
Studies of original literature and materials on invertebrate paleontology and stratigraphy.

250. Seminars in Paleontology. (2) I and II.
The Staff (Mr. Gregory in charge)
Advanced study and current literature in various fields of paleontology. Topics vary from year to year. During 1961–1962 the following seminars will probably be offered:
(a) Biostratigraphy, I, Mr. Berry; (b) Micropaleontology, I and II, Mr. Kleinpell; (c) Geographic distribution, I, Mr. Stinton; (d) Functional skeletal morphology, I and II, Mr. Gregory; (e) Invertebrate paleontology, I and II, Mr. Durham; (f) Paleobotany, I and II, Mr. Fry.

299. Research in Paleontology. (1-6) I and II.
The Staff (Mr. Gregory in charge)

* Not to be given, 1961–1962.
Museum of Paleontology

The museum was founded by the late Annie M. Alexander in 1921 to encourage and sponsor research in paleontology. Each academic member of the Department of Paleontology also has the function of curator relative to the specimens in his field of study. The museum collections are used in teaching, and in graduate and faculty research. Research institutes and departments in the University as well as other institutions of learning are served by the museum.

The primary function of the museum as a research institute is to support and sponsor research projects by the staff, the most capable of the graduate students, and visiting scientists.

The museum has large collections of fossil vertebrates, invertebrates, and plants. The best representation of these is from western North America but there are excellent materials, many of them unique, from every continent. The growth and quality of the collections result from the continually expanding and diversified research program. The specimens are invaluable reference materials for research now in progress and they will become indispensable for the future. The collections are housed in the Earth Sciences Building, and in the Campanile, Berkeley campus.

Anyone wishing to utilize the collections or facilities of the museum may address the Director.

Matthew Memorial Library

A branch of the General Library containing an outstanding collection of books and pamphlets on paleontology and related fields of study provides service to both faculty and students.

PHILOSOPHY

(Department Office, 4401 Dwinelle Hall)

Karl Aschenbrenner, Ph.D., Professor of Philosophy (Chairman of the Department).
William Craig, Ph.D., Professor of Philosophy.
William R. Demes, D.Phil., LL.D., Mills Professor of Intellectual and Moral Philosophy and Civil Polity.
Lewis S. Feuer, Ph.D., Professor of Philosophy and of Social Science.
Isabel C. Hungerland, Ph.D., Professor of Philosophy.
Benson Mates, Ph.D., Professor of Philosophy.
David Rynin, Ph.D., Professor of Philosophy.
Edward W. Strong, Ph.D., Professor of Philosophy.
Jacob Loewenberg, Ph.D., Professor of Philosophy, Emeritus.

1 In residence fall semester only, 1961–1962.
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 95.

Departmental Major Adviser: Mr. E. W. Adams.

The Major. A total of 34 units is required in the major program. The following courses are required for a major program in the department: 20A–20B, 12, 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 units of the major may be taken in another department, provided the course selected is regarded as relevant to the major.

Honors Program in the Major. Students who have achieved honors standing at the end of the junior year will be permitted to enter the departmental honors program in the senior year. This program demands completion with a grade of B or better of one of the following three options: 1) Philosophy H195, Philosophy Tutorial; 2) Philosophy H197, Senior Colloquium; 3) a graduate seminar—with the approval of the Departmental Honors Committee and the instructor in charge, the student will be permitted to enroll in a seminar, approval being based on the adequacy of the student's preparation and the likelihood of his profiting from such study. In addition the student will submit an acceptable thesis for which no unit credit will be assigned. Option 2) above, Senior Colloquium, will be offered for the first time in the academic year 1961–1962.

Lower Division Courses

6A–6B. Introduction to Philosophy. (3–3) Yr. Beginning each semester.
   Mr. Aschenbrenner, Mr. Cavell, Mr. Charlson, Mr. Clarke, Mr.
   Feyerabend, Mrs. Hungerland, Mr. Rynin, Mr. Santas, Mr. Stroud
   Two lectures and one weekly section meeting for discussion and written work. Course
   6A is not prerequisite to 6B.
   6A. Emphasis on moral, social, and political philosophy.
   6B. Emphasis on metaphysics and the theory of knowledge.

12. Introduction to Logic. (4) I and II.
   Mr. Adams, Mr. Clarke, Mr. Herzberger, Mr. Mates, Mr. Rabin
   Two lectures and two section meetings per week.

20A–20B. History of Philosophy. (3–3) Yr. Beginning each semester.
   Mr. Aschenbrenner, Mr. Dennes, Mr. Sullivan, Mr. Santas
   Two lectures and one weekly section meeting for discussion and written work.
   Course 20A is not prerequisite to 20B.
   20A. From the Pre-Socratics to Plotinus: Mr. Dennes, I; Mr. Santas, II.
   20B. From the Scholastics to Kant: Mr. Sullivan, I; Mr. Aschenbrenner, II.

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, or have completed, under conditions specified below, course 101. Additional prerequisites are indicated in certain courses.

Prerequisites in philosophy are waived for courses in the history of science, History 105A–105B, and History 127A–127B.

Unrestricted Course

101. Philosophical Theories. (3) I and II.
   Mr. Fischer
   Fundamental problems in metaphysics and the theory of knowledge. Careful reading
   and discussion of selected texts of Plato, Hume, Kant, and recent authors.
Course 101 is open to juniors and seniors who are not majors in philosophy and who have not taken courses 6A, 6B, 20A, or 20B, or their equivalent. It 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 and II.  Mr. Dennes, Mrs. Hungerland
Moral values; the concepts of good and right; the criteria of conduct.

**108. Social Philosophy.** (3) II.  Mr. Popper
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.

**112. Philosophy of Religion.** (3) II.  Mr. Cavell
The nature and the validity of religious ideas.

**125. Theory of Value.** (3) II.  Mr. Shwayder, Mr. Rynin
The principles of evaluation in relation to both individual and social problems.

**128. Political Philosophy.** (3) I.  Mr. Feuer
Analysis of political obligation and related problems.

**136A–136B. Aesthetics.** (3–3) Yr.  Mr. Charlson
Course 136A is not prerequisite to 136B.
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 for upper division courses in philosophy may be waived for major students in literature or in the fine arts.

**137. Aesthetic Theories.** (3) II.  Mr. Aschenbrenner
A study of aesthetic theories based on historical and recent materials.

**140. Philosophy of Law.** (3) II.  Mr. Feuer

**146A–146B. Philosophy in Literature.** (3–3) Yr.  Mr. Sullivan
Philosophical issues as expressed in poetry, drama, and the novel.
At the discretion of the instructor, the general prerequisite may be waived for major students in literature or in the fine arts.

**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. Feuer

**113A–113B. Logic.** (3–3) Yr.  Mr. Craig
Prerequisite: course 12 or equivalent.

* Not to be given, 1961–1962.
114. Theory of Knowledge. (3) I and II. Mr. Clarke, Mr. Stroud

120A–120B. Scientific Method. (3–3) Yr. Mr. Feyerabend
Methodology of the mathematical, the natural, and the social sciences.

124. Philosophy of Science. (3) II. Mr. Adams
Prerequisite: course 12.
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. Clarke, Mr. Herzberger
The logical structure of language: propositions, reference, truth, predication and related concepts.

135A–135B. Contemporary Philosophy. (3–3) Yr. Mr. Cavell, Mr. Searle

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.

161. Semantics. (3) I. Mr. Rynin
Prerequisite: 6 units of philosophy, or equivalent at the discretion of instructor. Recommended: an acquaintance with the truth-tables techniques of elementary propositional logic.
A systematic discussion of the theory of meaning based on the verifiability principle: criteria and procedures for ascertaining the significance of linguistic expressions of the several main types developed against the background of a general theory of signs.

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) II. Mr. Aschenbrenner

*115. Medieval and Early-Modern Thought. (3) II. Mr. Strong

116. Plato. (3) I.

117. Aristotle. (3) II.

118. Spinoza. (3) II.

121. Hobbes. (3) I.

Mrs. Hungerland

Development of Scientific Thought and Technique (History 105A–105B) (3–3) Yr.

Topics in the History of Physical Science. (*History 127A–127B). (3–3) Yr. Mr. Kuhn

129. Leibniz. (3) II.

* Not to be given, 1961–1962.
130. Materialism and Naturalism. (3) II.  
Mr. Matson  
Historical and critical studies of the chief philosophical materialists from Democritus to Dewey.

132. Descartes. (3) II.  
Mr. Sullivan  

145. American Philosophy. (3) II.  
Mr. Rynin  

171. Greek Philosophy from Thales to Democritus. (3) II.  
Mr. Matson  
Prerequisite: course 20A.  
The emergence, from a mythological background, of Greek philosophical thought in the sixth century, B.C. The philosophies of the Milesians, Herachitus, the Pythagoreans, Parmenides, the Pluralists, and the Atomists.

183. Locke. (3) II.  
Mr. Stroud  

184. Berkeley. (3) I.  
Mr. Mates  

185. Hume. (3) I.  
Mr. Aschenbrenner  

188. Post-Kantian Idealism. (3) I.  
Mr. Fischer  
The philosophies of Fichte, Hegel, and Schelling.

189. Modern German Philosophy. (3) II.  
Mr. Fischer  
German phenomenology from Brentano to Heidegger.

H195. Philosophy Tutorial. (3) I and II.  
The Staff (Mr. Rynin in charge)  
Restricted to senior honor students majoring in philosophy.  
The department will designate a tutor, with whom the student will meet once a week, submitting written work on topics designated by the tutor.

H197. Senior Colloquium. (3) I.  
Mr. Clarke  
Restricted to senior honor students majoring in philosophy.  
A seminar course for a group of honor students on a topic to be announced. The colloquium will meet once or twice a week. Emphasis on the writing of papers and discussion of them in the colloquium.

199. Special Study for Advanced Undergraduates. (1–4) I and II.  
The Staff (Mr. Rynin in charge)  

Graduate Courses  
(Concerning conditions for admission to graduate courses, see page 163.)

250. Special Studies. (1–6) I and II.  
The Staff (Mr. Rynin in charge)  
Enrollment is ordinarily restricted to students who have been admitted to candidacy for the doctor's degree.

290. Seminar. (3) I and II.  
The Staff (Mr. Rynin in charge)  
Advanced study in various fields of philosophy. Topics will vary from year to year. The program for 1961–1962 will probably include seminars in:  
(a) Probability and Induction (I. Adams); (b) Kant’s Critique of Judgment (I. Charlson); (c) Rationalism and Empiricism (I. Sullivan); (d) Aesthetics (II. Charlson); (e) Philosophy of Science (I. Feyerabend, II. Popper); (f) Moral Philosophy (I. Cavell); (g) Wittgenstein (I. Searle and Cavell); (h) Metaphysics (I. Rynin); (i) Plato (II. Mates); (j) Philosophy of the Social Sciences (II. Feuer); (k) Philosophy of Language (II. Searle); (l) Logic (I. Craig); (m) Philosophy and Psycho­therapy (I. Clarke); (n) Theory of Knowledge (II. Searle); (o) History of Science, History 205 (I. Kuhn).  

* Not to be given, 1961–1962.
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.
Lucile K. Czarnowski, M.S., Supervisor of Physical Education, Emeritus.
Marie H. Glass, A.B., Supervisor of Physical Education, Emeritus.
Eleanor E. Bartlett, A.B., Associate Supervisor of Physical Education, Emeritus.
Clara L. Allison, M.A., Acting Assistant Professor of Physical Education.
David H. Clarke, Ph.D., Assistant Professor of Physical Education.
Jean Grutzmacher, Ph.D., Assistant Professor of Physical Education.
Joseph Royce, Ph.D., Assistant Professor of Physical Education.
Frederica Bernhard, M.S., Supervisor of Physical Education.
Charles J. Keeney, A.B., Supervisor of Physical Education.
Ralph D. Miller, M.A., Supervisor of Physical Education.
Charles A. Pease, A.B., Supervisor of Physical Education.
Kooman Boycheff, Ph.D., Associate Supervisor of Physical Education.
Lance Flanagan, Ed.D., Associate Supervisor of Physical Education.
Harold J. Frey, M.S., Associate Supervisor of Physical Education.
Chester W. Murphy, Ed.D., Associate Supervisor of Physical Education.
Edgar Nemir, A.B., LL.B., Associate Supervisor of Physical Education.
Frances A. Bloland, M.S., Assistant Supervisor of Physical Education.
June Day, M.S., Assistant Supervisor of Physical Education.
Alfred Mathews, Jr., M.A., Assistant Supervisor of Physical Education.
Robert J. Park, M.A., Assistant Supervisor of Physical Education.
William H. Phillips, Jr., M.A., Assistant Supervisor of Physical Education.
Barbara A. Saltzsieder, M.Ed., Assistant Supervisor of Physical Education.
Dorothy M. Wendt, M.S., Assistant Supervisor of Physical Education.
Doris White, M.A., Assistant Supervisor of Physical Education.
Thomas S. Yukie, Ed.D., Assistant Supervisor of Physical Education and Coordinator of Recreation.
Joanna R. Gewertz, M.A., Junior Supervisor of Physical Education.
Marvin Levy, 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 95.

Departmental Major Advisers: for women, Miss Espenschade, Miss Hodgson; for men, Mr. Nordly, Mr. Clarke, Mr. Henry, Mr. Keeney, Mr. Miller, Mr. Royce.

The Major. High school chemistry or the equivalent, Anatomy 25, Physics 10, Physiology 1, 1L, Psychology 1A, Nutrition 10, Physical Education 20; for men, Physical Education 1; for women, Physical Education 26 and 35.

Physical Education 101, 105, 110, 130, 135A, 140 and 120 or 135B; plus six units selected from the following: Anthropology 118, 119, 162, Education 100A, Physiology 102, 103, 104, 107, Psychology 111, 113N, Public Health 106, Sociology 148.

Honors Program. Physical Education H195, or H195 and 200—4 units; Physical Education H196—2 units. One course in the major will be waived with the approval of the adviser.

Teacher Education. Men consult Mr. Flanagan; women consult Miss Hodgson; see also the ANNOUNCEMENT OF THE SCHOOL OF EDUCATION.

Higher degrees. Men consult Mr. Nordly or Mr. Henry; women consult Miss Espenschade; see also the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION, and the ANNOUNCEMENT OF THE SCHOOL OF EDUCATION.

The incidental fee payable by all students at the time of registration entitles students to 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.

Fees. The fee for ice skating is $8.50; for bowling, $8.

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, $4; (c) overnight use of dressing locker, $2; (d) failure to empty locker within designated time, $5.
Lower Division Courses for Men

1. Physical Education Activities. (½) I and II.

   The Staff (Mr. Nordly in charge)

   **Sports Activity Classes:** Most sections meet twice weekly at various hours.

   Classes in the following sports activities are open to men in acceptable physical condition: apparatus, badminton, basketball, bodybuilding, bowling, boxing, diving, golf, gymnastics, handball, judo, officiating, squash rackets, swimming, lifesaving, skin diving, tumbling, trampoline, tennis, weightlifting, and wrestling.

   **Sports Teams:** Advanced instruction and coaching for intercollegiate competition in the following sports is open to men accepted by the intercollegiate team coach and the Student Health Service: baseball, basketball, boxing, crew, cross country, gymnastics, football, rugby, swimming, soccer, tennis, track and field, waterpolo, and wrestling.

Lower Division Courses 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:** badminton, basketball, bowling, diving, fencing, field hockey, field sports, golf, lifesaving, tennis, swimming, and officiating.

   **General Exercise:** tumbling, trampoline, and conditioning exercises.

   **Individual Exercise:** group exercises adapted to individual needs.

Lower Division Courses for Men and Women

5A. First Aid. (1) I and II. Miss Wendt

   Standard and advanced course.

   Upon successful completion of the course, a Red Cross certificate is awarded.

12. Physical Education Activities. (½) I and II.

   The Staff (Miss White, Mr. Keeney in charge)

   **Sports:** archery, badminton, bowling, fencing, figure skating, golf, tennis, and sailing.

   **Dance:** modern, folk, and social.

   **Elementary School Activities:** dance and games.

20. Introduction to Physical Education. (1) I and II.

   Miss Hodgson, Miss Grutzmacher, Mr. Nordly

   An interpretation of the field designated to give the prospective major student an understanding of its scope.

35. Rhythmic Basis of Dance and Allied Arts. (2) I. Mrs. Bloland

   Prerequisite: 2 semesters of dance, or consent of instructor.

   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
Lectures and laboratory. Prerequisite: Red Cross First Aid Certificate, Physiology 1 or Anatomy 25.
Conditioning and care of athletes; 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. Mrs. Bloland, Miss Gewertz
160A, II; 160B, I.
Lectures and laboratory. Prerequisite: course 35 and Psychology 1A.

165A. Theory of Group Athletics. (3) I. Miss Park
Lectures and laboratory. Recommended: course 101. Prerequisite: experience in the activities included.

165B. Theory of Gymnastics. (2) I. Miss Saltzsieder
Lectures and laboratory. Recommended: course 101. 165A is not prerequisite to 165B

166. Theory of Individual Athletics. (2) II. Miss White, Miss Day, Miss Wendt
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 25; Physics 10.
Physical structure and muscular movements in various physical education activities. Anatomical concepts and physical laws applied to joint and muscular action.

102. Corrective Physical Education. (3) II. Miss Grutzmacher
Prerequisite: course 101.

105. Physiological Hygiene. (4) II. Mr. Henry
Lectures and laboratory. Prerequisite: high school chemistry; Nutrition 10 or 111; Physiology 1, 1L.
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. Mr. Henry
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.

111. Motor Development. (2) II. Miss Espenschade
Prerequisite: Psychology 1A, course 135A.
Motor development from birth to maturity, age changes, sex and individual differences, maturation, and motor learning in childhood and adolescence, relation of motor performance to other aspects of behavior.

† To be given if a sufficient number of students enroll.
120. Sports in American Society. (2) I.  
Mr. Flanagan  
Prerequisite: junior standing, Sociology 1 or consent of instructor.  
Interrelationships of sports and physical recreation with other aspects of American culture. Emphasis on the twentieth century.

130. History and Theories of Physical Education. (3) II.  
Miss Hodgson  
Prerequisite: course 20; Psychology 1A; three units from History 4A–4B, or 17A–17B.  
Ideas and practices in physical education in selected periods in the United States and other countries.

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.  
Mr. Clarke, Miss Hodgson  
(Formerly numbered 131B.)  
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. I and II; 135B. I.  
Miss Espenschade  
Prerequisite: Education 100A or a course in statistics.

140. Community Recreation. (2) I.  
Mr. Miller  
Prerequisite: junior standing; Sociology 1 or consent of instructor.  
Nature, scope and historical background of organized recreation in community life. Purpose, functions and interrelationships of community groups which serve recreational needs. Principles of organization, leadership, programming, facilities, financing.

H195. Honors Course. (2-4) II.  
The Staff (Mr. Nordly in charge)  
Special study and/or research in the field of the major.

H196. Honors Thesis. (2) I and II.  
The Staff (Mr. Nordly in charge)

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 (aquatics).  
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, ———  
Boxing, wrestling, combative games.
344. The Theory and Teaching of Field Sports. (2) II.
   Mr. Keeney, Mr. Mathews, Mr. Levy, Mr. Wolfman
   Prerequisite: course 1 (field sports).
   Baseball, American football, soccer, softball, touch football, track and field.

345. The Theory and Teaching of Court Sports. (2) I.
   Mr. Flanagan, Mr. Miller, Mr. Murphy, Mr. Mathews
   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 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
   Review of literature and research methods.

201. Seminar in Movement and Body Mechanics. (2) II. Mr. Royce
   Neurophysiological concepts, physical laws, and kinesiology.

205. Seminar in Physiological Hygiene. (2) II. Mr. Henry, Mr. Clarke
   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) I.
   Prerequisite: course 110.
   Miss Espenscand

230. Seminar in Cultural and Historical Foundations of Physical Education.
   (2) I. Miss Hodgson

231. Administration of Physical Education. (2) I.
   Mr. Nordly

290. Research. (1–6) I and II.
   The Staff (Mr. Nordly in charge)

PHYSICS

(Department Office, 366 LeConte Hall)

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.
Donald A. Glaser, Ph.D., Professor of Physics.

† To be given if a sufficient number of students enroll.
‡ In residence spring semester only, 1961–1962.
Erwin L. Hahn, Ph.D., Professor of Physics.
August C. Helmholtz, Ph.D., Professor of Physics (Chairman of the Department).

Robert Karplus, Ph.D., Professor of Physics.
Arthur F. Kip, Ph.D., Professor of Physics.
Charles Kittel, Ph.D., Professor of Physics.
Walter D. Knight, Ph.D., Professor of Physics.
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.

Wilson M. Powell, Ph.D., Professor of Physics.
John H. Reynolds, Ph.D., Professor of Physics.
Malvin A. Ruderman, Ph.D., Professor of Physics.
Emilio G. Segre, Ph.D., Professor of Physics.
Edward Teller, Ph.D., Sc.D., Professor at Large.

Robert L. Thornton, Ph.D., Professor of Physics.
Michael Tinkham, Ph.D., Professor of Physics.
Kenneth M. Watson, Ph.D., Professor of Physics.

Harvey E. White, Ph.D., Professor of Physics and Director of the Lawrence Hall of Science.

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 of Optometry, Emeritus.
Hiram W. Edwards, Ph.D., Associate Professor of Physics, Emeritus.
Robert R. Brown, Ph.D., Associate Professor of Physics.

William Chinowsky, Ph.D., Associate Professor of Physics.
Frank S. Crawford, Ph.D., Associate Professor of Physics.
Kenneth M. Crowe, Ph.D., Associate Professor of Physics.
Klaus Dransfeld, Ph.D., Associate Professor of Physics.

Gerson Goldhaber, Ph.D., Associate Professor of Physics.
Carson D. Jeffries, Ph.D., Associate Professor of Physics.
Leroy T. Kerth, Ph.D., Associate Professor of Physics.
Donald H. Miller, Ph.D., Associate Professor of Physics.

Alan M. Portis, Ph.D., Associate Professor of Physics.
Frederick Reif, Ph.D., Associate Professor of Physics.
Arthur H. Rosenfeld, Ph.D., Associate Professor of Physics.
M. Lynn Stevenson, Ph.D., Associate Professor of Physics.
George H. Trilling, Ph.D., Associate Professor of Physics.

Thomas J. Ypsilantis, Ph.D., Associate Professor of Physics.
Kinsey Anderson, Ph.D., Assistant Professor of Physics.
Eugene D. Commins, Ph.D., Assistant Professor of Physics.

*In residence spring semester only, 1961–1962.
Sumner P. Davis, Ph.D., Assistant Professor of Physics.
John J. Hopfield, Ph.D., Assistant Professor of Physics.
Charles L. Schwartz, Ph.D., Assistant Professor of Physics.
Howard A. Shugart, Ph.D., Assistant Professor of Physics.
Herbert M. Steiner, Ph.D., Assistant Professor of Physics.
Robert D. Tripp, Ph.D., Assistant Professor of Physics.
*Steven Weinberg, Ph.D., Assistant Professor of Physics.
*Eyvind Wichmann, 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.
David L. Judd, Ph.D., Lecturer in Physics.
Allan Kaufman, Ph.D., Lecturer in Physics.
Wulf B. Kunkel, Ph.D., Lecturer in Physics.
Joseph V. Lepore, Ph.D., Lecturer in Physics.
Haskell Reich, 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.
Robert K. Mortimer, Ph.D., Associate Professor of Medical Physics.
Howard C. Mel, Ph.D., Assistant Professor of Medical Physics and Biophysics.

Ernest L. Dobson, Ph.D., Lecturer in Physiology.
R. Lowry Dobson, M.D., Ph.D., Lecturer in Medical Physics.
Thomas L. Hayes, Ph.D., Lecturer in Medical Physics and Biophysics.
Lola S. Kelly, Ph.D., Lecturer in Medical Physics, Biophysics and Physiology.
Alexander V. Nichols, Ph.D., Lecturer in Medical Physics and Biophysics.
Howard G. Parker, M.D., Lecturer in Medical Physics.
Donald J. Rosenthal, M.D., Lecturer in Medical Physics.
Charles A. Sondhaus, Ph.D., Lecturer in Medical Physics.
Bo Thorell, M.D., Visiting Professor of Biophysics.
Roger W. Wallace, Ph.D., Lecturer in Medical Physics.

Letters and Science List. All undergraduate courses in physics except 126 and 126L are included in the Letters and Science List of Courses. For regulations governing this list, see page 95.

Departmental Major Advisers: Mr. Anderson, Mr. Kip, Mr. Reif, Mr. Shugart, Mr. Steiner, Mr. Ypsilantis.

The Major. In his first four semesters the student ordinarily will take courses in elementary physics, differential and integral calculus, and elementary chemistry. In each of these areas more than one sequence of courses is available, and the student is advised to consult, if necessary, with the departmental adviser concerning the several possibilities. The following sequences are desirable: Physics 4A, 4B, 4C; Mathematics 1A, 1B, 2A, 2B (which includes differential equations, a prerequisite for several of the upper division courses in physics); and Chemistry 1A, 1B. The minimum preparation for all upper division courses ordinarily will be Physics 4A, 4B, 4C; Mathematics 1A, 1B, 2A or Mathematics 3A, 3B, 4A, 4B. When differential equations is listed as a prerequisite to upper division physics courses this is taken to mean Mathematics 2B, or Mathematics 119, or equivalent.

The major must include courses 105A-105B, 108B, 110A-110B, 110C or 110D, 115, and 121. Recommended: Physics 112; Mathematics 119 (for those who have taken 3A, 3B, 4A, 4B), 185; and a reading knowledge of two of the three languages, French, German, and Russian.

Mathematics 2B will be counted as upper division units for majors in physics.

Honors Program. Students with a grade-point average of 3.0 or better may be graduated with Honors in Physics upon completion of the required major, at least two semesters of Physics H197, and the recommendation of the departmental advisers. Special research work which may be taken as Physics 199 may be substituted for one semester of Physics H197.

Physics and Biology. An individual group major may be arranged for students who wish to obtain a broad introduction to the physical sciences and to their application to biology. Advisers: Mr. Tobias, Mr. Lawrence.

Engineering Physics. The College of Engineering with the cooperation of the Department of Physics offers a curriculum in engineering physics leading to the degree of Bachelor of Science. Major Adviser: Mr. Davis. (See section on Program of Study in Engineering Physics, page 72.)

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.

All students planning to take lower division courses except course 10 should have completed trigonometry.
2A–2B. General Physics Lectures. (3–3) Yr. Beginning each semester.

Mr. Brown, Mr. White, ———

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. Brown

Required for premedical students. Recommended for all students who elect course 2A–2B.

Experimental work planned to accompany the lectures in course 2A–2B.

4A. General Physics. (4) I and II. Mr. Commins, Mr. Trilling, Mr. Brown

Three lectures and one three-hour laboratory section per week, with an additional one-hour discussion group per week. Prerequisite: Mathematics 3A or 1A; Mathematics 3B or 1B should 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. Anderson, Mr. Goldhaber, Mr. Kip, ———, ———, ———

Three lectures and one three-hour laboratory section per week, with an additional one-hour discussion group per week. Prerequisite: course 4A; Mathematics 3A–3B or 1A–1B; Mathematics 4A or 2A should be taken concurrently. 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. Alvarez

Three lectures and one three-hour laboratory period per week. Prerequisite: course 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. Shugart, Mr. Helmholz, Mr. Rosenfeld

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 equivalent.

A brief presentation of some of the more important phenomena in physics, with experimental illustrations.


Mr. Knight, Mr. Phillips

Two lectures and one three-hour laboratory period per week. 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 completed other courses in the Departments of Chemistry and Physics; sponsored jointly by Chemistry-Physics.

Elementary quantitative study of matter, radiation, gravitation, electromagnetism, quantum theory, chemical binding, thermodynamics, kinetic theory, relativity; nuclear structure. Necessary mathematical foundations will be introduced.

49. Supplementary Work in Lower Division Physics. (1–3) I and II.

Mr. Brown (in charge)

Students with partial credit in lower division physics courses may, with the consent of instructor, complete the credit under this heading.
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. Mathematical Methods in Physics. (3) I and II.
Prerequisite: senior standing, or consent of instructor.
Emphasizing vectors, matrices, symmetry principles, and invariance principles.

Mr. Dransfeld, Mr. Goldhaber, Mr. Moyer, Mr. Reif, Mr. Rosenfeld
105A. I: Mr. Moyer, Mr. Reif; II: Mr. Rosenfeld, .
105B. I: Mr. Dransfeld, Mr. Goldhaber; II: Mr. Moyer, .
Prerequisite: differential equations (may be taken concurrently).
Fundamental principles of Newtonian mechanics. Brief introduction to Lagrange's and Hamilton's equations.

108A. Geometrical Optics. (3) I. Mr. Davis
Two lectures and one three-hour laboratory period per week. Prerequisite: course 2A–2B and 3A–3B.
Geometrical methods applied to the optics of mirrors, prisms, and lenses.

108B. Physical Optics. (3) I and II. Mr. Davis, Mr. Powell, Mr. Stone
I: Mr. Powell, Mr. Stone; II: Mr. Davis, Mr. Powell, Mr. Stone.
Two lectures and one three-hour laboratory period per week. Section 1 (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. Crawford, Mr. Crowe, Mr. Reynolds, Mr. Thornton, Mr. Tripp
110A. I: Mr. Crawford, Mr. Reynolds, ; II: Mr. Tripp, Mr. Thornton.
110B. I: Mr. Crowe, Mr. Tripp; II: Mr. Crawford, Mr. Reynolds, .
Prerequisites: differential equations.
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. Shugart, Mr. Ypsilantis
Use and calibration of electrical instruments and electronic devices.

110D. Modern Physics Laboratory. (2) I and II. Mr. Shugart, Mr. Ypsilantis
Prerequisite: course 121.
Experimental foundation for the theory of atomic and nuclear structure.

112. Thermodynamics and Kinetic Theory. (3) I and II.
Mr. Fretter, Mr. Reif
Thermodynamics and the kinetic theory of gases, with an introduction to statistical mechanics.

115. Introduction to Quantum Mechanics. (3) I and II. Mr. Segrè, 
Prerequisite: course 105A and 121.
The classical background, basic ideas, and methods of quantum mechanics, with applications to atomic physics.
121. Introduction to Atomic Physics. (3) I and II.
   Mr. Anderson, Mr. Brown, Mr. Thornton, Mr. Reich, ---, ---
   Special relativity, electron physics, atomic structure, spectroscopy, X rays.

124. Introductory Nuclear Physics. (3) I and II.
   Prerequisite: course 121.

   Prerequisite: course 121.
   Mr. Chamberlain, Mr. Trilling
   Designed to cover more thoroughly the material of course 124, including magnetic
   moments, mesons, high-energy physics.

132. Modern Physics. (3) I.
   Prerequisite: Physics 2A–2B, 3A–3B, or equivalent, or consent of instructor.
   Not open for credit to students who have had course 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.
   Prerequisite: course 121.
   Mr. Dransfeld, Mr. Kip
   An elementary survey of the classification and properties of solids. Ionic, covalent,
   molecular, metallic and semiconducting crystals. Dielectric, thermal, magnetic, conduc­
   tive, and mechanical properties. Superconductivity, ferromagnetism, defects in solids.

1197. Physics Honors Course. (2) I and II.
   Mr. Segre, Mr. Helmholz
   A proseminar which includes study of a standard book on theoretical physics and re­
   ports 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. De­
   signed to introduce students to advanced topics and to the technique and methods of
   research. Credit value to be fixed in each case. Open only to honor students.

Graduate Courses

(Congering conditions for admission to graduate courses, see page 163.)

205A. Advanced Dynamics. (3) I and II.
   Mr. Judd, ---
   Prerequisites: course 105A–105B and 104, or equivalent.
   General principles of analytical mechanics of particles, systems of particles, and rigid
   bodies. Methods of Lagrange, Hamilton, and Jacobi. General treatment of kinematics, in­
   cluding collisions of relativistic particles. Inversions, symmetry and conservation laws.
   Small oscillations. Approximate methods in mechanics.

205B. Advanced Dynamics. (3) II.
   Mr. Judd
   Prerequisite: course 205A.
   Advanced topics in classical dynamics, including selections from: hydrodynamics, mag­
   netohydrodynamics, theory of elasticity, mechanics of periodic structures, nonlinear me­
   chanics, advanced perturbation theory, and computational methods.

208. Interactions of Light with Matter. (3) I.
   Mr. Schwartz
   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.
210A–210B. Theory of Electricity and Magnetism. (3–3) Yr. Beginning each semester. Mr. Kaufman, Mr. Lepore, Mr. Zemach

210A. I: Mr. Kaufman, ——, Mr. Lepore; II. ——.
210B. I: Mr. Zemach; II: Mr. Kaufman.
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. Watson, Mr. Hopfield

Prerequisite: course 112 or equivalent, course 115 or equivalent.

220. Advanced Statistical Mechanics. (3) II. Mr. Watson

Prerequisite: Physics 219 or consent of 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. Mr. Schwartz, Mr. Zemach, ——, ——.

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.

223A–223B. Advanced Quantum Mechanics of Atoms, Molecules, and Solids. (3–3) Yr. Mr. Tinkham, Mr. Hopfield
The first semester treats the quantum mechanics of atoms and molecules, using group theoretical methods. The second semester treats solid state theory with emphasis on field theoretical methods.

224A–224B. Nuclear Physics. (3–3) Yr. Mr. Chew
Prerequisite: the equivalent of course 221A, and also either course 124 or 129A.
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) I. Mr. Karplus, Mr. Ruderman
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. Beginning each semester. Mr. Karplus, Mr. Ruderman
Quantization of the electromagnetic field; formal and phenomenological meson theories with applications; general relativity.

* Not to be given, 1961–1962.

Consent of instructor required. The Staff (Mr. Fretter in charge)
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. Kittel
Prerequisite: course 115 or equivalent. Course 140 and 221A are recommended.

290. Seminar. (2) I and II. The Staff (Mr. Helmholz in charge)
295. Research. (1–6) I and II. The Staff (Mr. Helmholz in charge)

Related Courses in Other Departments
Physical Biochemistry (Biochemistry 206).
Principles of Geophysics (Geology 122A–122B).
Elastic Waves (Geology 204A–204B).
Advanced Seismometry (Geology 217).
Development of Scientific Thought and Technique (History 105A–105B).
Seminar in the History of Science (History 205).
Seminar (Philosophy 290).
Radiation Physiology (Physiology 108).

MEDICAL PHYSICS

Lower Division Course

25. Atomic Radiation and Life. (2) I and II. Mr. Mel
Basic aspects of atomic radiations with examples from 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. For liberal arts as well as science students.

Upper Division Courses

126. Artificial Radioactivity in the Biological Sciences. (2) I and 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.
Theory, methods, and interpretation of the use of artificial radioactive elements for research in the biological sciences. Emphasis on the role of radioactive tracers in metabolism.

* Not to be given, 1961–1962.
126L. Artificial Radioactivity in the Biological Sciences. (1) I and II.  
Laboratory work to accompany course 126. Mr. Gofman, Mr. Hayes

128A–128B. Nuclear and Radiation Physics in Biology. (3–3) Yr.  
Mr. Mortimer, Mr. Sondhaus, Mr. Wallace

128A. Mr. Mortimer, Mr. Sondhaus; two lectures and one three-hour laboratory period per week.

128B. Mr. Wallace; three lectures (no laboratory) per week.
Prerequisite: course 4A–4B–4C, or equivalent, calculus.

131. Biological Effects of Radiation. (3) II.  
Mr. Mortimer
One lecture and two three-hour laboratory periods per week. Prerequisite: course 2A–2B, lower division biology, and consent of instructor. Recommended: Physiology 108, Medical Physics 126–126L, or 128A–128B.
Actions of ionizing radiations and ultraviolet light on biological systems. Illustration of various types of radiation damage, including lethal and genetic effects, and dependence on modification of physical and biological parameters.

133A–133B. Physics of Biological Systems. (3–3) Yr.  
Mr. Mel, Mr. Tobias

133A: Mr. Mel; 133B: Mr. Tobias.
Prerequisite: Physics 4A–4B–4C, or the equivalent, and differential equations. Course 133A is not prerequisite to 133B.
Aspects of physics important for the understanding of living phenomena.
133A. Biological rate processes and thermodynamics of closed and open systems; electrokinetic phenomena; active transport.
133B. Biophysics of sensory systems; information theory and replication; quantum biology, bioelectricity.

198. Special Study in Medical Physics for Undergraduates. (1–3) I and II.  
The Staff (Mr. Jones in charge)
Advanced upper division work in medical physics and biophysics. Introduces students to the topics, technique and methods of research. Credit determined by faculty sponsor.

Graduate Courses

225A–225B. Isotopes in Experimental Medicine. (2–2) Yr.  
Mr. Rosenthal, Mr. Lawrence, Mr. Parker

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 vary from year to year. Program for 1961–1962 may include seminars in (g) Effects of Radiation in Mammals (II, Kelly and Dobson); (i) Aging (II, Jones); (p) Progress in Biophysics (I, Thorell; 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)

* Not to be given, 1961–1962.
**Related Courses in Other Departments**

- Physical Biochemistry (Biochemistry 206).
- Nuclear Chemistry (Chemistry 123).
- Chemical Instrumentation (Chemistry 125).
- Principles of Genetics (Genetics 100).
- General Physiology (Physiology 100A–100B).
- Radiation Physiology (Physiology 108).
- Properties of Colloidal Particles and Systems (Soils 114).
- Introduction to Physiochemical Biology (Zoology 101).
- Laboratory in Physiochemical Biology (Zoology 102).
- Genetics (Zoology 114).
- Optics and Metrology in Biology (Zoology 119A–119B).
- Electrical Measurements in Biology (Zoology 120).

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**PHYSIOLOGY**

(Department of Anatomy and Physiology; for courses in Anatomy, see page 172.)

(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 of Physiology).
Hardin B. Jones, Ph.D., Professor of Physiology and Medical Physics.
Nello Pace, Ph.D., Professor of Physiology.
Walter J. Freeman, M.D., Assistant Professor of Physiology.
Robert I. Macey, Ph.D., Assistant Professor of Physiology.
Paola S. Timiras, M.D., Ph.D., Assistant Professor of Physiology.

Ernest L. Dobson, Ph.D., Lecturer in Physiology.
Dorothy H. Eichorn, Ph.D., Lecturer in Physiology.
Gilbert S. Gordon, Jr., Ph.D., M.D., Associate Professor of Medicine.
Lola S. Kelly, Ph.D., Lecturer in Medical Physics and Biophysics.
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 95.

*Departmental Major Advisers:* Mr. Freeman, Mrs. Timiras.

*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),
PHYSIOLOGY

8 (3); Mathematics 3A–3B or 16A–16B. Recommended: Anatomy 25; Chemistry 109; and a reading knowledge of French and German.

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.

Honors Program. The student must:

1. Maintain a 3.0 grade-point average in his over-all college work and in the courses required for the regular major in physiology.

2. Complete the regular major in physiology, as stated on page 481.

3. Take at least 6 units of course 199 which is designated “Special Study for Advanced Undergraduates.” The special study involved may, at the discretion of the department, consist of a reading program or elementary experimental or laboratory work, or both.

4. Take one unit of course 203A or 203B. This course is the regular seminar required of all graduate students and is designed to give students training in formulating and delivering reports on current topics of interest.

5. Pass with a grade of C or better Chemistry 109 (Physical Chemistry) or Physics 132 (Modern Physics).

6. Submit a satisfactory thesis based upon the work performed for course Physiology 199.

Lower Division Courses

1. Introductory Physiology. Lectures. (3) I and II. Mr. Macey
   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. Macey
   Prerequisite: course 1 (may be taken concurrently). The laboratory sections will be limited to 60 or 90 students, depending on availability of space.

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).

102. Physiology of Human Development. (2) I and II.
   Mr. Chaikoff, Mr. Cook, Mr. Jones, Mrs. Timiras
   Prerequisite: course 1, or Zoology 1A–1B, or equivalent.
   A. Prenatal to Maturity. I. Mrs. Timiras
   B. The Aging Process. II. Mr. Chaikoff, Mr. Cook, Mr. Jones, Mrs. Timiras
103. Human Physical Growth. (3) II. 
Prerequisite: course 1, or Zoology 1A–1B, or the equivalent.
Lectures and demonstrations on the physical growth of the human from conception to maturity, including techniques of measurement and analyses of data.

104. Physiology of the Endocrines. (2) I. 
Mr. Chaikoff, Mr. Gordan
Prerequisite: course 1–1L, or Zoology 1A–1B, or consent of the instructor.
Lectures and clinical demonstrations at the University of California Medical Center, San Francisco, designed to acquaint the nonmedical student with the principles of the physiology and chemistry of the endocrine glands.

107. Environmental Physiology. (3) II.
Mr. Pace
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) I. 
Mr. Jones, Mr. Dobson, Mrs. Kelly
Prerequisite: Chemistry 1A–1B, Physics 2A–2B, and course 1–1L, or Zoology 1A–1B. Recommended: Mathematics 16A–16B, and Physics 132.
Lectures on the physiological effects of radiation.

110A–110B. Mammalian Physiology. (3–3) Yr.
Mr. Chaikoff, Mrs. Timiras, Mr. Freeman
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.
Mrs. Timiras, Mr. Freeman, ———, and Assistants
Prerequisite: course 110A–110B; 110B may be taken concurrently.

115. Morphology and Physiology of the Visual System. (4) II.
Mr. Walls, Mr. Cook
Lectures and laboratory. Prerequisite: course 1–1L or Zoology 1A. Open to students in the School of Optometry and to others with consent of the instructor.

120A–120B. Comparative Physiology. (3–3) Yr.
Mr. Cook
(Formerly numbered 120A, 120B, 120C.)
Prerequisite: Chemistry 1A–1B, Physics 2A–2B, and course 1–1L or Zoology 1A–1B.
120A. A comparative survey of the muscular, nervous, sensory and circulatory systems of animals.
120B. Respiration, blood, digestion, metabolism, excretion, and endocrines.

199. Special Study for Advanced Undergraduates. (1–4) I and II.
The Staff (Mr. Cook in charge)
Prerequisite: at least 6 units of upper division courses in physiology.

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 163.)

200. Seminar in Cell Physiology. (1) II. 
Mr. Pace
Prerequisite: courses 100A–100B and Chemistry 109.

201A–201B. Research. (2–8; 2–8) Yr.
The Staff (Mr. Cook in charge)
203A–203B. Seminar in Physiology. (1–1) Yr.  
Mr. Freeman  
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

205. Physiological Action of Drugs. (2) I.  
Prerequisite: courses 110A–110B, 112, 100A–100B, 100L.  
Mrs. Timiras  
Lectures and reports on the current literature. Topics will vary from year to year.  
Emphasis will be placed on the mode of action of drugs at the organismic and cellular levels.

206. Neurophysiology. (3) II.  
Prerequisite: course 110A–110B, or consent of the instructor.  
Mr. Freeman

207. Seminar in Environmental Physiology. (1) I.  
Prerequisite: courses 107 and 110A–110B.  
Mr. Pace  
Topics will vary from year to year.

217. Space Physiology. (2) II.  
Prerequisite: course 107, 110A–110B. Recommended: course 108 and 207.  
Lectures and discussion of the physiological effects encountered by the mammal during extraterrestrial space flight.

PLANT BIOCHEMISTRY

(For courses in Plant Biochemistry, see Biochemistry, page 200.)

PLANT NEMATOLOGY

(For courses in Plant Nematology, see Entomology and Parasitology, page 341.)

PLANT NUTRITION

(See Soils and Plant Nutrition, page 545.)

PLANT PATHOLOGY

(Department Office, 133 Giannini Hall)

Kenneth F. Baker, Ph.D., Professor of Plant Pathology.
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.
Stephen Wilhelm, Ph.D., Professor of Plant Pathology.
Cecil E. Yarwood, Ph.D., Professor of Plant Pathology.

*In residence spring semester only, 1961–1962.*
Peter A. Ark, Ph.D., *Professor of Plant Pathology, Emeritus.*
James T. Barrett, Ph.D., *Professor of Plant Pathology, Emeritus.*
Max W. Gardner, Ph.D., D.Sc. (hon.c.), *Professor of Plant Pathology, Emeritus.*
H. Earl Thomas, Ph.D., *Professor of Plant Pathology, Emeritus.*
A. Herbert Gold, Ph.D., *Associate Professor of Plant Pathology.*
Robert D. Raabe, Ph.D., *Associate Professor of Plant Pathology.*
John R. Parmeter, Jr., Ph.D., *Assistant Professor of Plant Pathology.*
David E. Schlegel, Ph.D., *Assistant Professor of Plant Pathology.*
Tewfik A. Toussoun, Ph.D., *Assistant Professor of Plant Pathology.*
Albert R. Weinhold, Ph.D., *Assistant Professor of Plant Pathology.*

Robert V. Bega, Ph.D., *Lecturer in Plant Pathology.*
Lyssle D. Leach, *Professor of Plant Pathology, Davis (Chairman of the Department).*
John T. Middleton, Ph.D., *Professor of Plant Pathology, Riverside.*

*Departmental Major Adviser: Mr. Rawlins.*

The Major in Plant Pathology. To obtain a B.S. degree in this major, the following five items must be satisfied: (1) General University requirements. (2) College of Agriculture requirements (see page 63). (3) Plant Science Curriculum requirements: (a) *General*—Botany and plant physiology, 9 units. Chemistry, 13 units. Economics, 3 units. English and/or speech, 6 units. Physics, 3 units. (b) *Agriculture*—Entomology and parasitology, 4 units. Genetics, 4 units. Irrigation, plant nutrition, or soils, 3 units. Plant pathology, 4 units. Upper division courses in either the major or a closely related field with approval of major adviser, 12 units. (c) *Electives* (restricted) selected from the two areas listed below (16 units). 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 units. (5) Certain courses are required by the major and, where applicable, may be used in partial satisfaction of 3 above. For details, see the *PROSPECTUS OF THE COLLEGE OF AGRICULTURE,* available without charge.

*Honors.* Information concerning honors may be obtained from the Dean’s Office, College of Agriculture.

† Not including Mathematics C or D.
‡ In addition to University requirements.
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. Raabe, Mr. Oswald
Lectures and laboratory. Prerequisite: Botany 1. Recommended: Bacteriology 1 or 2, and 4. A general course on the nature, cause, and control of plant diseases.

122. Plant Pathology Methods. (3) II. Mr. Schlegel
Lecture and laboratory. Prerequisite: course 120. Laboratory methods used in the study of plant diseases.

123. Principles of Plant Pathology. (3) II. Mr. Wilhelm
Prerequisite: course 120. Principles broadly applicable to fungus, bacterial, virus, and nutritional diseases of plants.

126. Plant Virology. (3) II. Mr. Gold
Lecture and laboratory. Prerequisite: course 120 or consent of instructor. Viruses as causal agents of plant diseases.

127. Plant Disease Control. (3) I. Mr. Yarwood
Lecture and laboratory. Prerequisite: course 120. Exclusion, eradication, protection, immunization, therapy.

199. Special Study for Advanced Undergraduates. (1–5) I and II.
Mr. Rawlins (in charge), Mr. Baker, Mr. Bega, Mr. Gold, Mr. Oswald, Mr. Parmeter, Mr. Raabe, Mr. Schlegel, Mr. Schroth, Mr. Snyder, Mr. Takahashi, Mr. Toussoun, Mr. Weinhold, Mr. Wilhelm, Mr. Yarwood

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

201. Seminar in Plant Pathology. (1) I and II. Mr. Toussoun, Mr. Weinhold
(Formerly numbered 201A–201B.)

210. Physiology of Plant Pathogens. (3) I. Mr. Weinhold
Lecture and laboratory. Prerequisite: course 122; Chemistry 5 and 8, or equivalent. Recommended: Botany 111; Biochemistry 102. Physiology and biochemistry of host-parasite relationships.

212. Epidemiology and Diagnosis of Plant Diseases. (3) I. Mr. Snyder, Mr. Toussoun
Lecture and laboratory. Prerequisite: consent of instructor. Experience in field and laboratory diagnosis of plant diseases.

299. Research in Plant Pathology. (1–9) I and II.
Mr. Snyder (in charge), Mr. Baker, Mr. Bega, Mr. Gold, Mr. Oswald, Mr. Parmeter, Mr. Raabe, Mr. Rawlins, Mr. Schlegel, Mr. Schroth, Mr. Takahashi, Mr. Toussoun, Mr. Weinhold, Mr. Wilhelm, Mr. Yarwood
(Formerly numbered 230A–230B.)
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(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 Akin, LL.B., Ph.D., Professor of Political Science.
Eric C. Bellquist, Ph.D., Professor of Political Science.
*Thomas C. Blaisdell, Jr., Ph.D., Professor of Political Science and Director,
   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.
George Lenczowski, LL.M., J.S.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.
Herbert McClosky, 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.
*Dwight Waldo, Ph.D., Professor of Political Science and Director, Bureau of
   Public Administration.
Hans Kelsen, Ph.D., Professor of Political Science, Emeritus.
Frank M. Russell, Ph.D., Professor of Political Science, Emeritus.
N. Wing Mah, Ph.D., Associate Professor of Political Science, Emeritus.
David E. Apter, Ph.D., Associate Professor of Political Science.
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.
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.

1 In residence fall semester only, 1961–1962.
2 In residence spring semester only, 1961–1962.
Richard H. Cox, Ph.D., Assistant Professor of Political Science.
D. Jay Doubleday, Ph.D., Assistant Professor of Political Science.
James J. Heaphey, A.B., Acting Assistant Professor of Political Science.
Eugene C. Lee, Ph.D., Assistant Professor of Political Science and Assistant Director, Bureau of Public Administration.
Harvey C. Mansfield, Jr., Ph.D., Assistant Professor of Political Science.
Ralph H. Retzlaff, 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.
Hugh M. Clokke, Ph.D., Lecturer in Political Science.
Heinz Eulau, Ph.D., Visiting Legislative Research Professor.
Margaret Fisher, Ph.D., Lecturer in Political Science.
William H. Gardner, M.A., Lecturer in Political Science.
Abraham M. Halpern, Ph.D., Lecturer in Political Science.
Thomas P. Jenkin, Ph.D., Visiting Professor of Political Science for the spring semester.
Norman Mellor, Ph.D., Visiting Professor of Political Science.
Lewis Mumford, Visiting Research Professor of Governmental Affairs for the fall semester.
Stefan Riesenfeld, Professor of Law and 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 95.

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 52.

Departmental Major Advisers: Mr. Akin, Mr. Apter, Mr. Bellquist, Mr. Cox, Mr. Harris, Mr. Lenczowski, Mr. Lipson, Mr. Macdonald, Mr. Pauker, Mr. Towster.

The Major. Students majoring in political science will be required to complete 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. 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.

The major program includes 24 units in upper division political science courses. Students in 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 3 courses (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.

Majors in the department will include in their programs, normally in the junior year, four core courses (two each semester), 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

Majors planning to emphasize the study of a region or country should begin their language preparation early, and students contemplating advanced graduate work should continue their study of French and/or German. Those considering a career in the Foreign Service of the United States or other overseas employment should obtain proficiency in one of those languages, Russian, or Spanish.

Program in Public Administration. Undergraduate students interested in governmental 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.

Honors Program. Attention is directed to the Honors Program, described below under course 198A–198B. Applicants should consult one of the instructors in the course.
Lower Division Courses

1. **Introduction to Government.** (3) I and II.  
   Mr. Schaar, Mr. Burdick  
   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. Lipson, Mr. Haas  
   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 consent of the instructor. Limited to fifteen students.  
   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 157 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. Jacobson, Mr. Mansfield,  
   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 1—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. Jones  
   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.  Mr. Macdonald
Organization of state government; federal-state relations; elections and politics; the courts; county government; current administrative problems.

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.

104A. California Government and Politics. (3) II.  Mr. Doubleday
Legislative, administrative and judicial system; politics and elections; city and county government; California in the federal system.

105A. The Legislative Process. (3) II.  Mr. Harris
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. Mansfield, 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, liberal, 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. Schaar
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, Miss Bondurant
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. Cox, Mr. Jenkin
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.  ———, Mr. Cox

* Not to be given, 1961–1962.
120A. The International Society. I and II. ———, Mr. Cox
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.

121. International Organization. (3) I. Mr. Haas
Relationship of the United Nations and regional organizations to peace and welfare.

122. Principles of International Law. (3) I. Mr. Riesenfeld
Nature, sources, function and evolution of international law; principal law-making and adjudicatory agencies; international legal personality; jurisdiction over places and persons. Diplomatic and consular intercourse; treaties and executive agreements; pacific settlement; war and neutrality.

128A. Concepts in American Foreign Policy. (3) I.
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, Mr. Johnson
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.
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 politics.

137B. Regional Problems.
The Middle East in world strategy; policies of major powers; supranational political movements; regional security arrangements; role of international agencies.

* Not to be given, 1961–1962.
138A–138B. International Relations in the Far East. (3–3) Yr. Mr. Brandt
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 North Atlantic Area. (3) I.
Politics of community-building among the states of the West.

140A–140B. Comparative Analysis of Political Systems. (3–3) Yr. Mr. Apter
140A. An examination of structural theories and propositions which have emerged from the study of comparative politics.
140B. Prerequisite: 140A and permission of instructor.
The examination of methods for systematic comparative studies and their application through group projects.

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.
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. Pauker
143B. I. 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 and Politics in Britain and the Commonwealth. (3–3) Yr. Mr. Clokie, Mr. Lipson
144A. II. The British constitutional system; parliamentary government, party system, administration and politics in the welfare state.
144B. I. The Commonwealth association: internal politics and external relations of the older members (Canada, Australia, South Africa, etc.), the status of new and prospective members (Ghana, West Indies, etc.)

145A–145B. Government and Politics in South Asia. (3–3) Yr. Mr. Retzlaff
(Formerly numbered 142B and 142C.)
145A. The growth of nationalism and the development of ideas and institutions in India and Pakistan, with some attention to Ceylon and Nepal.
145B. Recent political development in India, Pakistan, Ceylon, and Nepal. Constitutional development, political parties, legislation, administration, economic planning.

* Not to be given, 1961–1962.
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.

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. II. 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.

147C. Government and Politics of the Northern European Countries. (3) II.

(Formerly numbered 218.) Mr. Bellquist

Constitutionalism and parliamentarism in the Scandinavian states—Denmark, Finland, Iceland, Norway, and Sweden. Constitutional history and present governmental systems. Inter-Scandinavian cooperation.

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) II.

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.

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.


156. Administrative Law. (3) II. Mr. Aikin

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.

* Not to be given, 1961–1962.
157A–157B. Constitutional Law of the United States. (3–3) Yr. Mr. Aikin
157A. The federal system.
157B. Civil liberties.

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 rates of labor, etc.

*159. American Judicial Administration. (3) I. Mr. Aikin
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. Mr. Schaar
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. McClosky
The individual and group aspects of political behavior; social and psychological factors in politics; consideration of available research on voting behavior, ideology, extreme belief and affiliation, leadership, participation, personality factors, public opinion, and group influence processes.

162A. Public Opinion. (3) I. Mr. Bellquist

163. Political Parties. (3) I and II. Mr. Doubleday
Nature and functions of political parties; origin, development, structure, economic and social composition, internal management and control; relation of parties and pressure groups to legislation and administration.

164A–164B. Problems in Analysis of Political Behavior. (3–3) Yr. Mr. Burdick
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.

* Not to be given, 1961–1962.
Group VII—Public Administration and Public Policy

175. National Administration of the United States. (3) II. Mr. Jones
Not open to students who have completed formerly 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) I.
Mr. Heaphey
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. Heaphey
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
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. Lepawsky
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 programs 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. Meller
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.

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. Cox
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.
02A–202B. Comparative Politics. (3–3) Yr. Mr. Lipson
(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: The Comparative Study of Parties.
The origin, rise and spread of political parties; the relation of party systems to constitu-
tional forms; the standard theories of party government; current trends in political
analysis.

03A. International Relations. (3) I. 
The bases of international relations in conflicting ideologies and philosophies. Special
problems: imperialism, demagogy, economic relations, regionalism, military, and geo-
graphic factors.

04A–204B. Public Administration. (3–3) Yr. Mr. Harris, Mr. Lepawsky
An advanced study of the theory and practice of public administration.

09A–209B. European Political Thought in the Nineteenth Century.
(3–3) Yr. Mr. Jenkin
An examination of the principal themes of political thought in England and on the
continent from the French Revolution to World War I.

10. Recent Indian Political Thought. (3) I. 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.

15A–215B. Government and Politics in China. (3–3) Yr. Mr. Brandt
215A. China as a nation in the Oriental world; impact of the Occident and its reper-
cussions; internal and external aspects of the struggle for the creation of a modern demo-
ocratic 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.

16. Government and Politics in Japan. (3) I. Miss Bondurant
How Japan is governed, with consideration of major changes in her basic political
structure and policies under Allied military occupation.

20. Theories of International Relations. (3) I. 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) I. Mr. Haas, Mr. Pauker
Themes in the theory of nation-building, illustrated with Western and non-Western case
studies.

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 po-
etial in relation to national power; international trade and autarchy; place of propa-
ganda and diplomacy.

* Not to be given, 1961–1962.
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 Government and Administration. (3–3) Yr.
Mr. Gardner, Mr. Lee
The social, political, economic, and legal background in which municipal administration is set. The tools and practices—budgeting, accounting, organization and methods, personnel, etc., of the municipal administrator.

Graduate Seminars

240A–240B. Comparative Government. (2–2) Yr.
Mr. Bellquist
Unless well prepared in European government, beginning graduate students are not admitted to this Seminar.

240C–240D. Research in Comparative Government. (2–2) Yr.
Mr. Apter

Mr. Towster

§ 241C. Political Institutions and Law in the Communist World. (2) II.
Mr. Hazard, Mr. Towster
A consideration of institutions and law in communist countries, as exemplified in the theory and practice of the principal communist states.

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 Asian countries, with emphasis upon the institutional structures, ideological patterns, and shifting socio-economic conditions of these societies.

245A–245B. Problems of India and Pakistan. (2–2) Yr.
Mr. Retzlaff

246. African Political Institutions. (2) I and II.
Mr. Rosberg

248A–248B. Governments and International Relations of Latin America. (2–2) Yr.
Mr. Macdonald

* Not to be given, 1961–1962.
§ To be offered one semester only, 1961–1962.
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) I and II.

252A–252B. Legislative Process. (2–2) Yr.
Mr. Eulau
(Formerly numbered 252.)
A comparative study of selected problems of the legislative process in the United States and abroad, with field research on legislative behavior in local city councils.

253A–253B. Political Behavior. (2–2) Yr.
Mr. McClosky
Intensive examination of major theories and research in political behavior; consideration of both procedural and substantive aspects of the most significant studies in the field.

256. Jurisprudence. (3) II.
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 obligations.

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.

260. International Relations. (2) II.
Research seminar on selected topics, with emphasis chiefly upon contemporary approaches to the study of international relations.

261. International Organization. (2) II.
Mr. Haas
The application of social science theory to research on international organizations.

262. Seminar in International Law. (2) II.
Mr. Riesenfeld
Selected problems in modern international law.

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. Brandt

265A–265B. Dependent Peoples and Trusteeships. (2–2) Yr.
Mr. Clokie, Mr. Haas
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.

* Not to be given, 1961–1962.
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-governamentally 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) I. 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 relations, 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.

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.

283. The Community. (2) I. Mr. Mumford

285A–285B. Regional Planning and Resources Management. (2–2) Yr. Mr. Lepawsky

286. Public Enterprise: Its Forms, Methods, and Directions. (2) II.

290A–290B. Political Theory and Scientific Methods. (2–2) Yr. Mr. Jacobson

291. American Political Theory. (2) II. Mr. Jacobson

* Not to be given, 1961–1962.
\$ To be offered one semester only, 1961–1962.
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 psycho-analysis, the political novel, sociology; the theory of totalitarianism.

293. Problems in Political Theory: Politics and Ethics. (2) II.

Mr. Mansfield

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. Heaphey

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.

Course Common to All Groups

298. Individual Study (1-4) I and II. The Staff (Mr. Jacobson in charge)

Related Courses in Other Departments

Introduction to Social Science (Social Science 1A-1B).
Freedom of Speech (Speech 123).

Bureau of Public Administration

The Bureau of Public Administration has as its purpose the development of increased understanding of public affairs, both through the marshaling and dissemination of existing information and through a research program designed to add to present knowledge. These activities are organized around a special library of public affairs materials—an extraordinarily rich and broad collection of documents, periodicals, and pamphlets that are indexed in a detailed subject catalogue.

The bureau has a staff of professional analysts who are specialists in various aspects of public administration, political affairs, public law, public finance, planning, and urban problems. Furthermore, several professors participate in the bureau functions through the device of joint departmental-bureau appointments.

In the fulfillment of its informational and research functions, the bureau publishes a wide range of materials, from books through booklets and pamphlets to monthly checklists and digests. Public officials and agencies, private organizations, and individual citizens make use of the bureau’s library and research facilities.

The Bureau of Public Administration participates in the University’s teach-

* Not to be given, 1961-1962.
ing function both through its library facilities and through training advanced students in public affairs analysis. In addition, the bureau serves as headquarters for two organizations active in governmental research and improvement: (1) the Western Governmental Research Association and (2) the San Francisco Bay Area Chapter of the American Society for Public Administration.

For further information concerning the activities of the Bureau of Public Administration, write to the Director, Room 346, Library.

PoultRy HusBanDry

(Department Office, 100 Poultry Husbandry Laboratory)

Samuel Lepkovsky, Ph.D., Professor of Poultry Husbandry.
Lewis W. Taylor, Ph.D., Professor of Poultry Husbandry.

Fredric W. Hill, Ph.D., Professor of Poultry Husbandry, Davis (Chairman of the Department).
I. Michael Lerner, Ph.D., Professor of Genetics.

Major Adviser: Mr. Taylor.

The Major in Poultry Husbandry. To obtain a B.S. degree in this major, the following five items must be satisfied and part of the work may have to be taken at Davis: (1) General University requirements. (2) College of Agriculture requirements (see page 63). (3) Animal Science Curriculum requirements: (a) General—Bacteriology, 4 units. Botany, 4 units. Chemistry and/or biochemistry, 16 units. Economics, 3 units. English and/or speech, 6 units. Physics, 4 units. Zoology, 10 units. (b) Agriculture—Animal nutrition, 3 units. Animal pathology, parasitology, or additional zoology, 3 units. Animal physiology, 5 units. Genetics, 4 units. Upper division courses in either the major or a closely related field with approval of major adviser, 12 units. (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), 50 units. (5) Certain courses are required by the major and, where applicable, may be used in partial satisfaction of (3) above. For details, see the Prospectus of the College of Agriculture, available without charge.

Honors.—Information concerning honors may be obtained from the Dean's Office, College of Agriculture.

Upper Division Courses

*102. Experimental Incubation. (3) II.
Lectures and laboratory. Prerequisite: Zoology 100 or equivalent, Chemistry 8.
Problems of embryonic development, causes of embryonic mortality in poultry, and principles of artificial incubation.

* Not to be given, 1961–1962.
198. Directed Group Study. (1–2) II. Mr. Taylor
Prerequisite: senior standing and consent of instructor.
Study of methods employed in poultry production and management.

199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. Taylor in charge)
Prerequisite: course 15, courses basic to the problems elected, and consent of 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 163.)

200A–200B. Research in Poultry Husbandry. (1–6; 1–6) Yr.
Mr. Lepkovsky, Mr. Lerner, Mr. Taylor

PSYCHOLOGY

(Department Office, 1023 Life Sciences Building)
Frank A. Beach, Jr., Ph.D., Professor of Psychology.
Clarence W. Brown, Ph.D., Professor of Psychology (Chairman of the Department).

†Richard S. Crutchfield, Ph.D., Professor of Psychology.
Edwin E. Chiselli, Ph.D., Professor of Psychology.
Harrison G. Gough, Ph.D., Professor of Psychology.
*Mason Haire, Ph.D., Professor of Psychology.
David Kreh, Ph.D., Professor of Psychology.
†Richard S. Lazarus, Ph.D., Professor of Psychology.
Donald W. MacKinnon, Ph.D., Professor of Psychology.
Paul H. Mussen, Ph.D., Professor of Psychology.
Leo J. Postman, Ph.D., Professor of Psychology.
Mark R. Rosenzweig, Ph.D., Professor of Psychology.
†Theodore R. Sarbin, Ph.D., Professor of Psychology (Vice-Chairman for the fall semester).
Alex C. Sherriffs, Ph.D., Professor of Psychology.
Brewster Smith, Ph.D., Professor of Psychology.
*Read D. Tuddenham, Ph.D., Professor of Psychology.
Robert Choate Tryon, Ph.D., Professor of Psychology.
Olga L. Bridgman, M.D., Ph.D., Sc.D., Professor of Psychology, Emeritus.
Jean Walker Macfarlane, Ph.D., Professor of Psychology, Emeritus.

† Not to be given, 1961–1962.
† Absent on leave fall semester, appointment in the Miller Institute for Basic Research in Science spring semester, 1961–1962.
‡ 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, 1961–1962.
2 In residence spring semester only, 1961–1962.
Egerton L. Ballachey, Ph.D., Associate Professor of Psychology.
Jack Block, Ph.D., Associate Professor of Psychology.
Rheem F. Jarrett, Ph.D., Associate Professor of Psychology.
John P. McKee, Ph.D., Associate Professor of Psychology.
Donald A. Riley, Ph.D., Associate Professor of Psychology.
Benbow F. Ritchie, Ph.D., Associate Professor of Psychology.
Hubert S. Coffey, Ph.D., Associate Clinical 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.
Gerald A. Mendelsohn, Ph.D., Assistant Professor of Psychology.
William M. Meredith, Ph.D., Assistant Professor of Psychology.
Lyman W. Porter, Ph.D., Assistant Professor of Psychology.
Edward E. Sampson, 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.
Bernard M. Bass, Ph.D., Visiting Professor of Psychology.
Lyle E. Bourne, Ph.D., Visiting Associate Professor of Psychology.
Marvin D. Dunnette, Ph.D., Visiting Associate Professor of Psychology.
Dorothy H. Eichorn, Ph.D., Lecturer in Psychology.
Susan M. Ervin, Ph.D., Assistant Professor of Speech and Lecturer in Psychology.
Seymour Feshbach, Ph.D., Visiting Associate 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.
Samuel R. Pinneau, Ph.D., Visiting Associate Professor of Psychology.
Philburn Ratoosh, Ph.D., Visiting Associate Professor of Psychology and Visiting Associate Professor of Business Administration.
Joseph G. Sheehan, Ph.D., Visiting Associate Professor of Psychology for the fall semester.
George C. Stone, Ph.D., Lecturer in Psychology and Assistant Clinical Professor of Medical Psychology.

Letters and Science List. All undergraduate courses in this department except 104, 114, 116, 117, 184, 185, 186, and 187 are included in the Letters and Science List of Courses. For regulations governing this list, see page 95.

Department Major Advisers: Mr. Ballachey, Mr. Block, Mr. Coffey, Mr. French, Mr. Ghiselli, Mr. Speisman, Mr. Tryon, Miss Bridgman.

*In residence spring semester only, 1961–1962.
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.

The Major. Required: Courses 1A, 1B, 5, Physiology 1, 1L, and any one of the following four courses: Anatomy 25, Anthropology 1, Genetics 10, or Zoology 10. (Zoology 1A–1B may be substituted for Physiology 1, 1L and a choice among Anatomy 25, Anthropology 1, Genetics 10, or Zoology 10.)

Second-year high school algebra is prerequisite to course 5. Courses 1A, 1B, 5, Physiology 1, 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. Courses in English composition, mathematics, and statistics are recommended. If the student anticipates proposing certain upper division courses from other departments as part of his major program, he should attempt to complete the prerequisites to such courses.

Not less than 24 units of upper division courses must be completed, including 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) 3 units in each of two other areas of concentration; (4) at least two courses in which controlled observation or the analysis of the actual results of such observations comprise the principal activity (see below); (5) at least 3 units in an upper division course that stresses the measurement methods of psychology (see below). Certain courses selected to satisfy requirements (4) or (5) may also be used to satisfy requirements (2) or (3). Except for the completion of the requirements listed above, substitutions up to 6 of the 24 upper division 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.

Requirements (2) and (3): Required Courses in Areas of Concentration.

Animal Psychology: courses 150A, and 150B* or 151*
Clinical Psychology: courses 162, and 165A* or 165B* or 168
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 145A and 142A* or 142B*, or 145B.
List of courses satisfying requirement (4) are any of the courses above followed by an asterisk and 115, 117.

List of courses satisfying requirement (5): 104, 107, 146B, 186.

Honors Program. The honors program consists of courses H101 and H102, to be taken in the junior year, and H195 to be taken in each semester of the 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. McKee, Mr. Jarrett  
Two lectures and one three-hour laboratory per week. Prerequisite: course 1A.  
A continuation of course 1A. Application of the scientific method in the study of behavior.

5. Introduction to Psychological Measurements. (3) I and II.  
Mr. McClearn, Mr. Brown  
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.

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.  
Dynamics of normal personality development. Family relationships, social adjustment, and factors modifying self-evaluation.

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. Cornsweet (in charge, fall semester), Mr. French (in charge, spring semester), Mr. Bourne, Mr. Cornsweet, Mr. French, Mr. Ratoosh, Mr. Ritchie, Mr. Stone  
Two lectures and one two-hour laboratory section per week. Prerequisite: courses 1A, 1B, 5.  
Survey at an advanced level 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. Rosenzweig, Mr. McClearn  
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.  
Theoretical and experimental analysis of current problems in perception, motivation, learning, and problem-solving.
H102. Honors Seminar. (3) I and II. Mr. MacKinnon, Mr. Mussen
Restricted as for H101.
Theoretical and experimental analysis of current problems in mental abilities, mental development, personality, social attitudes, group behavior, and mental disorders.

104. The Psychological Test. (3) I. Mr. Meredith
Lectures and laboratory. Prerequisite: course 1A, 1B, 5.
Theory, logic and methodology of psychological measurements, including attitude scales and psychological tests.

*105. Psychology of Speech and Communication. (3) II.
Prerequisite: course 1A, 1B, 5.
Research and theories of communication including physical, physiological and psychological aspects of speech sounds, auditory perception and communication.

106A. Experimental Psychology. (3) I. Mr. Bourne
Lectures and laboratory. Prerequisite: course 1A, 1B, and 5 or an equivalent course in statistics.
Performance of typical experiments on reaction tendencies, perception, learning, and problem-solving. Emphasis on methods of experimentation.

106B. Advanced Statistical Methods in Psychology. (3) I and II.
Mr. Jarrett, Mr. Meredith
Lectures and laboratory. Prerequisite: course 5 or an equivalent course.
Probabilistic considerations involved in the interpretation of psychological data derived from controlled observation; large-sample 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: course 1A, 1B, 5, and Physiology 1 and 1L or consent of instructor.
Relations between behavior and biological processes. Coordination of behavior; nervous and endocrine systems; sensory and perceptual processes; physiological processes in motivation, maturation and learning.

111. Child Psychology. (2) I. Mr. Pinneau
Prerequisite: course 1A, and either 1B, 5, or 33 (1B, 5, or 33 may be taken concurrently).
Prenatal development; period of infancy; intellectual, social, and personality development in childhood.

112. Developmental Psychology. (3) I. Mr. McKee
Prerequisite: course 1A, 1B, 5. Primarily for majors in psychology. Not open to students who have taken course 111 or Home Economics 132.
Development of motor functions, social and emotional traits, language, and mental abilities. Individual differences as related to physical, social, and psychological factors.

113. Adolescence. (2) II. Mr. Pinneau
Prerequisite: course 1A, 1B, 5. Primarily for majors in psychology.
A survey of current research.

113N. Adolescent Psychology. (2) I. Mr. Pinneau
Prerequisite: course 1A and one other course in psychology. This course is for non-majors; it is not open to students who have taken course 113.
Adolescent development and the problems of adolescents.

* Not to be given, 1961–1962.
114. Laboratory in Child Psychology. (2) I and II. Mrs. Eichorn, Mr. McKee
One hour of lecture and three hours of laboratory per week to be arranged. Prerequisite: course 1A, 1B, 5 (with grade of A or B) and either 111, 112, Education 111, or Home Economics 132.
Empirical methods of investigation used in child psychology.
Students will conduct an original investigation.

115. Laboratory in Adolescent Development. (1) II.
Three hours per week to be arranged. Prerequisite: consent of 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) II.
Prerequisite: course 5 and 112 or Home Economics 132.
Mrs. Honzik
Measurement of mental, physical, motor and personality development of infants and young children. Class demonstrations. Theory and empirical research discussed.

117. Laboratory Tests and Measurements of Infants and Preschool Children. (2) II.
Mrs. Honzik
Prerequisite: consent of instructor.
Laboratory work 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. Nineteenth-century structuralism, functionalism, behaviorism, Gestalt psychology, and psychoanalysis.

126. Contemporary Psychology. (3) II.
Mr. Jarrett
Prerequisite: course 1A, 1B, and at least 6 upper division units in psychology. Primarily for seniors.
Contemporary aims, methods, and achievements in psychology.

130A–130B. Learning and Thinking. (3–3) Yr.
Mr. Postman, Mr. Riley
(Formerly numbered 130 and 135.)
Two hours of lecture and four hours of laboratory per week.
Prerequisite: course 1A, 1B, and 5.
Theoretical and experimental analysis of conditioning, learning, transfer of training, memory and thinking.
130A. The major emphasis will be on conditioning, verbal learning, motor learning, and retention.
130B. The major emphasis will be on concept learning, problem solving and thinking.

131. Perception. (3) II.
Mr. Cornsweet
Two hours of lecture and four hours of laboratory per week.
Lecture and laboratory work, with primary emphasis on the psycho-physiological relationships involved in the perception of brightness, color and form.

134. Motivation. (3) I.
Mr. Sampson
Prerequisite: course 1A, 1B, and at least 6 upper division units in psychology. Primarily for seniors and graduates.
Primary and secondary drives; theories of drives in animal, child, experimental, social, and abnormal psychology.

136. Psychology of the Unconscious. (3) II.
Mr. MacKinnon
Prerequisite: course 1A.
Nature and role of unconscious psychological processes in behavior.

* Not to be given, 1961–1962.
140. Personality Assessment. (3) II.
Lectures and laboratory. Prerequisite: course 1A, 1B, 5.
Analysis of concepts and methods used in assessing personality.

141. Personality in Society and Culture. (3) I.
Prerequisite: course 1A, 1B, and senior standing.
Social and cultural determinants of personality.

142A–142B. Experimental Social Psychology. (3–3) Yr. Mr. Sampson
Lectures and laboratory. Prerequisite: course 1A, 5, and 145, or equivalent. 142A is not prerequisite to 142B.
142A. Experiments on social factors in perception, motivation, suggestion, attitudes and prejudice, rumor; group influences upon behavior.
142B. Individual investigations, utilizing laboratory or field methods.

144. Social Psychology of the Interview. (3) I. Mr. Ballachev
Lectures and laboratory. Prerequisite: course 1A and 145 or consent of instructor.
Interview techniques used in the social sciences, with special reference to distortions arising from differences in psychosociological frames of reference.

145A–145B. Social Psychology. (3–3) Yr. Beginning each semester.
Prerequisite: course 1A.
145A: I. Smith; II. Ballachev; 145B: I. Feshbach; II. Smith.
145A. Survey of social psychology, including language, communication, social interaction; social norms, roles, leadership, influence of culture and social structure on personality; social attitudes, propaganda, attitude change.
145B. Intensive consideration of selected topics. Sections will differ in topical emphasis.

146A. Differential Psychology. (3) I. Mr. McClearn
Prerequisite: course 1A, 5 or equivalent, and one other course in psychology, or consent of instructor.
Hereditary and environmental bases of individual differences in intelligence and personality. Family, sex, class, and race differences.

146B. General Traits and Types of Individuals. (3) II. Mr. Tryon
Prerequisite: course 1A, 5 or equivalent. (Course 146A may be omitted as prerequisite to 146B with consent of instructor.)
Introduction to cluster and factor analysis of individual and group differences; methods and findings.

147. Behavioral Genetics. (3) II. Mr. McClearn
Prerequisite: upper division status, course 5 or equivalent, and one of the following four courses or equivalent (may be taken concurrently): Genetics 10, 100, Zoology 114, 115.
Intensive survey of the evidence regarding the inheritance of behavioral characteristics in animals and man, with emphasis on animal research; implications of behavioral genetics for psychological theory and research design.

148A–148B. Personality. (3–3) Yr. Mr. Block, Mr. Feshbach, Mr. Speisman
148A. I. Mr. Block; II. Mr. Speisman.
148B. II. Mr. Feshbach.
Prerequisite: course 1A and either 1B or 33; 162 or 134 or 136 and senior or graduate standing.
Theory and research in the field of personality, with emphasis on dynamic and genetic problems.

* Not to be given, 1961–1962.
150A. Comparative Psychology. (3) I.  
Mr. Beach  
Two lectures and four hours of laboratory per week.  
Prerequisite: consent of instructor.  
Determinants of animal behavior at the various phyletic levels. Analysis of the role of stimulation and neural integration, instincts and habits.

150B. Animal Learning and Problem-Solving. (3) II.  
Mr. Ritchie  
Two lectures and four hours of laboratory per week.  
Prerequisite: course 100B or consent of instructor.  
Conditions under which habits are acquired or lost or old habits integrated in the solution of new problems in higher animals.

151. Experiments in Animal Psychology. (3) I.  
Mr. French  
Lectures and laboratory. Prerequisite: course 150A and consent of instructor.

160. Mental Deficiency. (3) I.  
Prerequisite: course 1A and upper division standing.  
Mental deficiency and abnormality in children.

161. Personality Development. (3) I.  
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.  
Biopsychosocial factors in the dynamics of normal personality development.

162. Clinical Psychology. (3) I.  
Mr. Mendelsohn  
Prerequisite: course 1A, 1B, 5 or 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, clinical methods and problems.

165A–165B. Introduction to Clinical Methods. (3–3) Yr.  
Mr. Sheehan, Mr. Ballachey  
Lectures and laboratory. Prerequisite: course 1A, 1B, 5.  
Theory and evaluation of the principal tests of ability and personality. Psychological test methods, with special reference to clinical diagnosis. Historical development of psychometrics. 165A is concerned with abilities and aptitudes; 165B, with personality.

168. Behavior Disorders. (3) II.  
Mr. Kostlan  
Prerequisite: course 1A.  
Psychology of the psychoneuroses and psychoses; appearance of abnormal traits in incipient stages of mental disturbance.

184. Psychological Problems in Industry. (3) I and II.  
Intended for nonmajors. Not open to students who have taken courses 185, 187, or 188. Theory and research in industrial psychology. Personnel selection and placement, conditions of work, training, communication, leadership, formal and informal organization.

185. Industrial Psychology. (3) I and II.  
Mr. Bass, Mr. Dunnette  
Two lectures and three hours of laboratory per week.  
Prerequisite: course 1A, 1B, and 5.  
Discussion and demonstration of existing problems and methods in analysis of jobs, personnel selection and evaluation, criterion measurement, work conditions and methods, training and other factors in productivity.

186. Theory of Mental Measurement. (3) II.  
Mr. Ghiselli  
Lectures and laboratory. Prerequisite: course 1A, 1B, 5.  
Scaling of psychological measurement, reliability and validity of tests, dimensions of psychological traits.

* Not to be given, 1961–1962.
187. Social Psychology of Industry. (3) I and II. Mr. Bass, Mr. Porter
Prerequisite: six units of upper division psychology.
Discussion of social and psychological problems encountered in industry; emphasis on perception, motivation, small groups, morale, leadership, communication, use of incentives, and status and role.

188. Attitudes and Perception in the Industrial Society. (3) II. Mr. Bass
Prerequisite: course 1A, 1B, 5.
Perceptual and attitudinal organization in industrial situations, role perceptions in labor and management relations, genesis of attitudes, morale surveys.

195. 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 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 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. Mr. Krech, Mr. Smith
Prerequisite: graduate standing.
An intensive consideration of major areas and problems in psychology.
Recommended for graduate students in their first year.

207. Quantitative Methods in Psychology. (3) I. Mr. Jarrett
Quantitative research methods in psychology. Rational and empirical equations, statistical testing of hypotheses.

228. The Conceptual Framework of Psychology. (3) II. Mr. Ratoosh
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 instructor.
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 points of view. The status of theory in modern psychology; description versus explanation, idiographic versus statistical versus nomothetic approach.

47. Advanced Group Dynamics and Group Therapy. (3) I. Mr. Coffey
Two two-hour sessions per week. Social welfare and public health students may be admitted.
Utilization of groups 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.

249. Experimental Psychodynamics. (3) II.
Two hours of lecture and four hours of laboratory work per week to be arranged.
Psychodynamics of behavior, emphasis upon the experimental literature.

61A–261B. Clinical Methods. (3–3) Yr. Mr. Coffey, Mr. Mendelsohn
Lectures and laboratory; four hours of field work per week to be arranged.
Clinical methods of measurement, interview, and observation.

* Not to be given, 1961–1962.

Prerequisite: course 261B or consent of instructor. Mr. Gough, Mr. Feshbach
Theory and practice of personality testing. Administration, scoring, and interpretation of diagnostic tests used in clinical settings. Rorschach method, Thematic Apperception Test, and Minnesota Multiphasic Inventory.

264A-264B. Seminar in Case History. (2–2) Yr. Mr. Kostlan, Mr. Lazarus
(Formerly numbered 264E and 264F.)
Prerequisite: course 261B.

265A-265B. Advanced Seminar in Case History. (2–2) Yr.
(Formerly numbered 265E and 265F.) Mr. Sheehan, ———
Prerequisite: course 264B.

266A. Seminar in Theories of Therapy. (2) I.
(Formerly numbered 266E.)

290. Seminar. (2) I and II. The Staff (Mr. Brown in charge)
Advanced study in the following areas of modern psychology: (a) Measurement, I, II, ———; (b) Experimental, I, Mr. Riley; II, Mr. Postman, Mr. Bourne; (c) Physiological, II, Mr. Rosenzweig; (d) Individual Differences, II, ———; (e) Constitutional, II, ———; (f) Developmental, I, II, Mr. Mussen, Mr. McKee; (g) Perception, I, Mr. Cornwall; (h) Psychological Change, II, Mr. Pinneau; (i) Social Perception, I, II, ———; (j) Personality Assessment, II, Mr. Gough; (k) Personality and Culture, I, ———; (l) Behavior Disorders, I, Mr. Ballachey; (m) Social, I, II, Mr. Smith, Mr. Sampson; (n) Perception and Personality, II, Mr. Lazarus; (o) Group Dynamics and Group Therapy, I, II, ———; (p) Personality, I, Mr. Feshbach; (q) Dynamic Psychology, I, II, Mr. Mendelsohn; (r) Animal, I, II, Mr. Ritchie, Mr. Beach; (s) Medical, I, II, ———; (t) Clinical Research, I, Mr. Sarbin, Mr. Speisman; (u) Industrial, I, II, Mr. Ghiselli, Mr. Dunnette; (v) Human Relations, II, Mr. Bass.

298. Research Methods. (3) II.
Mr. Block, Mr. Coffey, Mr. French, Mr. Kreach, Mr. Speisman
Experimental design and analysis considered in relation to individual research 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) I.
Sec. 1: Mr. Haire, Sec. 2: Mr. Cornsweet. Mr. Haire, Mr. Cornsweet
Critical approach to presentation of psychological material in publications, lectures, demonstrations, etc., with emphasis on content, evidence, and significance of material, and relevant techniques of presentation.

**PUBLIC HEALTH**

(Department Office, 19 Earl Warren Hall)

Jessie M. Bieman, M.D., M.S.P.H., Professor of Maternal and Child Health
Sanford S. Elberg, Ph.D., Professor of Immunology and Bacteriology.
William Griffiths, Ph.D., Professor of Public Health.
Percy H. McGauhey, M.S., Professor of Public Health Engineering and Professor of Sanitary Engineering, and Director of the Sanitary Engineering Research Laboratory.

* Not to be given, 1961–1962.
Stewart H. Madin, Ph.D., D.V.M., Professor of Public Health and of Bacteriology, Director, Naval Biological Laboratory.
Sven Nissen-Meyer, M.D., Ph.D., Professor of Biostatistics.
William C. Reeves, Ph.D., M.P.H., Professor of Epidemiology.
Edward S. Rogers, A.B., M.D., M.P.H., Professor of Public Health and Medical Administration.
Charles Edward Smith, A.B., M.D., D.P.H., Professor of Public Health (Chairman of the Department).
William W. Stiles, B.S., 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 Administration.
Bernard D. Tebbens, Sc.D., Professor of Industrial Hygiene Engineering.
Jacob Yerushalmi, Ph.D., Professor of Biostatistics.
Margaret Beattie, M.A., Gr.P.H., Professor of Public Health, Emeritus.
Dorothy Bird Nyswander (Dorothy Nyswander Palmer), Ph.D., Professor of Public Health Education, Emeritus.
Harry Bliss, M.S., M.P.H., Dr.P.A., Associate Professor of Public Health and Coordinator of Environmental Health and Safety.
Chin Long Chiang, Ph.D., Associate Professor of Biostatistics.
Nell F. Hollinger, Ph.D., Associate Professor of Public Health.
Ruth L. Huenemann, Sc.D., Associate Professor of Public Health Nutrition.
Warren J. Kaufman, Sc.D., Associate Professor of Public Health and 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.
William J. Oswald, Ph.D., Associate Professor of Public Health.
Beryl Roberts, M.Ed., Dr.P.H., Associate Professor of Public Health.
Aueel A. Stallones, M.D., M.P.H., Associate Professor of Public Health.
William Taylor, Ph.D., Associate Professor of Biostatistics.
Alan Burkharter, Ph.D., Assistant Professor of Toxicology.
Robert C. Cooper, Ph.D., Assistant Professor of Public Health.
Nedra Bello, M.A., Associate in Public Health.
Roberta E. Christianson, B.S., Associate in Public Health.
Edward Edgerley, Jr., M.S., Associate in Public Health.
Michael Granich, B.S., Associate in Public Health.
Mary C. Hampton, M.S., Associate in Public Health.
Flora J. Hanks, R.N., A.B., Associate in Public Health.
Theo M. Hawkins, M.P.H., Associate in Public Health.
Cecil V. Martin, M.P.H., Associate in Public Health.
Carl W. Miller, M.P.H., Associate in Public Health.
Catherine Prato, M.P.H., Associate in Public Health.
Helen S. Ross, M.P.H., Associate in Public Health.
Allen Steinmetz, B.S., M.P.H., 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.
Eleanor A. Boydston, M.A., Lecturer in Public Health.
Edna J. Brandt, M.S., Lecturer in Public Health.
Lester Breslow, M.D., Lecturer in Public Health.
Adolph F. Brewer, M.D., Lecturer in Public Health.
George M. Briggs, Ph.D., Lecturer in Public Health and Professor of Nutrition.
Sylvia C. Bryson, M.A., 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.
Hugh T. C roley, Ph.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.
Anita E. Faverman, M.D., M.P.H., 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.
Fern E. French, M.A., Dr.P.H., Lecturer in Public Health.
James E. Froeschle, M.D., M.P.H., Lecturer in Public Health.
David Frost, B.S., M.D., M.P.H., Lecturer in Public Health.
Lloyd A. Frost, M.P.H., Lecturer in Public Health.
Charles R. Gardipee, M.D., M.P.H., Lecturer in Public Health.
Carl Goetsch, M.D., Lecturer in Public Health.
George L. Hall, LL.B., Lecturer in Hospital Administration.
Arild E. Hansen, M.D., Ph.D., Lecturer in Public Health.
Floyd W. Hartmann, Sc.D., Lecturer in Public Health.
Charles H. Hine, Ph.D., M.D., Associate Clinical Professor of Public Health.
Arthur C. Hollister, Jr., M.D., M.P.H., Lecturer in Public Health.
Don M. Hufhines, M.P.H., Lecturer in Public Health.
Cecilia L. Johnson, A.B., M.D., 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.
Alvin R. Leonard, M.D., M.P.H., Clinical Professor of Public Health.
Thomas H. Llewellyn, M.D., M.P.H., Lecturer in Public Health.
Arthur P. Long, M.D., Dr.P.H., Lecturer in Public Health.
Alfred E. Maffly, B.S., F.A.C.H.A., Lecturer in Hospital Administration.
Malcolm H. Merrill, M.S., M.D., M.P.H., Lecturer in Public Health.
Paul R. Mico, M.P.H., Lecturer in Public Health.
David C. Miller, M.D., M.P.H., Lecturer in Public Health.
Howard W. Mitchell, M.D., M.P.H., Lecturer in Public Health.
Theodore A. Montgomery, M.D., M.P.H., Lecturer in Public Health.
Robert E. Mytinger, M.P.H., Lecturer in Public Health.
Alberta Parker (Alberta Parker Horn), M.D., Lecturer in Public Health.
Beulah Parker (Beulah Parker Vaughn), M.D., Lecturer in Public Health.
Steven Polgar, Ph.D., M.P.H., Lecturer in Public Health.
Edith P. Sappington, M.D., Dr.P.H., Lecturer in Public Health.
Leona R. Shapiro, M.S., Lecturer in Public Health.
Ruth E. Simonson, M.P.H., Visiting Professor of Public Health.
Esther C. Spencer, M.S.S., Lecturer in Public Health.
William W. Stadel, A.B., M.D., Lecturer in Hospital Administration.
John M. Switzer, M.P.H., Lecturer in Public Health.
Richard M. Taylor, M.D., Dr.P.H., Lecturer in Public Health.
Constantine H. Tempelis, Ph.D., Lecturer in Public Health.
Helen E. Walsh, M.A., Lecturer in Public Health.
James Watt, M.D., Dr.P.H., Lecturer in Public Health.
Howard J. Weddle, M.S., M.P.H., Lecturer in Public Health.
George U. Wood, Ph.C., Lecturer in Hospital Administration.
David Yaukey, Ph.D., Lecturer in 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 95.

Lower Division Courses

5A. Individual and Community Health. (3) I and II. Mr. Stiles
A survey of the field of health, including field observations and a consideration of the revolution 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 5A.

35. Personal Health Problems. (3) I and II. Miss Lindsay
Factors which determine physical, mental, and emotional health and influence the prevention of disease.

Upper Division Courses

100. Introduction to Public Health. (3) I. Miss A. Parker, Mr. Leonard
Prerequisite: course 5A.
Organization and programs of official and voluntary health agencies.

101. Introduction to Hospital Administration. (3) II. Mr. K. Taylor

103A–103B. Hospital Organization and Management. (3–3) Yr.
Mr. K. Taylor

106. Introduction to Human Ecology and Health. (3) I. Mr. Rogers
Current theory and methods of study of social, economic, and other environmental factors affecting health status and the receipt of medical care.

108. Special Studies in Public Health Administration. (1–5) I and II.
Mr. Rogers, Mr. Leonard, Miss A. Parker

109. Special Studies in Hospital and Medical Care Administration.
(1–5) I and II. Mr. K. Taylor, Mr. Rogers

110. Environmental Health Sciences. (2) I and II. Mr. Oswald
(Formerly numbered 111.)

112. Control of Vector and Reservoir Animals Affecting the Public Health. (3) I.
Mr. Cooper

113. Sanitary Control of Foods. (3) II. Mr. Hartmann
Food production, processing, and distribution.

114. Special Studies in Sanitation. (1–5) I and II. Mr. Mangold, Mr. Cooper

115. Radiological Aspects of Public Health Engineering. (2) I and II.
Mr. Kaufman
Radiation detection, shielding design, monitoring procedures, low-level assaying of food and water, waste disposal, water decontamination, regulation of radiation sources.

117. Sanitary Microbiology of Water and Sewage. (4) I. Mr. Cooper

118. Sanitary Microbiology of Foods and Beverages. (4) II. Mr. Cooper

119. Administrative Aspects of Sanitary Science. (2) I and II.
Mr. Mangold, Mr. Bliss
Communicable disease control, schools, recreation, housing, emergencies, organizations, laws, and personnel.
125. Child Health. (3) I.
Factors pertaining to the health of children from conception to the end of puberty; community health facilities.

131. Health Education Laboratory. (2) II.
Teaching health to adults through various media.

132. Group Study in Health Instruction. (2) I and II.
Health instruction of community groups.

133. Introduction to Group Process. (2) II.
Dynamics of interpersonal relationships.

134. Community Health Education. (3) II.

135. Individual Health. (3) I.
Research in personal health problems.

136. Health Programs for the School-Age Child. (2) II.

145. Introduction to Epidemiology. (3) I and II.
Mr. Reeves, Mr. Smith, Mr. Stallones

148. Special Studies in Epidemiology. (1-5) I and II.
(Formerly numbered 149.)
Mr. Reeves, Mr. Smith, Mr. Stallones

150A. Quantitation in Clinical Chemistry and Hematology. (8) I.
Prerequisite: Chemistry 5 and 8.
Miss Hollinger

150B. Public Health Microbiology. (8) II.
Prerequisite: Bacteriology 101.
Miss Hollinger

153. Special Studies in Public Health Microbiology. (1-5) I and II.
(Formerly numbered 154.)
Miss Hollinger

160A. Introduction to Probability and Statistics in Biology and Public Health. (3) I and II.
Mr. Chiang, Mr. Nissen-Meyer
Descriptive statistics, probability, probability distributions, point and interval estimation, hypothesis testing, applications.

160B. Introduction to Probability and Statistics in Biology and Public Health. (3) II.
Mr. Chiang
Prerequisite: course 160A and Mathematics 3A, or consent of instructor. Bivariate distributions, regression, correlation, analysis of variance.

161A–161B. Introduction to Biostatistics. (3–3) Yr.
Mr. W. Taylor

162A. Introduction to Public Health Statistics. (3) I and II.
Mr. Yerushalmy, Mr. Chiang
Tabulation and graphics, collection and analysis of vital data, rate adjustment, descriptive statistics, statistical inference.

* Not to be given, 1961–1962.
162B. Introduction to Public Health Statistics. (2) II. Mr. Nissen-Meyer
Prerequisite: course 162A or equivalent.

163. Demography. (3) II.
Prerequisite: course 161A or equivalent.
Factors in population growth; population distribution, composition and trends; demographical problems in medicine and public health.

164. Biostatistical Methods in Biology and Medicine. (2) I.
Prerequisite: Mathematics 4B and Statistics 130B or equivalent.
Mr. Nissen-Meyer
Bioessay, evaluation of therapy and related topics.

Prerequisite: course 162A or equivalent.
Mr. Yerushalmy
Evaluation designs, indices and measures, sample designs, analysis.

166. Special Studies in Biostatistics. (1–5) I and II.
(Formerly numbered 169.)
Mr. Yerushalmy

170. Introduction to Occupational Health and Industrial Hygiene. (3)
I and II. Mr. Tebbens, Mr. Wilson
Occupational hazards and their control; industrial safety; industrial health problems and organizations.

171. Industrial Environment Control: Sanitary Air Analysis. (2) II.
Prerequisite: Chemistry 5 or Civil Engineering 146 or equivalent; Physics 2A–2B or equivalent.
Mr. Tebbens
Analysis of air quality and other environmental factors affecting the health of workers in industry.

172. Industrial Toxicology. (2) II.
Prerequisite: Chemistry 5 and 9; Physics 2A–2B; Physiology 1–1L, or equivalent.
Mr. Burkhalter
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

187. Nutrition Problems in Public Health. (2) II.
(Formerly numbered 189.) Miss Huenemann, Miss Shapiro, Miss Walsh

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 163.)

200A–200B. Public Health Organization and Administration. (3–2) Yr.
Mr. Rogers
Importance and uses of demographic data, history, current organization and programs; principles of administration; trends and relationships in the local, national and international setting; case studies in current problems and patterns of public health practice.
203. Advanced Studies in Hospital Administration. (1–5) I and II.
Formerly numbered 202.)
Mr. K. Taylor

204A–204B. Seminar in Hospital Administration. (2–2) Yr.
Formerly numbered 203A–203B.)
Mr. K. Taylor, Mrs. Inghram

206A–206B. Seminar in Medical Care Administration. (2–2) Yr.
Mr. Rogers

209A–209B. Seminar in Public Health Practice. (1–1) Yr.
Mr. Leonard, Mr. Blum

Mr. Mangold, Mr. Oswald, Mr. Cooper

214A–214B. Seminar in Environmental Health and Safety. (2–2) Yr.
Mr. Mangold, Mr. Bliss

222. Investigative Techniques in Public Health Nursing Administration.
(1–5) I and II.
Problem selection and formulation, research design, methodological problems, analysis
and interpretation.
Miss Simonson

223. Advanced Studies in Public Health Nursing Administration. (1–5)
I and II.
Miss Simonson

224A–224B. Seminar in Public Health Nursing Administration. (2–2) Yr.
Miss Simonson

226. Seminar in Mental Health. (1) II.
Formerly numbered 238.)
Miss B. Parker

227. School Health Administration. (2) II.
Mr. Foord, Mrs. Boydston
Organization, administration and supervision of school health programs.

Miss Bierman, Mrs. Boydston, Miss Johnson

229A–229B. Seminar in Maternal and Child Health. (1–1) Yr.
Miss Bierman, Mrs. Boydston, Miss Johnson

231. Communications Research Applicable to Public Health. (1) I and II.
Miss Roberts, Mr. Knutson

233. Group Work Procedures in Health Education. (2) I and II.
Mr. Griffiths, Miss Roberts, Mrs. Ross
Social and psychological factors which determine the effectiveness of group work in
promoting public health activities.

238. Advanced Studies in Health Education. (1–5) I and II.
Formerly numbered 239.)
Mr. Griffiths, Miss Roberts, Mr. Knutson

239A–239B. Seminar in Public Health Education. (1–2) Yr.  Mr. Griffiths
Formerly numbered 234A–234B.)
245A. Advanced Epidemiology. (3) I. Mr. Reeves, Mr. Smith, Mr. Stallones
Prerequisite: a doctoral degree in a medical science or consent of instructor for those with adequate background in allied medical sciences. To be taken concurrently with course 160A or 162A.

245B. Advanced Epidemiology Laboratory. (3) II. Mr. Reeves, Mr. Stallones
Prerequisite: course 245A and 162A (or its equivalent) or consent of instructor.
The analysis and interpretation of epidemiological data and communication of findings by written reports.

246. Seminar in the Epidemiology of Noninfectious Diseases. (1) II. Mr. Stallones

248. Advanced Studies in Epidemiology. (1-5) I and II. Mr. Reeves, Mr. Smith, Mr. Stallones, Mr. R. Taylor

249A–249B. Seminar in Epidemiology. (1–1) Yr. Mr. Reeves, Mr. Smith, Mr. Stallones, Mr. R. Taylor

253. Advanced Studies in Public Health Laboratory. (1–5) I and II. (Formerly numbered 254.) Miss Hollinger

260. Advanced Probability and Statistics in Biology, Medicine and Public Health. (3) I. Mr. W. Taylor
Prerequisite: course 164 or equivalent.
Probability models for the study of epidemics, medical diagnosis, accident proneness, other stochastic processes.

261A–261B. Advanced Biostatistics. (3–3) Yr. Mr. Yerushalmy, Mr. W. Taylor, Mr. Nissen-Meyer
Prerequisite: course 161B and 164 or equivalent.
Epidemetic investigations; evaluation of therapy; advanced life table methods, program evaluation, design of surveys in human populations.

262. Selected Topics in Biostatistics. (3) II. Mr. Chiang
Prerequisite: course 261A.
Advances in biostatistics methodology and its applications.

268. Advanced Studies in Biostatistics. (1–5) I and II. Mr. Yerushalmy

269A–269B. Seminar in Biostatistics. (1–1) Yr. Mr. Yerushalmy

273. Advanced Studies in Industrial Health. (1–5) I and II. (Formerly numbered 278.) Mr. Tebbens, Mr. Wilson, Mr. Burkhalter
Projects in industrial environment control, industrial toxicology, sanitary air analysis, or industrial medical administration.

279A–279B. Seminar in Industrial Health. (1–1) Yr. (Formerly numbered 274A–274B.) Mr. Tebbens, Mr. Wilson

288. Advanced Studies in Public Health Nutrition. (1–5) II. (Formerly numbered 286.) Miss Huenemann
289A–289B. Seminar in Public Health Nutrition. (2–2) Yr.
Miss Huenemann

291. Clinical Problems in Public Health. (1–4) II.
(Formerly numbered 287.)
Clinical subjects of major public health importance with recent advances in diagnosis, treatment and prevention.

Mr. Smith, Mr. Stallones

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

(Office, 241 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).
William C. Weir, Ph.D., Professor of Animal Husbandry, Davis.
Harold F. Heady, Ph.D., Associate Professor of Forestry.

Arnold M. Schultz, Ph.D., Lecturer in Forestry.

Major Adviser: Mr. Heady.

The Major in Range Management: To obtain a B.S. degree in this major, the following five items must be satisfied and part of the work must be taken at Davis: (1) General University requirements. (2) College of Agriculture requirements (see page 63). (3) Range Management Curriculum requirements: (a) General—Botany, 16 units. Chemistry, 8 units. Economics, 3 units. Engineering, 3 units. English and/or speech, 6 units. Physics, 6 units. Zoology, 8 units. (b) Agriculture—Agronomy and range management, 12 units. Animal husbandry, 10 units. Soil science and/or geology, 6 units. Summer field practice course, 0 units. (c) Electives (restricted)—Genetics, statistical methods; or additional units in botany, chemistry, geology, and zoology, 6 units. Anthropology, art, foreign language, geography, history, * music, philosophy, political science, * psychology, sociology; or additional units in economics, English, and speech, 9 units. (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 units. (5) Certain courses are required for the major and, where applicable, may be used in partial satisfaction of above requirements. For details, see the PROSPECTUS OF THE COLLEGE.

* In addition to courses in these fields used at Davis in fulfillment of University requirements.
of Agriculture, available without charge. Instruction in range management is not organized as a single administrative unit in the College of Agriculture. The required courses in range management are offered by a number of departments at Berkeley and at Davis.

Honors. Information concerning honors may be obtained from the Dean's Office, College of Agriculture.

**Lower Division 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 Division Courses**

101. Introduction to Range Management. (3) I. Mr. Schultz
   Principles and development in the United States; relations to agriculture and wildland management.

102. Advanced Range Management. (3) II. Mr. Heady
   Lecture, laboratory, field trips. Prerequisite: Engineering 21 or the equivalent; a course in plant ecology. Recommended: Botany 108.
   Procedure in determination of range adequacy and quality.

123. Range Forage Utilization. (3) I. Mr. Biswell
   Lecture, laboratory, field trips. Prerequisite: course 49 or 101.
   Principles of range forage utilization; forage preference of animals; control means to obtain proper utilization.

133. Grassland Ecology. (3) II. Mr. Heady
   Prerequisite: Forestry 103.
   Composition, structure, development, habitat factors, and management of the native North American grasslands.

199. Special Study for Advanced Undergraduates. (1-5) I and II.
   Prerequisite: senior standing and consent of instructor. Mr. Heady, Mr. Schultz

**Graduate Courses**

(Concerning conditions for admission to graduate courses, see page 163.)

201A–201B. Seminar in Range Management. (2–2) Yr.
   201A is not prerequisite to 201B.
   201A. Mr. Schultz; 201B. Mr. Heady.

299. Research in Range Management. (1–6) I and II.
   Mr. Heady, Mr. Schultz

**ROMANCE PHILOLOGY**

Francis J. Carmody, Ph.D., Professor of French.
Yakov Malkiel, Ph.D., Professor of Romance Philology.
Manfred M. G. Sandmann, Ph.D., Professor of French and Romance Philology.

* Not to be given, 1961–1962.
Aldo D. Scaglione, Dottore in Lettere, Associate Professor of Italian.
Ronald N. Walpole, Ph.D., Professor of French.

Graduate Adviser: Mr. Malkiel.

*200. Linguistic History of the Roman Empire. (2) I. Mr. Malkiel
The spread of Latin over the Western Mediterranean area, and its gradual change into the Romance dialects, with emphasis on substrata and superstrata.

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 questions of cultural origins and influences.

204. Humanistic Literature in Latin. (1) II. Mr. Scaglione
Prerequisite: a working knowledge of Latin and consent of instructor.
A study of the growth of Humanism through the reading and interpretation of selected Latin texts, from Alcuin to Erasmus.

*205. Romance Dialect Geography. (2) II. Mr. Malkiel
Methods of interpreting linguistic atlases 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 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 instructor.
Problems and methods in the study of the Spanish linguistic areas, in diachronic and synchronic projection.

208. Romance Etymology and Derivation. (2) I. Mr. Malkiel
Prerequisite: graduate standing and consent of instructor.
Methods and assumptions in the study of Romance etymology and word formation, with special attention to derivational suffixes.

299. Special Advanced Study. (1–4) I and II.
Mr. Carmody, Mr. Malkiel, Mr. Sandmann, Mr. Scaglione, Mr. Walpole

Related Courses in Other Departments

The Age of Chaucer (English 155).
The Medieval Mind (English 220A–220B).
Historical French Grammar (French 201A–201B).

* Not to be given, 1961–1962.
Reading and Interpretation of Typical Old French Texts (French 206A–206B).
Gothic (German 265).
Dante's *Divina Commedia* (Italian 109A–109B).
Principles of Descriptive and Historical Linguistics (Linguistics 100).
Phonetics and Phonemics (Linguistics 130).
Introduction to Indo-European Comparative Grammar (Linguistics 150).
A History of the Spanish Lexicon (Spanish 131).
The Ballad (Spanish 208A–208B).
Old Spanish (Spanish 212A–212B).

**SANSKRIT**

For courses in the Sanskrit language and literature, see under Department of Classics, page 237.

**SCANDINAVIAN**

(Department Office, 1218 Dwinelle Hall)

Assar Götrik Janzen, Ph.D., *Professor of Scandinavian.*
Haakon Hamre, C.phil., *Associate Professor of Scandinavian (Chairman of the Department).*
Eric O. Johannesson, Ph.D., *Assistant Professor of Scandinavian.*
Børge Gedso Madsen, Ph.D., *Assistant Professor of Scandinavian.*

Madison S. Beeler, Ph.D., *Professor of German and Linguistics.*

*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 95.

*Departmental Major Adviser:* Mr. Janzen.

*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. Twenty-four units of 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 Program.* Students must have completed with distinction the course outlined for the major as well as two semesters of course H195. A thesis is also required. Students should consult the major adviser.
Lower Division Courses

1A–1B. Elementary Swedish. (4–4) Yr.
   1A. Elementary grammar, reading of easy prose.
   1B. Elementary grammar, reading, conversation, composition.

3A–3B. Elementary Norwegian. (4–4) Yr.
   3A. Elementary grammar, reading of easy prose.
   3B. Elementary grammar, reading, conversation, composition.

4A–4B. Elementary Danish. (4–4) Yr.
   4A. Elementary grammar, reading of easy prose.
   4B. Elementary grammar, reading, conversation, composition.

   11A, 11B: I; 11B: II.
   Prerequisite: course 1A–1B or the equivalent.
   Intermediate grammar, extensive reading, conversation, composition.

13A–13B. Intermediate Norwegian. (4–4) Yr.
   13A, 13B: I; 13B: II.
   Prerequisite: course 3A–3B or the equivalent.
   Intermediate grammar, extensive reading, conversation, composition.

14A–14B. Intermediate Danish. (4–4) Yr.
   Prerequisite: course 4A–4B or the equivalent.
   Intermediate grammar, extensive reading, conversation, composition.

Upper Division Courses

A. Language Courses

   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.

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. Janzén in charge)

* Not to be given, 1961–1962.
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.

Mr. Janzén, Mr. Madsen, Mr. Johannesson

Survey course: reading of selected works of Danish, Norwegian, and Swedish literature in translation; lectures.

*100A. From 1300 to 1850. (3) II. Mr. Janzén
*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. Madsen

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. Janzén

Reading and discussion of Ibsen’s most important plays; lectures.

108. Strindberg and His Writings. (3) II. Mr. Janzén

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. Madsen

Reading of modern Scandinavian dramas in translation; discussions; lectures.

120A–120B. The Novel in Scandinavia. (3–3) Yr. Mr. Johannesson

Course 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.

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 163.)

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.

* Not to be given, 1961–1962.
A. Language Courses

201. Old Swedish. (3) II.  
Phonology, historical grammar, texts.  
Mr. Janzén

203. Old Icelandic. (3) I.  
Descriptive and historical phonology and grammar; texts. Some attention is given to Old Norwegian.  
Mr. Beeler

206. Readings of Old Icelandic Sagas. (2) II.  
One of the longer or two of the shorter Old Icelandic sagas will normally be read in this course. May be repeated with consent of instructor.  
Mr. Hamre

°208. The Poems of the Poetic Edda. (3) II.  
Reading of some more important poems with emphasis on the mythological songs.  
Mr. Hamre

215. Scandinavian Dialects. (2) I.  
A survey of the Scandinavian dialects with special reference to their relation to the standard languages of the different countries.  
Mr. Hamre

°250. Seminar in Scandinavian Linguistics. (2) II.  
Mr. Janzén, Mr. Hamre  
Conference work on chosen or assigned topics; at least one shorter paper a semester is normally required.

B. Literature Courses

°230. Eighteenth-Century Scandinavian Literature. (2) II.  
Reading and analysis of representative works; lectures.  
Mr. Johannesson

231. Romanticism in Scandinavia. (2) I.  
Reading and analysis of representative works; lectures.  
Mr. Madsen

°233. Scandinavian Literature of the Twentieth Century. (2) I.  
Reading and analysis of representative works; lectures.  
Mr. Johannesson

251. Seminar in Scandinavian Literature. (2) I and II.  
Mr. Johannesson, Mr. Madsen  
Prerequisite: course 100B, 100C and at least one of the following courses: 106, 109, 125.

298. Special Study for Graduate Students. (1–4) I and II.  
The Staff (Mr. Johannesson in charge)

Related Courses in Another Department

The Symbolist Movement in European Literature (Comparative Literature 201A–201B).
Dramatic Literature of Western Civilization (Dramatic Art 125D–125E).
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).

° Not to be given, 1961–1962.
German Realism, 1850–1900 (German 238).
Germanic Linguistics (German 260).
Gothic (German 265).
Principles of Descriptive and Historical Linguistics (Linguistics 100).
Introduction to Indo-European Comparative Grammar (Linguistics 150).

**SLAVIC LANGUAGES AND LITERATURES**

(Department Office, 5416 Dwinelle Hall)

Czeslaw Milosz, Mag. Jur., Professor of Slavic Languages and Literatures.
Gleb Struve, A.B., Professor of Slavic Languages and Literatures.
Francis J. Whitfield, Ph.D., Professor of Slavic Languages and Literatures (Chairman of the Department).
Vaclaw Lednicki, Ph.D., Professor of Slavic Languages and Literatures, Emeritus.
Oleg A. Maslenikov, Ph.D., Associate Professor of Slavic Languages and Literatures.
Lawrence L. Thomas, Ph.D., Associate Professor of Slavic Languages and Literatures.
Kathryn B. Feuer, M.A., Acting Assistant Professor of Slavic Languages and Literatures.
Emil Kevtun, M.A., Acting Assistant Professor of Slavic Languages and Literatures.
Michael Samilov, Ph.D., Assistant Professor of Slavic Languages and Literatures.
Olga Astromoff, M.A., Associate in Russian.
Milan Fryšák, A.B., Associate in Czech.
Michael K. Pawlikowski, LL.M., Associate in Polish and Russian.
Olga Sorokin, M.A., Associate in Russian.
Allan R. Taylor, A.B., Associate in Russian.

Andrew O. Jáši, Ph.D., Associate Professor of German.
Tadeusz E. Goździk, Ph.D., Lecturer in Hungarian.
Serge Kassatkin, M.A., Lecturer in Russian.
Jadwiga Maurer, Ph.D., Lecturer in Polish.
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 95.

*Departmental Major Adviser:* Mr. Kevtun.

*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 Program._ 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.  
   Two lectures and three recitation hours per week.  
   The conversation course of corresponding level is 18A.  
   Mr. Taylor (in charge)

2. **Elementary Russian (continuation of 1).** (4) I and II.  
   Two lectures and three recitation hours per week. Prerequisite: course 1.  
   The conversation course of corresponding level is 18B.  
   Mr. Thomas (in charge)

3. **Intermediate Russian.** (4) I and II.  
   Three lectures and two recitation hours per week. Prerequisite: course 2. The conversation course of corresponding level is 19.  
   Mrs. Sorokin (in charge)

4. **Elementary Ukrainian.** (3–3) Yr.  
   Mr. Thomas

5. **Elementary Polish.** (3–3) Yr.  
   Mr. Samilov

6. **Elementary Serbo-Croatian.** (3–3) Yr.  
   Mr. Whitfield

7. **Elementary Bulgarian.** (3–3) Yr.  
   Mr. Fryščák

8. **Elementary Czech.** (3–3) Yr.  
   Mrs. Astromoff

9. **Elementary Russian Conversation.** (2) I and II.  
   Open only to students who are taking course 1. Not acceptable for the foreign language requirement of the College of Letters and Science.

10. **Elementary Russian Conversation.** (2) I and II.  
    Open only to students who are taking course 2. Not acceptable for the foreign language requirement of Letters and Science.  
    Mrs. Astromoff

11. **Intermediate Russian Conversation.** (2) I and II.  
    Open only to students who are taking course 3. Not acceptable for the foreign language requirement of the College of Letters and Science.  
    Mrs. Patrick

12. **Elementary Russian. Intensive Course.** (8) I.  
    Classes meet ten hours per week.  
    Mr. Kassatkin

13. **Intermediate Russian. Intensive Course.** (8) II.  
    Prerequisite: course 2 or 21.  
    Classes meet ten hours per week.  
    Mr. Kassatkin

* Not to be given, 1961–1962.
23. Elementary Polish. Intensive Course. (8) I. Mrs. Maurer
Classes meet ten hours per week.

24. Intermediate Polish. (3) II. Mrs. Maurer
Prerequisite: course 6B or 23.
Emphasis on the spoken language.

25. Elementary Serbo-Croatian. Intensive Course. (8) I. Mr. Samilov
Classes meet ten hours per week.

26. Intermediate Serbo-Croatian. (3) II. Mr. Samilov
Prerequisite course: 10B or 25.
Emphasis on the spoken language.

Hungarian 27. Elementary Hungarian. Intensive Course. (6) I. Mr. Goździk
Classes meet eight hours per week.

Hungarian 28. Intermediate Hungarian. (3) II. Mr. Goździk
Prerequisite: course 27.
Emphasis on the spoken language.

39. Great Writers of Russian Literature. (3) I. Mrs. Feuer
No knowledge of Russian is required.

Upper Division Courses

100. Specialized Russian Reading. (3) I and II. Mrs. Feuer
Prerequisite: course 3 or consent of instructor.

102. Russian Reading, Grammar, and Composition. (3) II. Mr. Maslenikov
Prerequisite: course 3.
The conversation course of corresponding level is 119.

103A–103B. Advanced Russian. (3–3) Yr. Mr. Maslenikov, 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.

107. Polish Reading, Grammar, and Composition. (3) II. Mrs. Maurer
Prerequisite: course 6B or 23.

108. Advanced Studies in Polish Grammar. (3) I. Mr. Thomas
Prerequisite: course 107.

111. Serbo-Croatian Reading, Grammar, and Composition. (3) II. Mr. Samilov
Prerequisite: course 10B or 25.

112. Advanced Studies in Serbo-Croatian Grammar. (3) I. Mr. Samilov
Prerequisite: course 111.
115. Czech Reading, Grammar, and Composition. (3) I. Mr. Kovtun
(Formerly numbered 115A–115B.)
Prerequisite: course 14B.

*116. Advanced Studies in Czech Grammar. (3) I. Mr. Kovtun
Prerequisite: course 115.

Hungarian 117. Reading, Grammar, and Composition. (3) II. Mr. Goździk
Prerequisite: course 27.

119. Advanced Russian Conversation. (2) II.
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)

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 at least junior standing and, with the consent of instructor, to properly qualified sophomores.

130A–130B. Survey of Russian Literature and Intellectual Trends. (3–3) Yr.
(Formerly numbered 130.)
Mr. Struwe

131. Russian Literature (1880–1917). (3) II. Mr. Maslenikov

132. Russian Literature since 1917. (2) II. Mr. Struwe

133A. The Russian Novel to 1850 and its Relations to West European Literatures. (3) I. Mrs. Feuer

133B. The Russian Novel 1850–1880 and its Relations to West European Literatures. (3) II. Mrs. Feuer

133C. Dostoevsky. (3) I. Mr. Maslenikov

133D. Tolstoy. (3) II. Mrs. Feuer

133F. Chekhov. (2) II. Mrs. Patrick

*134. Russian Folklore. (2) I. Mrs. Patrick

* Not to be given, 1961–1962.
135. The Russian Drama from the Seventeenth Century to the Twentieth. (2) I.

140. Survey of Western and Southern Slavic Literatures. (3) II. Mr. Kovtun

143. Introduction to Modern Slavic Literary Theory. (2) II. Mr. Kovtun

151. Polish Literature: Sixteenth–Eighteenth Centuries. (3) II. Mr. Milosz

153. Polish Literature of the Post-Romantic Period. (2) I. Mr. Milosz

154. Polish and Russian Romanticism. (2) II. Mr. Milosz

155. Mickiewicz. (2) II. Mr. Milosz

160. Survey of Czech and Slovak Literatures. (2) I. Mr. Kovtun

161. Czech and Slovak Literatures of the Nineteenth Century. (2) II. Mr. Kovtun

*170. Survey of Serbian and Croatian Literatures. (2) I. Mr. Samilov

*180A. Survey of Russian Culture to 1800. (2) I. Mr. Struve

*180B. Survey of Russian Culture from 1800 to the Present. (2) II. Mr. Struve

182. History of Polish Culture. (2) I. Mr. Milosz

Hungarian 185. History of Hungarian Culture. (2) I. Mr. Gozdzik

187. Russian Poetry. (2) II. Mr. Struve

Prerequisite: course 103A or consent of instructor.

Lecture course given in Russian.

*188. The Slavic-Speaking World. (3) I. Mr. Kovtun

Graduate Courses

210. Old Church Slavic. (2) I. Mr. Whitfield

(Formerly numbered 224.)

220. Comparative Slavic Linguistics. (2) II. Mr. Samilov

Prerequisite: course 210.

226. Historical Russian Grammar. (2) II. Mr. Maslenikov

Prerequisite: course 210.

*285. Russian Prose. (2) I. Mr. Maslenikov

Lecture course given in Russian.

* Not to be given, 1961–1962.
290. Seminar. (2) I and II.
Advanced study in Slavic languages and literatures. Topics will vary from year to year and will be announced at the beginning of each semester.

298. Special Study for Graduate Students. (1-4) I and II.
The Staff (Mr. Whitfield in charge)

Scientific Russian for Graduate Students. First Course. (No credit) I.
Mr. Kovtun

Scientific Russian for Graduate Students. Second Course. (No credit) II.
Prerequisite: first course.

SOCIAL SCIENCE
(Office, 220 Wheeler Hall)
Lewis S. Feuer, Ph.D., Professor of Philosophy and Social Science.
Eugene L. Burdick, Ph.D., Associate Professor of Political Science.
Ralph C. Beals, M.A., Associate in Social Science.
George A. Huaco, M.A., Associate in Social Science.
Ernest Landauer, M.A., Associate in Social Science.
Vernon Lidtke, M.A., Associate in Social Science.
Ruth Markovitz, M.A., Associate in Social Science.
William O'Neill, M.A., Associate in Social Science.
Ingeborg B. Powell, M.A., Associate in Social Science.
Emanuel Schegloff, M.A., Associate in Social Science.
John S. Spier, A.B., Associate in Social Science.

Letters and Science List. Course 1A–1B is included in the Letters and Science List of Courses. For regulations governing this list, see page 95.

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.

SOCIAL WELFARE
(Department Office, 222 Building T-1)
Milton Chernin, Ph.D., Professor of Social Welfare (Chairman of the Department).
Gordon Hearn, Ph.D., Professor of Social Welfare.
Henry S. Maas, Ph.D., Professor of Social Welfare.
Davis McEntire, Ph.D., Professor of Social Welfare.
Maurine McKeany, 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.
George A. De Vos, Ph.D., Associate Professor of Social Welfare.
Ernest Greenwood, Ph.D., Associate Professor of Social Welfare.
Margaret S. Schubert, Ph.D., Associate Professor of Social Welfare.
Kermit T. Wiltse, D.S.W., Associate Professor of Social Welfare.
'Martin Wolins, D.S.W., Associate Professor of Social Welfare.
Joseph S. Briar, D.S.W., Assistant Professor of Social Welfare.
James R. W. Leiby, Ph.D., Assistant Professor of Social Welfare.
Irving M. Piliavin, M.S.W., Assistant Professor of Social Welfare.

Irving P. Babow, Ph.D., Lecturer in Social Welfare.
Evelyn Citrin, M.S.W., Lecturer in Social Welfare.
Florence D. Clemenger, M.S.W., Lecturer in Social Welfare and Field Work Consultant.
Sally Dewees, M.S., Lecturer in Social Welfare.
Margaret S. Gordon, 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 Consultant.
Elizabeth E. Pfeiffer, M.S.W., Lecturer in Social Welfare and Field Work Consultant.
Ralph H. Potter, Jr., M.D., Lecturer in Social Welfare.
Lydia Rapoport, M.S.S., Lecturer in Social Welfare and Coordinator of Field Work.
William L. Rowe, Ph.D., Lecturer in Social Welfare.
Alvin Rudoff, A.B., Lecturer in Social Welfare.
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.

Mary E. Anderson, M.S.W., Field Work Supervisor in Social Welfare.
Alice Barber, M.S.W., Field Work Supervisor in Social Welfare.

‡ In residence fall semester only, 1961–1962.
The School of Social Welfare offers two graduate programs: a two-year curriculum, based upon the bachelor's degree, leading to the degree Master of Social Welfare; and a program of advanced study and research, based upon the Master of Social Welfare degree, leading to the degree Doctor of Social Welfare. For information regarding admission to and requirements prescribed for the graduate programs, 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 on page 135.

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 95.

Upper Division Courses

100. The Field of Social Welfare. (3) I and II. Mr. Chernin
Survey of social welfare problems, programs, and issues. Designed to acquaint non-majors with the field of social welfare.
Not open to students who have completed or are taking course 110A–110B.

102. Methods in Social Work. (3) I and II. Mr. O'Shea
Prerequisite: social welfare majors, senior standing; others, course 110A (may be taken concurrently) or 100, and consent of instructor.
Introduction to social work methods, including social casework, social group work, and community organization. Observational visits to agencies and institutions.
*106. Community. (2) II.
   Concept of community; major institutions; community surveys; sociological background of community organization for social welfare.

110A–110B. The Social Services. (3–3) Yr. Mr. Piliavin
   Historical survey of social services and their social-philosophical base: economic security; child welfare; family service programs; health services; corrections; school social services; civil rights programs; community organization.

H197A–H197B. Senior Honors Course. (3–3) Yr. Mr. Chernin
   Problems in social welfare and social work. Preparation of a senior essay.

*198. Group Study for Advanced Undergraduates. (1–3) I and II.

199. Special Study for Advanced Undergraduates. (1–3) I and II.
   The Staff (Mr. Hearn in charge)

Graduate and Professional Courses


201. Law and Social Welfare. (1) I. Mrs. Taylor
   Legal information for social workers, with emphasis on family law.

202A–202B. Social Casework. (2–2) Yr. Miss Cooper, Miss Pfeiffer, Miss Rapoport, Mrs. Schubert,

203. Community Organization. (2) I and II.
   Mr. Kramer, Mr. Maldonado, Mr. Wolins
   Theory of community structure and function and methods of planning for social welfare services.

205A–205B. Growth and Change of the Individual. (2–2) Yr. Mr. Maas (in charge), Mr. De Vos, Mr. Margen, Mrs. Oswald, Mr. Potter, Mrs. Stewart, Mr. Zimmerman
   Physiological, psychological, social development and adaptations of the individual, as related to social welfare.

207. Social Welfare Organization. (2) II. Mrs. Taylor, Mr. Wiltse
   Principles governing organization of major social welfare programs.

208. Social Welfare and Income Maintenance. (2) I. Mrs. Gordon, Mrs. Taylor
   Policies, methods, and issues in public assistance and social insurance.

209. Theory of Group Development. (2) I. Mr. Hearn
   Scientific bases of group behavior; universal properties of groups.

*211. Rural Welfare Problems. (2) II.

*252. Social Welfare Administration. (2) I.
   Administrative process and problems in social welfare organizations.

* Not to be given, 1961–1962.
253. Family and Child Welfare Services. (2) I. Mr. Wiltse

254. Public Health and Public Medical Care and the Role of Social Work. (1) II. Miss Hoodwin, Miss Rapoport


258A–258B. Advanced Social Casework. (2–2) Yr. Mr. Briar, Miss Pfeiffer, Miss Rapoport, Mr. Wiltse Generic and specific components of advanced social casework in different areas of practice.

*259. Supervision in Social Work. (2) II.

262. Psychiatry and Social Work. (2) I. Miss Sarvis, Mr. Simon Diagnosis and treatment of psychoneuropses, neuroses, psychoses, character disorders, and mental deficiencies, and their social implications.

265. Social Welfare Research: Fields and Techniques. (2) I and II. Mr. Greenwood

266. Psychoanalysis and Social Work. (2) II. Mrs. Maenchen, Miss Sarvis The contribution of psychoanalytic theory to social work.

280. Group Methods in Social Welfare. (2) II. Mrs. Clemenger, Mr. Hearn Concepts, principles, and techniques of work with groups in all areas of practice.

281A–281B. Social Group Work. (2–2) Yr. Mrs. Clemenger


283. Group Process in Professional Practice. (2) I. Mr. Hearn Prerequisite: for social welfare students, course 280. Theory of group process; development of competence to participate in professional groups.

290A–290B. Seminar in Social Work Theory. (2–2) Yr. Mr. Maas (in charge), Mr. Wiltse Analysis of concepts and theories of social work; emphasis on behavioral science formulations related to development of diagnostic and treatment typologies and principles of social work methods.

291. Comparative Welfare Institutions and Practice. (2) II. Mr. McEntire, Mr. Rowe Comparative analysis of welfare policies and methods in selected countries in cultural and ideological context. Problems of welfare policy in underdeveloped countries. Theory and practice of community development, with case studies. Place of social welfare in technical assistance programs.

293. Seminar in Social Security. (2) I.  
Mrs. Gordon

294A–294B. Seminar in Social Welfare Policy and Administration. (2–2) Yr.  
Mr. McEntire
Selected problems in social welfare policy and administration; interrelations of policy and administration.

295A–295B. Seminar in Social Research. (2–2) Yr.  
Mr. Greenwood
Advanced study of logic, method, technique, design and organization of social research, with special reference to social welfare and social work.

296A–296B. Social Work Practice in Public Health. (2–2) Yr. Miss Hoodwin  
Limited to graduate social welfare students admitted to the intern year and to social workers employed in public health.

(2–2) Yr.  
Mr. Leiby

298. Special Study for Graduate Students. (1–6) I and II.  
The Staff (Mr. Chernin in charge), Mr. Maas

299. Special Research. (2) I and II.  
Mr. Babow, Mr. Briar, Mr. Hearn, Mr. Leiby, Mr. Maccoby, Mr. Piliavin, Mr. Rowe, Mrs. Schubert, ———  
Group research on selected problems in social welfare.

401. Field Work. (2–12) I and II.  
Miss Pettes (in charge), Mr. Briar, Mrs. Clemenger, Miss Cooper, Mrs. Ferguson, Miss Godfrey, Mr. O'Shea, Miss Pfeiffer, Miss Rapoport, Mrs. Schubert, Mrs. Stewart, Miss Watt  
Supervised practice in social agencies. First year: two days a week, minimum 400 hours over two semesters for 8 units credit. Second year: three days a week in selected area of practice, minimum 600 hours for 12 units credit. Special arrangements for hours and credits may be made.

Miss Hoodwin (in charge), Miss Boggs  
Supervised social work practice in public health departments four to five days a week during an eleven-month period.

405. Internship in Research in Community Welfare Planning. (4–12) II.  
Mr. Greenwood, Mr. Wolins  
Supervised internship in research in community welfare planning two to five days a week.

410A–410B. Program Media in Social Group Work. (1–1) Yr.  
Diagnostic use of program media in social group work practice.  
Mrs. Clemenger

* Not to be given, 1961–1962.
SOCIETY

(Department Office, 206 South Hall)

†Reinhard Bendix, Ph.D., Professor of Sociology.
Herbert Blumer, Ph.D., Professor of Sociology, and Director, Institute of Social Sciences.
John A. Clausen, Ph.D., Professor of Sociology, and Director, Institute of Human Development.
Kingsley Davis, Ph.D., Professor of Sociology (Chairman of the Department).
Wolfram Eberhard, Ph.D., Professor of Sociology (Vice-Chairman of the Department).
Charles Y. Glock, Ph.D., Professor of Sociology, and Director, Survey Research Center.

Seymour M. Lipset, Ph.D., Professor of Sociology.
*Leo Lowenthal, Ph.D., Professor of Sociology and of Speech.
Philip Selznick, Ph.D., Professor of Sociology.
Margaret T. Hodgen, Ph.D., Professor of Sociology, Emeritus.
Kenneth E. Bock, Ph.D., Associate Professor of Sociology.
†Erving Goffman, Ph.D., Associate Professor of Sociology.
†William A. Kornhauser, Ph.D., Associate Professor of Sociology.
†William Petersen, Ph.D., Associate Professor of Sociology.
H. Franz Schurmann, Ph.D., Associate Professor of Sociology and of History.
Hanan C. Selvin, Ph.D., Associate Professor of Sociology.
*Neil J. Smelser, Ph.D., Associate Professor of Sociology.
David Matza, Ph.D., Assistant Professor of Sociology.
Martin A. Trow, Ph.D., Assistant Professor of Sociology and of Education.
Warren Hagstrom, M.A., Acting Instructor in Sociology.

Amitai Etzioni, Ph.D., Visiting Associate Professor of Sociology for the fall semester.
Gino Germani, Ph.D., Visiting Professor of Sociology for the fall semester.
David Heer, Ph.D., Lecturer in Sociology.
Helmut V. Muhsam, Ph.D., Visiting Associate Professor of Sociology for the fall semester.
William L. Nicholls, II, M.A., Lecturer in Sociology.
Eugene V. Schneider, Ph.D., Visiting Professor of Sociology.

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 95.

* In residence fall semester only, 1961–1962.
* In residence spring semester only, 1961–1962.
Departmental Major Advisers: Mr. Glock (year); Mr. Trow (fall); Mr. Smelser (spring).

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 or 108, 30, 40, 105, 109, and 141, plus 15 units of other sociology courses within the department. In addition, it is recommended that those who major in sociology 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, Economics 1A–1B, History 4A–4B, Philosophy 20A–20B, Psychology 1A–1B, Social Science 1A–1B.

Honors Program. Majors who enter their senior year with an over-all B average are invited to join the departmental Honors program.

1. Man and Society. (3) I and II. Mr. Matza, Mr. Selznick
   Two lectures and one weekly discussion section to be arranged.
   Introductory analysis of human group life. Theories concerning culture, institutions, community, personality, social planning.

20. Population Problems. (3) I. Mr. Petersen
   An elementary course in population, descriptive rather than technical. Includes the “population explosion,” the “baby boom,” and growing cities and suburbs.

30. Society and Personality. (3) II. Mr. Blumer, Mr. Goffman
   Two lectures and one weekly discussion section to be arranged.
   First course in social psychology. 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 and II. Mr. Nicholls, Mr. Hagstrom
   Prerequisite: Mathematics D or equivalent. Two lectures and one three-hour laboratory per week.
   An introduction to the statistical analysis of social data.

*100. Social Evolution. (3) I. Mr. Bock
   Major views of social development: cultural cycles, progress, social and cultural evolution.

*101. Historical Sociology. (3) II. Mr. Bock
   Social and cultural processes of change and persistence in Marx, Toynbee, Kroeber, Spengler, Teggart, Sorokin, Weber, and others.

105. Introduction to Methods of Sociological Study. (3) I and II. Mr. Heer, Mr. Nicholls
   Prerequisite: course 40 and 6 additional units in sociology, or equivalent.
   Methodological problems and technical procedures in defining problems to investigate and in selecting, describing, classifying, and analyzing data.

107. Social Control. (3) I. Mr. Hagstrom
   Critical evaluation of various analyses of social control.

* Not to be given, 1961–1962.
108. Principles of Sociology. (3) II. Mr. Heer
Open only to upper division majors in a social science or history. Not open to students who have taken course 1.
An advanced, comprehensive survey of sociological fundamentals.

109. Sociology and Social Thought. (3) II. Mr. Smelser
History of social thought as a source of present-day problems and hypotheses.

110. Inter-Ethnic Contacts. (3) Mr. Schneider
Prerequisite: course 1 or consent of instructor.
Significance of identification, 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. Hagstrom
Prerequisite: course 40 or equivalent.
Analysis of variance and its application to sociological problems; multiple and partial correlation and regression; sampling procedures; introduction to scaling theory and factor analysis.

115. Major Social Problems. (3) II. Mr. Matza
The diagnosis and treatment of problems related to race relations, crime, old age, industrial conflict, political disorder.

118. Introductory Political Sociology. (3) I. Mr. Etzioni
Political processes in organized groups, 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) I. Mr. Nicholls
Administrative organizations and voluntary associations; major social institutions in industry, government, religion, and education.

125. Sociology of Intellectual Life. (3) II. Mr. Germani, Mr. Schneider
The status of the intellectual, knowledge and action in social thought as analyzed by major social theorists.

129. Sociology of Occupations and Professions. (3) I. Mr. Schneider
Historical and comparative study of selected occupational and professional groups.

130. Sociology of the Family. (3) II. Mr. Heer
Systematic and comparative analysis of family structure and change: marriage, reproduction, child-rearing, marital dissolution.

131. Study of Social Processes. (3) I. Mr. Bock
Laboratory and discussion sessions, personal conferences, occasional lectures.
Individual or group research in the comparative and historical study of war or peace; or other projects in institutional processes with consent of the instructor. Emphasis on the sociological use of historical materials.

132. Social Stratification. (3) I and II. Mr. Germani, Mr. Schneider
Recent trends in occupational stratification; social classes in local communities and the nation as related to interest organizations.

133. Population: Theory and Methods of Study. (3) II. Mr. Davis
Prerequisite: course 20 or consent of instructor.
Statistical techniques and theoretical interpretation. Social causes and consequences of population trends; population structure, geographical distribution, migration, relation of population to resources and levels of living, population policies.

* Not to be given, 1961-1962.
134. Sociology of War and Conflict. (3) II. Mr. Bock
Violent and peaceful procedures in the pursuit of national objectives; analysis of attempts to specify the causes of war.

135. Social Change in Underdeveloped Countries. (3) I. Mr. Schurmann
The problem of progress; factors influencing social change, especially in the modern West and Asia.

140. Social Change. (3) I. Mr. Etzioni
Major sources of change in societies; prediction of future changes.

141. Social Organization of Modern Western Societies. (3) I. Mr. Eberhard

*142. Comparative Institutions. (3) II. Mr. Eberhard
Comparison of selected social institutions; their relation to ideas and social change.

*145. Preindustrial Societies. (3) I. Mr. Eberhard
Comparison of political-social institutions; village, city, state, stratification.

146. Sociology of Religion. (3) I. Mr. Glock
A systematic survey including sociological theory and organizational structure of religion, the character of religious authority and leadership, the individual's religion, and the interplay with other spheres of social life.

*147. Religious Doctrines and Social Conduct. (3) I.
Comparable elements in various religious doctrines; their direct and indirect effects on human behavior.

148. Elementary Collective Behavior. (3) II.
Social contagion and crowd behavior, psychic epidemics, popular arts and interests, fashions, mass behavior, formation and manipulation of public opinion.

*149. Social Movements and Public Action. (3) II.
Social movements, the formation and play of public opinion, and the behavior of interest groups.

160. Urbanization and the City. (3) I. Mr. Muhlsam
The nature, causes, and consequences of world urbanization; metropolitan areas; location and types of cities; social and demographic characteristics of urban populations.

*161. Community and Modern Industry. (3) II.
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. Agricultural Oriental Societies. (3) I. Mr. Eberhard
Main characteristics of medieval China, Japan, India as compared with the West. Research methods.

167. Nomadic Societies. (3) II. Mr. Eberhard
Main characteristics of Central Asia, Turks, Mongols, Middle East; contacts with non-nomadic cultures.

175. Communication and Social Contact. (3) II.
Recommended: course 1 or 30.
The establishment of communication channels by differential contact and association; the emergence of consensus in primary and secondary groups; the organization and modification of perspectives in mass societies.

* Not to be given, 1961–1962.
178. Social Interaction and Personal Organization. (3) I. Mr. Blumer
A critical analysis of dominant theories and schemes of research in social psychology.

*180. Industrial Societies. (3) I.
Industrialization and other forms of economic modernization in relation to the changing social structure of selected western societies.

§184. Social Structure of the Soviet Union. (3) I. Mr. Heer
The class system, social aspects of economic life, nationality groups, the family, education, and demographic factors; comparison of the Soviet social structure with the American.

H194. Senior Honors Seminar. (3) I. Mr. Bock
Two lectures and three discussion sections weekly. Open only to seniors who are seeking an A.B. degree with honors.
Intensive study of individual topic to provide background for honors thesis.

H195. Honors Thesis. (3) II. Mr. Bock
One lecture and six section meetings weekly. Prerequisite: course 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. Glock 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). (3) II. Mr. Strong

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 163.)

201A–201B. Methods of Sociological Research. (3-3) Yr. Mr. Selvin, Mr. Trow
Prerequisite: course 40 (may be taken concurrently) or equivalent.
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.

204. Social Contacts. (2) II. Mr. Goffman
Social units and dynamics of face-to-face interaction in natural settings; communication aspects of public order.

206. Socialization and Personality. (2) II. Mr. Clausen
Goals and process of socialization; the self; organized social roles as mediated through the norms and patterned interactions of family, peer group and school.

207. Analysis of Social Action. (2) II. Mr. Blumer
Advanced social psychology, particularly from the viewpoint of George H. Mead; the nature of the social situation, social roles, the self, socialization, the social act.

* Not to be given, 1961–1962.
§ Approved for one offering only, 1961–1962.
212. Deviance and Social Control. (2) II.  Mr. Goffman
Deviance and social system analysis; ethnography of deviant communities.

217. History of Social Thought Since the Enlightenment. (3) I.  Mr. Bock, Mr. Petersen

218. Modern Sociological Theory. (3) II.  Mr. Selznight

219. Sociology of Law. (2) II.  Mr. Selznight
Functions of law in society; social sources of legal change; social conditions affecting the administration of justice; role of social science in jurisprudence.

224. Social Change. (2) II.  Mr. Smelser
Stresses the rise and spread of industrialism to underdeveloped countries.

229. Sociology of Work. (2) II.  Mr. Schneider
Work institutions, social psychology of work, and social composition of the labor force. Social organization of industries and occupations. Social processes of professionalization. Relations between work institutions and other major social institutions.

230. Population. (2) I.  Mr. Muhsam
Prerequisite: a course in population or consent of instructor. Problems in the theory of population; institutional and motivational aspects of demographic behavior.

231. Sociology of Marriage, Family, and Kinship. (2) I.  Mr. Davis
Family structure and behavior, including kinship, marriage, divorce, reproduction, and parental relations; interrelations between family and stratification, economy, law, religion.

232. Social Stratification. (2) I.  Mr. Lipset
Theoretical and methodological problems in the field, with special emphasis on comparative materials.

241. Organizations and Institutions. (2) I.  Mr. Selznight

242. Comparative Social Structure. (2) II.  Mr. Eberhard

246. Sociology of Religion. (2) II.  Mr. Glock
Prerequisite: course 146, or consent of instructor. Interplay between theory and research; the interrelation of religious ideas and institutions with the economic, political, and social order.

248. Collective Behavior. (2) II.
Studies in mass behavior, social movements, and political action.

253. Sociology of Culture. (2) II.  Mr. Lowenthal
Theories of elite and popular cultures, particularly in modern mass society: sociology of knowledge, the arts, popular culture, and education.

260. Political Sociology. (2) II.  Mr. Lipset
Contributions of sociology to theory and research in politics. Analysis of structure and ideology of organized groups.

262. Urbanization. (2) I.  Mr. Germani
Urbanization in the world and in particular countries. Causes and consequences of organization, theory of city location; patterns of city growth, problems of measurement.

290. Seminar. (2) I and II.  The Staff
Advanced study in modern sociology. The specific topics will be announced at the beginning of each semester.

* Not to be given, 1961–1962.
SOILS AND PLANT NUTRITION

(Department Office, 140 Giannini Hall)

Daniel I. Arnon, Ph.D., Professor of Cell Physiology.
Geoffrey B. Bodman, Ph.D., Professor of Soil Physics.
Paul R. Day, Ph.D., Professor of Soil Physics.
Constant C. Delwiche, Ph.D., Professor of Soil Science.
Louis Jacobson, Ph.D., Professor of Plant Nutrition.

†A. Douglas McLaren, Ph.D., Professor of Soil Biochemistry.
Roy Overstreet, Ph.D., Professor of Soil Chemistry.
James P. Bennett, Ph.D., Professor of Plant Physiology, Emeritus.
John S. Burd, B.S., Professor of Soils and Plant Nutrition, Emeritus.
Walter P. Kelley, Ph.D., Professor of Soil Chemistry, Emeritus.
R. Earl Storie, B.S., Professor of Soils and Plant Nutrition, Emeritus.
Kenneth L. Babcock, Ph.D., Associate Professor of Soil Chemistry.

Reynolds J. Arkley, Ph.D., Lecturer in Soils and Plant Nutrition.
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.
Robert Cleland, Ph.D., Assistant Professor of Botany.
Louis C. Erickson, Ph.D., Lecturer in Plant Biochemistry, Riverside.
David P. Hackett, Ph.D., Associate Professor of Biochemistry.
Frank F. Harradine, Ph.D., Professor of Soil Technology, Davis.
Leonard Machlis, Ph.D., Professor of Botany.
Gordon Mackinney, Ph.D., Professor of Food Technology.
Edward C. Stone, Ph.D., Associate Professor of Forestry.
Perry R. Stout, Ph.D., Professor of Soil Science, Davis (Chairman of the Department).

Albert Ulrich, Ph.D., Lecturer in Soils and Plant Nutrition.
Frederick R. Whatley, Ph.D., Lecturer in Plant Physiology.

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 95.

Departmental Major Adviser: Mr. Babcock.

Majors in General Soil Science; Plant Nutrition and Soil Fertility; Pedology and Soil Survey; Soil Management and Conservation. The B.S. degree in Soil Science is granted upon the completion of one of these majors. The following five items will need to be satisfied: (1) General University requirements. (2) College of Agriculture requirements (see page 63). (3) Soil Science Curriculum requirements: (a) General—Bacteriology, 4 units. Botany (including plant physiology), 9 units. Chemistry, 16 units. English and/or speech, 6 units. Geology, 3 units. Physics, 8 units. (b) Agriculture—Crop science (i.e., agronomy, horticulture, pomology, vegetable crops, viticulture) or plant ecology, 3 units. Soil science courses required for major, 20 to 27 units. (c) Electives (restricted)—At least 18 units selected from major requirements listed under 5 and with approval of major adviser, 24 to 18 units. Anthropology, art, classics, decorative art, dramatic art, economics, English, foreign languages, geography, history, music, philosophy, political science, psychology, sociology or speech, 6 units. (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 units. (5) Certain courses are required and, where applicable, may be used in partial satisfaction of (3) above. For details, see the PROSPECTUS OF THE COLLEGE OF AGRICULTURE, available without charge.

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.

Honors. Information concerning honors may be obtained from the Dean’s Office, College of Agriculture.

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.
For students who desire a general knowledge of soils.

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).

* In addition to University requirements.
Upper Division Courses

100. Soil Characteristics. (4) I.
Mr. Day
Lectures, laboratory, and field trips. Prerequisite: Chemistry 1A–1B, Physics 2A–2B. Recommended: Geology 10 or equivalent. Introduction to physical, chemical, and biological properties of soil.

101. Development and Morphology of Soils. (3) II.
Mr. Jenny
Prerequisite: Geology 10, Chemistry 1A. Recommended: course 100. Climate, vegetation, geology, topography, and time as factors in development and chemistry of great world soil groups.

101F. Development and Morphology of Soils. (1) II.
Mr. Arkley
Field trips. Prerequisite: course 101 should be taken concurrently. Saturday excursions in connection with 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.

102L. Soil Physics. (2) II.
Mr. Day
Laboratory. Prerequisite: course 102 (may be taken concurrently).

103. Soils of California. (3) I.
Mr. Arkley
Lectures and discussion section. Two field trips during the semester to be arranged. Prerequisite: Geology 10 and Chemistry 1A–1B. Detailed characterizations and geography of agricultural, grazing, and forest soils of the state; their identification and use rating.

105. Summer Field Course. (5)
Mr. Harradine
Six weeks, daily. Prerequisite: course 100, 101, or 103, and consent of instructor. Field studies of soil morphology, genesis, and classification in relation to agricultural, grazing, forest, and multiple land use.

110. The Soil as a Medium for Plant Growth. (4) I.
Mr. Babcock
Lectures and one conference. Prerequisite: Chemistry 1A–1B and 5. Recommended: Geology 10. Chemistry of plant soil and microbial interrelationships under acid, alkaline, and saline regimes; nutritional factors in productivity, reclamation and conservation.

111. Soil Microbiology and Soil Biochemistry. (3) II.
Lectures and laboratory. Prerequisite: Chemistry 5 and 8, Bacteriology 1 or 2, and 4 or consent of instructor. Activities of microorganisms related to soil organic matter, soil properties, and the rhizosphere.

112. Soil Chemistry in Relation to Plant Growth. (2) II.
Mr. Delwiche
Lectures. Prerequisite: course 110 and Chemistry 5. Properties of the physical chemical environment influencing plant growth.

113. Soil Chemistry in Relation to Plant Growth. (2) II.
Mr. Delwiche, Mr. Babcock
Laboratory. Prerequisite: Chemistry 5, course 112 (usually taken concurrently). Liquid, solid, and gaseous phases of soils; cation exchange, solubility, buffering, salinity, reaction; chemistry of macronutrients and micronutrients.

114. Properties of Colloidal Particles and Systems. (3) I.
Mr. Helfferich
Lectures with demonstrations. Prerequisite: a course in physical chemistry. Properties of colloidal systems of importance in agriculture and biology.
116. Soil Management. (2) I. Mr. Bodman
Lectures and demonstrations. Prerequisite: senior standing in soil science.
Estimation of soil fertility by soil and tissue analysis and plant growth methods; use of fertilizers; soil physical properties related to management problems.

199. Special Study for Advanced Undergraduates. (1–5) I and II. The Staff
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 163.)

201A–201B. Research in Soil Science. (1–9; 1–9) Yr. The Staff

203. Soil Resource Evaluation. (3) I. Mr. Arkley
Prerequisite: training in any one of the following fields: soil science, forestry, range management, irrigation, land economics, geography.
Survey data interpretations for appropriate land uses; cultivation, grazing, timber, watershed, and multiple use; tax and economic appraisals.

212. Advanced Soil Chemistry. (3) I. Mr. Babcock
Prerequisite: course 110, 114; Chemistry 110A–110B, or Chemistry 109 and consent of instructor. Open to graduates and qualified seniors.
Applications of thermodynamics to soil systems.

213. Pedochemistry and Mineralogy of Soils. (4) II. Mr. Barshad
Two lectures and two three-hour laboratory periods per week.
Prerequisite: graduate standing in soil science or consent of instructor.
Chemical and mineralogical analyses for evaluating soil profile formation.

220. Soil Physics. (3) I. Mr. Day
Prerequisite: course 102, 102L; Mathematics 14A–14B; and consent of instructor.
An advanced course dealing with the dynamics of soil water and soil deformation theory, with applications to irrigation, drainage, and tillage.

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, including functional aspects of inorganic nutrients, photosynthesis, nitrogen metabolism.

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 student's major adviser.
Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

201A–201B. Research. (1–9; 1–9) Yr.
Prerequisite: graduate standing and consent of instructor. Research on problems of plant nutrition and plant physiology.

The Staff

206. Seminar in Plant Physiology. (1) I.
Mr. Aron (in charge), Mr. Babcock, Mr. Broyer, Mr. Cleland, Mr. Hackett, Mr. Jacobson, Mr. Machlis, Mr. Mackinney, Mr. Overstreet, Mr. Stone, Mr. Whatley
Prerequisite: qualified graduate students, with consent of staff member in charge. Problems of plant physiology in the fields of botany, food technology, forestry, plant nutrition and soil science.

The spring semester of this seminar is listed under Botany 206.

*280. Advanced Plant Nutrition. (2) I.
Prerequisite: Biochemistry 102; Botany 160B or course 117.
Recent advances in knowledge of mechanisms of plant growth; methods of research.

Staff Seminar in Plant Nutrition. (No credit) Yr.
The Staff (Mr. Aron in charge)

SOILS AND PLANT NUTRITION
(Given at Riverside)

Mr. Chapman, Mr. Erickson

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 Monguió, Licenciado en Derecho, Professor of Spanish.
José F. Montesinos, Licenciado en Filosofía y Letras, Professor of Spanish.
Edwin S. Morby, Ph.D., Professor of Spanish (Chairman of the Department).
^ Arturo Torres-Rioseco, Ph.D., Professor of Latin-American Literature.
Dorothy C. Shadi, Ph.D., Professor of Spanish.
Erasmo Buceta, Doctor en Derecho, Professor of Spanish, Emeritus.
S. Griswold Morley, Ph.D., Litt.D., Professor of Spanish, Emeritus.
Lesley B. Simpson, Ph.D., Professor of Spanish, Emeritus.

^ Not to be given, 1961–1962.
^ In residence spring semester only, 1961–1962.
Robert K. Spaulding, Ph.D., Professor of Spanish, Emeritus.
R. Fernando Alegria, Ph.D., Associate Professor of Spanish.
* G. Arnold Chapman, Ph.D., Associate Professor of Spanish.
Benjamin M. Woodbridge, Jr., Ph.D., Associate Professor of Portuguese.
Raúl A. Del Piero, Doctor en Filosofía y Letras, Ph.D., Assistant Professor of Spanish.
† Louis A. Murillo, Ph.D., Assistant Professor of Spanish.
John H. R. Polt, Ph.D., Assistant Professor of Spanish.
Juan V. Agudiez, Docteur ès Lettres, Instructor in Spanish.
Brenton K. Campbell, Ph.D., Instructor in Spanish.
George G. Wing, Ph.D., Instructor in Spanish.
Marian F. Place, M.A., Associate in Spanish.

Raul Silva-Castro, Profesor extraordinario de literatura chilena, Lecturer in Spanish.

Letters and Science List. All undergraduate courses are included in the Letters and Science List of Courses. For regulations governing this list, see page 95.

Departmental Major Advisers: Mr. Chapman, Mr. Polt, Mr. Kany, Mr. Alegria, Mr. Wing.

The Major. Courses 1, 2, and 3 or their equivalents; course 4C or 4L (unless course 3 is passed with a grade of A); course 25A–25B or 25; one year of high school Latin, or Latin 1A (to be completed before entering upon the senior year). Students who may wish to pursue work toward advanced degrees in Spanish should note that a broader foundation in Latin taken in the high school or as part of the undergraduate program is a prerequisite for such work. A minimum of one year of college Latin is therefore strongly recommended.

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.

Thirty units of upper division work in the department, including courses 107A–107B (6 units), 103A (3 units), and 104A–104B (6 units). The remaining units must be completed from among the upper division courses in Spanish and, with the consent of the adviser, may include up to three units of upper division courses in Portuguese. Recommended electives: further study in French, Italian, Latin, Portuguese; and History 160A–160B, 161A–161B, 165A–165B.

Honors Program. For the honors program consult one of the major advisers.

Higher Degrees. See the ANNOUNCEMENT OF THE GRADUATE DIVISION, NORTHERN SECTION.

Preparation for graduate reading examinations.
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.
Sections meet five hours per week. Mrs. Place in charge

2. Elementary Spanish (continuation of 1). (4) I and II. Mr. Wing in charge
Sections meet five hours per week. Prerequisite: course 1 or a satisfactory score on the placement test.

3. Intermediate Spanish (continuation of 2). (4) I and II.
Sections meet five hours per week. Prerequisite: course 2 or a satisfactory score on the placement test.

4. Intermediate Spanish. (4) I and II.
Mr. Alegria, Mr. Agudiez, Mr. Del Piero, Mr. Campbell
Prerequisite: course 3 or a satisfactory score on the placement test.
4C. Oral and Written Composition. (4) I and II.
4L. Introduction to Spanish Literature. (4) I and II.
A student will be allowed to receive credit for both 4C and 4L.

5. Oral Spanish. (2) I and II. Mr. Wing
Prerequisite: course 4C, 4L, 25A, 25B or 25, or a satisfactory score on the placement test.
Reading, discussion, and oral interpretation of modern Spanish and Spanish-American plays.

Mr. Morby (in charge), Mr. Malkiel, Mr. Murillo
Prerequisite: course 3 (with a grade of A) or course 4C or course 4L (the latter with a grade of A or B), or equivalent. Recommended: sophomore standing. Required of majors.

25. Advanced Spanish. (5) II. Mr. Morby
Prerequisite: same as for 25A.
Alternative course to 25A–25B, designed for students entering in midyear 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. Polt
39C. Spanish America: To the End of the Nineteenth Century. (2) I. Mr. Wing
39D. Spanish America: Modernism and the Contemporary Period. (2) II. Mr. Chapman

Spanish for Graduate Students. First Course. (No credit) I and II. Mr. Wing
(Formerly numbered 1G.)
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. Required of majors. Mr. Polt, Mr. Agudiez

103B. Study of a Prose Genre of the Nineteenth Century. (3) II. Mr. Polt

104A–104B. Spanish-American Literature. (3–3) Beginning each semester. Required of majors. Mr. Alegria, Mr. Monguió, Mr. Silva-Castro

105. Modern Peninsular Drama: From the Romantic Movement to the Present. (3) I. Mrs. Shadi

106. Spanish Literature of the Eighteenth Century. (3) II. Mr. Polt

107A–107B. History of Spanish Literature to 1680. (3–3) Yr. Mr. Morby, Mr. Montesinos

Prerequisite: senior standing in Spanish. Required of majors.

*108A–108B. Introduction to the Ballad. (2–2) Yr.

*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, Mr. Torres-Rioseco

111A–111B. Cervantes. (3–3) Yr. Mr. Montesinos

112A–112B. A Survey of Spanish Culture. (2–2) Yr. Mr. Monguió

113A*–113B. A Survey of Latin-American Culture. (2–2) Yr. Mr. Torres-Rioseco

114A–114B. The Contemporary Spanish-American Novel. (2–2) Yr. Prerequisite: course 104A–104B. Mr. Alegría

115. A Survey of Spanish Lyric Poetry. (3) II. Mrs. Shadi

116A–116B. Advanced Grammar and Composition. (3–3) Yr. Mr. Kany, Mr. Murillo, Mr. Polt

Required of candidates for the Certificate of Completion, teacher-training curriculum, whose major or minor is Spanish.

* Not to be given, 1961–1962.
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. Monguió 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 163.)

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. Monguió
Studies of a period, movement, or type of Spanish language poetry. When appropriate the study will include both Spanish and Spanish-American poetry.
I: Spanish-American Romanticism.
II: Spanish Romanticism.

203A–203B. Techniques of Literary Scholarship. (2–2) Yr. Mr. Silva-Castro

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. Alegria

*208A–208B. The Ballad. (2–2) Yr.

212A–212B. Old Spanish. (2–2) Yr. Mr. Malkiel
Required for candidates for the master’s degree.

*213A–213B. The Spanish Novel in the Nineteenth Century. (2–2) Yr. Mr. Montesinos

*214A–214B. Modernism in Hispano-America. (2–2) Yr. Mr. Torres-Rioseco

215A–215B. Moralists and Satirists of the Sixteenth and Seventeenth Centuries. (2–2) Yr. Mr. Montesinos

216. Spanish Versification. (1) II. Mrs. Shadi

* Not to be given, 1961–1962.
*226. Critical and Stylistic Studies of a Single Author or Genre. (2) II. The Staff

228A–228B. The Literature of a Single Spanish-American Country. (2–2) Yr.
Topic for 1961–1962: The Literature of Chile. Mr. Silva-Castro

299. Special Advanced Study. (1–4) I and II. Mr. Monguíó 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. Mr. Woodbridge
Sections meet five hours per week.

2. Elementary Portuguese. (4) II. Mr. Woodbridge
Sections meet five hours per week. Prerequisite: course 1 or equivalent.

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 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. Mr. Woodbridge
Restricted to senior honor students.

**Graduate Courses**

201. The Brazilian Novel. (2) II. Mr. Woodbridge

299. Special Advanced Study. (1–4) I and II. Mr. Woodbridge
Restricted to candidates for higher degrees.

* Not to be given, 1961–1962.
### SPEECH

(Staff Office, 3125 Dwinelle Hall)

Woodrow Borah, Ph.D., Professor of Speech.
Leo Lowenthal, Ph.D., Professor of Speech and Professor of Sociology.
Gerald E. Marsh, M.A., Professor of Speech.
* Jacobus ten Broek, S.J.D., Litt.D., Professor of Speech.
1 Garff B. Wilson, Ph.D., Professor of Speech and Professor of Dramatic Art.
Edward Z. Rowell, Ph.D., Associate Professor of Speech, Emeritus.
1 Ethel M. Albert, Ph.D., Associate Professor of Speech.
Edward N. Barnhart, Ph.D., Associate Professor of Speech and Lecturer in Psychology.
Robert L. Beloof, Ph.D., Associate Professor of Speech (Vice-Chairman of the Department).
Don Geiger, Ph.D., Associate Professor of Speech (Chairman of the Department).
1 Richard Hagopian, M.F.A., Associate Professor of Speech.
Anthony Ostroff, M.S., Associate Professor of Speech.
Arnold Perstein, Ph.M., Associate Professor of Speech.
William F. Shepard, Ph.D., Associate Professor of Speech.
Christian Bay, Ph.D., Assistant Professor of Speech.
Seymour B. Chatman, Ph.D., Assistant Professor of Speech.
Susan M. Ervin, Ph.D., Assistant Professor of Speech.
Leonard E. Nathan, Ph.D., Assistant Professor of Speech.
Robert L. Oswalt, Ph.D., Assistant Professor of Speech.
Jesse O. Sawyer, Jr., Ph.D., Assistant Professor of Speech and Director, Language Laboratory.
Laura Kent, M.A., Instructor in Speech.
Mark Klyn, M.A., Instructor in Speech.
Elizabeth F. Russell, Ph.D., Associate in Speech.
Fred S. Stripp, Th.D., Associate in Speech.
Ward E. Tabler, A.B., Associate in Speech.

1  Albert Bendich, LL.B., Lecturer in Speech.
William J. Brandt, Ph.D., Visiting Assistant Professor of Speech.
Judith B. Davis, Ph.D., Lecturer in Speech.
Magoroh Maruyama, Ph.D., Lecturer in Speech.
Floyd Matson, Ph.D., Lecturer in Speech.
Peter D. Scott, Ph.D., Lecturer in Speech.
Shirley K. Silver, A.B., Lecturer in Speech.

* Students must have passed Subject A before taking any course in speech.
The central concern of the Department of Speech is the study of dis-

1 In residence fall semester only, 1961–1962.
course—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 95.

*Departmental Major Advisers:* Mr. Beloof, Mr. Bendich, Mr. Borah, Mr. Matson, Mr. Nathan.

*The Major.* Speech 1A–1B and 2A–2B or their equivalent.

Departmental upper division courses are classified into five categories as follows:


The major shall include 24 units of upper division courses: 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.

*Honors Program.* Students enrolled in the honors program may depart from the above scheme to the extent permitted by the chairman of the honors program.

*Lower Division Courses*

1A–1B. First-Year Reading, Writing and Speaking. (3–3) Yr.

Beginning each semester.

The Staff

Prerequisite: a passing grade in Subject A. In each semester there are sections of 1A and 1B intended primarily for prelegal students.

Written and oral composition, based upon readings and discussions of major works of literature, philosophy, and science.


Beginning each semester.

Mr. Beloof, Mr. Hagopian, Miss Kent, Mr. Klyn, Mr. Nathan, Mr. Ostroff, Mr. Wilson

Oral reading of prose and poetry; practice in speaking and reading with training in the principles of effective delivery.
10A–10B. The Logic of Argument. (3–3) Yr. Beginning each semester. 
Mr. Maruyama

10A. Principles of argument, with emphasis on the problems of meaning, inference, and evidence.
10B. Construction and criticism of arguments, chiefly social issues.

12. Psychology of Argument. (3) II. 
Mr. Barnhart
The function of communication in inducing belief and directing behavior; techniques of 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. Oswalt, Mrs. Silver
Required of foreign students whose grades on the diagnostic examination indicate need for training in basic English for University work.

Miss Ervin, Mr. Oswalt, Mrs. Silver
Required of foreign students whose grades on the diagnostic examination indicate need for further instruction in English for University work.

40. Advanced Oral English for Foreign Students. (3) I and II. 
Mrs. Russell, Mrs. Silver
Elective course for foreign students with advanced ability in English.

45. Public Speaking. (3) I and II. 
Mr. Marsh, Mr. Perstein, Mr. Stripp
Designed for sophomores, but open to students in the upper division.
Intensive work in the essentials of public speaking and the forms of public address; platform theory and practice; principles of oral style.

Upper Division Courses

103. General Phonetics. (3) II. 
Mr. Sawyer
Physical, anatomical, and physiological factors in speech; classical articulatory phonetic theory; modern acoustic phonetics.

106. Oral Reading of Poetry and Prose. (3) I and II. 
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.
Poetry and prose from the point of view of oral interpretation; principles of effective oral reading of literature; practice in platform reading.

Mr. Bendich, Mr. Borah
Beginning each semester.
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. Of special value to those intending to teach speech.

   Mr. Beloof, Mr. Hagopian, Mr. Nathan, Mr. Ostroff, Mr. Wilson
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 and II.

   Mr. Beloof, Mr. Hagopian, Mr. Ostroff, Mr. Wilson
Prerequisite: course 2A–2B.
Oral interpretation of poetic and prose drama.

*117A–117B. Semantics. (3–3) Yr.
Prerequisite: junior standing.
Nature and functions of language, with special emphasis on the problems of meaning.

118. Symbolism: Expressive Functioning of Signs. (3) II. Mr. Beloof
The functions of language in literature, especially poetry; the literary symbol; the nature and function of figures of speech.

119. Analysis of Communication Content. (3) I. Mr. Barnhart
Research techniques in communication, with special emphasis on content analysis and audience response; supervised individual and group research.

121A–121B. Speech and Society. (3–3) Yr. Mr. Lowenthal
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; the reciprocal influence of social institutions and speech.

123. Freedom of Speech. (3) II. Mr. Bendich
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

136. Latin-American Spokesmen. (3) I. Mr. Borah
Critical analysis of outstanding speeches, in translation, with special attention to major movements, controversies, issues, and problems.

*137. American Public Address during the Eighteenth and Nineteenth Centuries. (3) I. Mr. Matson

*138. Modern Public Address. (3) II.
Critical analysis of speeches of Wilson, Roosevelt, Churchill, and other leaders from 1914 to the present time.

139. Modern Spokesmen. (3) I. Mr. Bay
Writings and speeches of leading spokesmen for major contemporary movements—political, social, and religious problems of ideology and ideological conflict, objectivity and evaluation, and the rationalization of conflict.

* Not to be given, 1961–1962.
SPEECH; STATISTICS / 559

141A–141B. Classical Rhetoric. (3–3) Yr.  Mr. Brandt
(Formerly numbered 132A–132B.)
Works of Isocrates, Plato, Aristotle, Cicero, Quintilian, and other classics of antiquity,
on criticism, aesthetic theory, and speech.

144A–144B. Medieval and Renaissance Rhetoric. (3–3) Yr.  Mr. Brandt
Rhetorical theory and practice 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.  Mr. Matson
Rhetorical theory and practice in the period of the Enlightenment and the beginnings
of the Industrial Revolution.

147. Modern Rhetoric. (3) I.  Mr. Matson
(Formerly numbered 133.)
Contemporary rhetorical theory, with analysis of selected literature.

149. Comparative Discourse. (3) I.  Mrs. Albert
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.  Mr. Stripp
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 instructor and may not receive more than
8 units of credit in any combination of the two courses.

160A–160B. Meaning and Communication. (3–3) Yr.  Mrs. Albert
Theories of meaning, with special attention to spoken communication; communication
and information theory; verbal and nonverbal components of the communication situa-
tion; misunderstanding as a special problem in communication.

162A–162B. Theory of Interpretation. (3–3) Yr.  Miss Ervin
162A. Interpretation of scientific and descriptive texts.
162B. Interpretation of literary texts, especially as they concern the oral interpreter.

H195A–H195B. Honors Course. (3–3) Yr.  Mr. Lowenthal (in charge)
Prerequisite: speech majors, senior standing, and on the honors list.
A special program extending through the senior year. 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. Geiger in charge)

199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. Geiger in charge)

STATISTICS

(Department Office, 501 Campbell Hall)
Edward W. Barankin, Ph.D., Professor of Statistics.
*David Blackwell, Ph.D., Professor of Statistics.
Joseph L. Hodges, Jr., Ph.D., Professor of Statistics.
George M. Kuznets, Ph.D., Professor of Agricultural Economics, of Statistics,
and of Economics.
Lucien LeCam, Ph.D., Professor of Statistics (Chairman of the Department).

Erich L. Lehmann, Ph.D., Professor of Statistics.
Michel Loève, Docteur ès Sciences, Professor of Statistics and of Mathematics.
Jerzy Neyman, Ph.D., D.Sc.(Hon.), Professor of Statistics and Director of
the Statistical Laboratory.
*Roy Radner, Ph.D., Professor of Economics and of Statistics.
Henry Scheffé, Ph.D., Professor of Statistics.
Evelyn A. Fix, Ph.D., Associate Professor of Statistics.
Elizabeth L. Scott, Ph.D., Associate Professor of Statistics.
Aram J. Thomasian, Ph.D., Associate Professor of Statistics and of Electrical
Engineering.
*Robert F. Cogburn, Ph.D., Assistant Professor of Statistics.
Lester E. Dubins, Ph.D., Assistant Professor of Statistics and of Mathematics.
Lawrence A. Shepp, Ph.D., Instructor in Statistics.

Florence N. David, D.Sc., Ph.D., Visiting Professor of Statistics.
David A. Freedman, Ph.D., Lecturer in Statistics.
Jerome H. Klotz, Ph.D., Visiting Assistant Professor of Statistics.
Robert M. Oliver, D.Sc., Lecturer in Industrial Engineering.
William F. Taylor, Ph.D., Associate Professor of Public Health.

Letters and Science List. All undergraduate courses in statistics except
courses 142A, 142B, 142C, 142D, 144 are included in the Letters and Science
List of Courses. For regulations governing this list, see page 95.

Departmental Major Adviser: Mr. Lehmann.

The Major. Before undertaking the upper division program in statistics
the student should acquire a thorough knowledge of elementary calculus and
algebra with an emphasis on the conceptual side of the material offered.

In addition to Mathematics 1A–1B and 2A–2B (or preferably the corre­
sponding honor courses) the student may consider taking Mathematics 11.
Statistics 12 is an excellent preparation for the upper division program in
statistics.

In the 24-unit upper division program, the student should acquire sub­
stantial knowledge of statistics and probability combined with a background
in the theory of functions of real and complex variables. To this end the pro­
gram must include Statistics 112, 113 and 120A and Mathematics 111 or 113B.
In addition the student must select at least one course from Mathematics 104,
105, 122, 125A, 125B, 135A, 135B, 185 and at least one course from Statistics
120B, 132, 134, 152, 155, 166, 168, 169. It is recommended that Statistics
112, 113, 120A–120B be combined with the corresponding laboratory courses.
The remaining courses for the major must be selected in consultation with the
major adviser.

The undergraduate courses are divided into two basic cycles. One cycle,
emphasizing theory, includes courses 12, 112, 113, 120A–120B, 120C–120D (or 202A–B–C–D) and leads to courses 255 and 260. The other cycle, emphasizing applications, is based on courses 130A–B–C–D and leads to 261, 280, and 281. Courses 1 and 2 do not belong to the basic cycles. Course 1 is a purely general education course. Course 2 is intended as a prerequisite to application 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 an individual major in statistics combined with an empirical science. This major will include courses 130A–130B, 130C–130D, and 132.

Honors Program. Students with a major in statistics may qualify as candidates for honors with the A.B. degree on completion of Statistics H195.

Higher Degrees. See the Announcement of the Graduate Division, Northern Section.

Lower Division Courses

1. Introduction to Probability and Statistics. (3) I and II.
   Miss Fix, Mr. Lehmann

2. Introduction to Statistical Methods. (3) I and II.
   Miss David, Mr. Klotz, Mr. Scheffé

12. Elements of Probability and Statistics. (3) I and II. Miss Scott, Miss Fix
   Prerequisite: Mathematics course 1A or 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 and II.
   Mr. Shepp, ———
   Prerequisite: Mathematics 2A–2B. 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 and II.
   May be taken only in conjunction with 112. Mr. Shepp, ——— in charge
   Illustrative examples in probability theory and applications in various fields.
113. Introduction to Theory of Statistics. (3) I and II. Mr. Freedman
Prerequisite: course 112 or 134. It is recommended that 113L be taken concurrently.

113L. Laboratory Course in Introduction to Theory of Statistics. (1) I and II.
May be taken in conjunction with 113. Mr. Freedman in charge
Illustrative examples in statistics and applications to various fields.

120A–120B. Theory of Statistics. (3–3) Yr. Mr. Hodges
Prerequisite: course 113 and Mathematics 111 or 113B. Also Mathematics 122 or 104 (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. Hodges in charge
May be taken only 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; prerequisite for 130B: 130A and Mathematics 1A 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.
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. Mr. Klotz
Lectures and laboratory. Prerequisite: Mathematics 2A–2B or consent of instructor.
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. Kuznets, Mr. Scheffé
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.
Mr. Kuznets, Mr. Scheffé in charge
Prerequisite: may be taken only concurrently with course 131.

132. Descriptive Statistics. (3) II. Miss Scott
Lectures and laboratory. Prerequisite: course 12 or 112 or 130A; and Mathematics 2A–2B, or grade of at least B in Mathematics 1A–1B or 16A–16B.
134. Methods of Probability Theory. (3) I.  Mr. Thomasian, Mr. Dubins
Prerequisite: Mathematics 14A–14B or consent of instructor.
A systematic development of the concepts and facts of probability theory needed for the technical treatment of engineering and operations research problems. Laws of large numbers, Markov chains, characteristic functions, central limit theorem, continuous time stochastic processes.

135. Methods of Statistics. (3) II.  Mr. Dubins
Prerequisite: course 134 or equivalent.
Presents the principal inference methods used in engineering and operations research. Sampling distributions. Estimation and hypothesis testing. Regression and linear hypotheses. Experimental designs and analysis of variance. Sequential and nonparametric methods briefly treated.

*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.

*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 1A, or course 130A.

152. Elementary Stochastic Processes. (3) I and II.  Mr. Freedman, Mr. Barankin
Random walks, branching processes, recurrent events, Markov chains, birth and death processes.

155. Introduction to Continuous Probability. (3) II.  Mr. Shepp
Prerequisite: course 112 and Mathematics 104.

166. Sampling Surveys. (3) I.  Miss Fix
Prerequisite: course 12 or 112 or 130A or consent of instructor. Recommended: course 113.

168. Linear Programming and Game Theory. (3) II.
Prerequisite: Mathematics 1A (may be taken concurrently), Mathematics 11 or consent of instructor. It is recommended that 168L be taken concurrently.

168L. Linear Programming and Game Theory Laboratory. (1) II.  May be taken only in conjunction with course 168.

169. Dynamic Programming. (3) I.  Mr. Oliver
Prerequisite: course 112, Mathematics 104.

* Not to be given, 1961–1962.
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. LeCam in charge

Investigation of special problems under the direction of members of the department.

Numerical Analysis. (Mathematics 128A.) (3) I and II.

Mr. Lehman, Mr. Bremermann

Numerical Analysis (Mathematics 128B.) (3) II.

**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.


Mr. Shepp, Mr. Neyman

Prerequisite: 12 units of upper division mathematics. An advanced treatment of the material covered in courses 112, 113, 120A–120B, designed as a unique statistical prerequisite for course 260A–260B. It is recommended that course 202C–202D be taken concurrently.


(1–1) Yr. Mr. Shepp, Mr. Neyman 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) I.

Mr. Barankin

Prerequisite: course 134 or 152 or 155, recommended 255A.


Mr. Barankin

Prerequisite: Mathematics 105 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 105 and 185. May be taken only concurrently with 255A–255B.
256. Nonparametric Inference. (3–3) II.
Prerequisite: course 260A.

258. Theory of Statistical Decision Functions. (3) II. Mr. LeCam
Prerequisite: course 260A–260B.
Theory of statistical decision functions as a generalization of theories of tests and of estimation. Decision problems viewed as two-person zero sum games. Determinateness, Bayes solutions. Characterization of complete families and minimax procedures. Applications to specific decision problems.

259. Probability Models of Natural Phenomena. (3) I. Mr. Neyman
Prerequisite: course 260A–260B or 280A–280B.

260A–260B. Advanced Topics in Statistics. (3–3) Yr. Mr. Lehmann
Prerequisite: course 120A–120B, Mathematics 111 (or 113B), 105 and 185. Mathematics 201A–201B will be accepted in replacement of 105 and 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. Lehmann in charge
May be taken only concurrently with course 260A–260B. 260C is not prerequisite to 260D.

261. Statistical Problems in Experimentation. (3) II. Miss Fix
Lectures and laboratory. Prerequisite: some familiarity with analysis of variance and consent of instructor.

*262. Information Theory. (3) II.
Prerequisite: course 255A–255B.

*263. Statistical Studies of Risks. (3) I.
Prerequisite: course 130A–130B or 113.

*264. Advanced Statistical Inference for Engineers. (3) I.
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
Prerequisite: course 255A–255B or consent of the instructor.
Recent developments in the theory of probability: Random functions and processes; martingales, decomposable processes, Markov processes.

* Not to be given, 1961–1962.
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 $\chi^2$ test. Likelihood ratio and related tests.

Mr. Lehmann, Mr. LeCam
Prerequisite: courses 255A and 260A.
Recent developments in the theories of hypothesis testing, estimation, and multiple decisions.

280A. Advanced Statistical Inference. (3) I.  
Mr. SchefTé
Prerequisite: Mathematics 11 or equivalent knowledge of matrix algebra, and 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. SchefTé, Miss Scott in charge
May be taken only 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.

290. Seminar. (2–6) I and II.  
The Staff

295S. Individual Research Leading to Higher Degrees. (2–6) I and II.  
The Staff

The Statistical Laboratory

When founded in 1939, the Statistical Laboratory was a unit of the Mathematics Department and combined research with an extensive instruction program in mathematical statistics. This instruction program led to B.A., M.A., and Ph.D. degrees in statistics. In 1955, the instruction activities in statistics were taken over by the newly established Department of Statistics. Since that time the Laboratory has been functioning as a research unit.

Research activity of the Statistical Laboratory includes work on the theory of statistics and its various applications: to astronomy (cosmology), to biology (population dynamics, competition of species), to communication theory, to problems of health (theory of diagnostic tests, bio-assay, apparent associations between diseases, carcinogenesis), to experimentation, to meteorology (experiments on weather control), etc.
Some of the above research is conducted in cooperation with other units of the University and with individuals and institutions outside the University. For example, work on astronomy is conducted in cooperation with astronomers at Lick Observatory.

Essentially, every faculty member of the Department of Statistics can use the facilities of the Statistical Laboratory. Its paid personnel consists of a substantial number of research assistants and secretarial help, mostly paid from project funds.

SUBJECT A: ENGLISH COMPOSITION

(Subject A Office, 216 Dwinelle Hall Annex)

Committee in charge:
Hilton J. Landry, Ph.D., Assistant Professor of English, Davis.
James J. Lynch, Ph.D., Professor of English.
Benbow F. Ritchie, Ph.D., Associate Professor of Psychology.

Helen R. DiBona, M.A., Supervisor of Subject A.

Subject A. (No credit) I and II.

Three hours weekly. Required of all students who do not pass the examination in Subject A. Fee, $35. For regulations governing this requirement see page 51.

Training in the principles of composition, sentence structure, grammar, punctuation, and spelling. Weekly compositions and frequent exercises. 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.
Harry Rubin, D.V.M., Professor of Virology.
Howard K. Schachman, Ph.D., Professor of Virology and of Biochemistry.
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 (Vice Chairman of the Department).
Robley C. Williams, Ph.D., Professor of Virology and Associate Director of the Virus Laboratory.

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 95.

Upper Division Courses

100A-100B. General Virology. (3–3) Yr.

Mr. Fraenkel-Conrat, Mr. Rubin, Mr. Stent, Mr. Williams

Prerequisite: Biology 11A-11B, or Zoology 1A, or Botany 1, or Bacteriology 1 or 2; Biochemistry 102 or 100A (may be taken concurrently); one year each of college mathematics and physics.

100A. Dynamics of growth, genetics, radiobiology, neutralization, and interference of animal, bacterial, and plant viruses. Mr. Stent, Mr. Rubin

100B. Chemical nature, structure, and function of viruses, and of their nucleic acid and protein components. Mr. Fraenkel-Conrat, Mr. Williams

177. A Survey of General Virology. (3) I.

Mr. Williams

Prerequisite: Biochemistry 100A or 102, or consent of instructor. Not open for credit to students who have credit in course 100A–100B.

199. Special Study for Advanced Undergraduates. (1–2) I and II.

Reading and conference under the direction of a staff member.

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 163.)

201. General Virology Laboratory. (3) II.

Mr. Stanley

Prerequisite: course 100A–100B, the latter may be taken concurrently.

Experimental techniques used in research on animal, bacterial, and plant viruses.

280. Research. (1–9) I and II.

The Staff (Mr. Williams in charge)

290. Seminar. (1) I and II.

The Staff (Mr. Rubin in charge)

Advanced study in the various fields of virology.

299. Special Study for Graduate Students. (1–3) I and II.

Reading and conference under the direction of a staff member.

ZOOLOGY

(Department Office, 4079 Life Sciences Building)

William Balamuth, Ph.D., Professor of Zoology.
William E. Berg, Ph.D., Professor of Zoology.
†Howard A. Bern, 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, Museum of Vertebrate Zoology.
*Ralph I. Smith, Ph.D., Professor of Zoology.
Robert C. Stebbins, Ph.D., Professor of Zoology and Curator in Herpetology, Museum of Vertebrate Zoology.
†Curt Stern, Ph.D., D.Sc., Professor of Zoology.
Samuel J. Holmes, Ph.D., LL.D., D.Sc., Professor of Zoology, Emeritus.
Max Alfert, Ph.D., Associate Professor of Zoology.
Seth B. Benson, Ph.D., Associate Professor of Zoology and Curator of Mammals, Museum of Vertebrate Zoology.
Cadet Hand, Ph.D., Associate Professor of Zoology (Vice-Chairman of the Department).
Peter Marler, Ph.D., Associate Professor of Zoology.
Wilbur B. Quay, 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.
Richard C. Strohman, Ph.D., Assistant Professor of Zoology.
Donald M. Wilson, Ph.D., Assistant Professor of Zoology.
Satyabrata Nandi, Ph.D., Acting Assistant Professor of Zoology.


Letters and Science List. All undergraduate courses in zoology except courses 109, 116, 119A–119B, 120, 145 and 146 are included in the Letters and Science List of Courses. For regulations governing this list, see page 95.

Departmental Major Advisers: Mr. Berg, Mr. Alfert, Mr. Quay, Mr. Marler, Mr. Lidicker, Mr. Strohman.

The Major. Required: (1) Courses 1A, 1B, Botany 1 or 10 or equivalent, Chemistry 1A and 8, Physics 2A–2B, 3A–3B. Recommended: German, French, Chemistry 1B, and elementary courses in other biological sciences. (2) 24 units of upper division courses in zoology, including the following: (a) 100
or 106, (b) 101, (c) 108 or 113, (d) 114 or 115, (e) two additional upper division laboratory courses. 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. (3) Seniors with a B average or better in zoology are encouraged to avail themselves of the opportunity of course 199 work and of the proseeinari, course 198.

Honors Program. Students with a major in zoology may qualify as candidates for honors with the A.B. degree on completion of Zoology 198 (Proseminar) and Zoology H196 (Thesis course).

GENERAL BIOLOGY

Biology 11A–11B. Introduction to the Science of Living Organisms. (3–3) Yr. Mr. Strohman, Mr. Emerson

Lectures and laboratory. For 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.

Biology 150. General Ecology. (3) I. Mr. Pitelka, Mr. Baker

Prerequisite: Biology 11A–11B; or an introductory course in each of botany and zoology.

An introduction to the principles of ecology, stressing the structure and dynamics of natural communities on both regional and local bases, and the historical and contemporary influences of man.

ZOOOLOGY

Lower Division Courses

1A. General Zoology. (4) I and II. Mr. Alfert, Mr. Hand, Mr. Harris

I: Mr. Hand, Mr. Harris; II: Mr. Alfert.

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. Introduction to Vertebrate Zoology. (4) II. Mr. Nandi, Mr. Rogers, Mr. Baker

Lectures and laboratory. Prerequisite: course 1A or Biology 11A–11B.

10. Animal Biology. (3) I and II. Mr. Sonleitner, Mr. Wilson, Mr. Eakin

I: Mr. Sonleitner, Mr. Wilson; II: Mr. Eakin.

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.
100. Vertebrate Embryology. (4) I.  
Lectures and laboratory. Prerequisite: course 1B.  
Mr. Rogers

101. Introduction to Physicochemical Biology. (3) I.  
Prerequisite: an introductory course in zoology, botany, or bacteriology, with 4 additional units in biological sciences; organic chemistry; general physics. Graduate students may be admitted by consent of instructor with less complete preparation.  
The living cell as an integrated molecular system; its structural organization, growth, reproduction and work output.

102. Laboratory in Physicochemical Biology. (3) II.  
Laboratory with lecture or conference. Prerequisite: course 101 and consent of instructor.  
Experimental approaches to problems of cell structure and function. Isolation, handling, and assay of some biological molecules.

103. Experimental Embryology. (2) II.  
Prerequisite: course 100.  
Mr. Berg

103C. Experimental Embryology Laboratory. (2) II.  
Prerequisite: course 103 (may be taken concurrently). Enrollment limited to ten students.  
Experimental embryology of sea urchin and amphibian embryos.

104. Animal Behavior. (3) I.  
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) II.  
Prerequisite: course 104 and consent of instructor.  
Limited to ten students.

*105. Growth and Form. (2) II.  
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.

106. Comparative Anatomy of the Vertebrates. (4) II.  
Lectures and laboratory. Prerequisite: course 1B or equivalent.  
Mr. Quay

107. Cytology. (2) I.  
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.  
Prerequisite: course 107 (may be taken concurrently). Recommended: course 117, working knowledge of microtechnique.

108. Invertebrate Zoology. (4) II.  
Lectures, laboratory, and field trips. Prerequisite: course 1A or Biology 11A–11B.  
Mr. Hand

109. Zoological and Histochemical Microtechnique. (3) I.  
Lecture and laboratory. Prerequisite: upper division or graduate standing in a biological science.  
Mr. Quay

* Not to be given, 1961–1962.
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.
Comparative aspects of morphology, physiology, and natural habitats. Emphasis in the
laboratory upon experimental treatment, 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.
General principles of parasitology, based upon protozoa, helminths, and other invertebrates, excepting higher arthropods. Emphasis upon life histories and host-parasite inter-
actions, 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.

113. Natural History of the Vertebrates. (4) II.
Mr. Stebbins, Mr. Benson, ——
Lectures, field trips, and laboratory. Prerequisite: course 1B.
Vertebrates, exclusive of fishes.

*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.

*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.
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; identification, distribution, and life histories of important species.

117. Comparative Histology. (4) I. Mr. Quay
Lectures and laboratory. Prerequisite: course 1B or equivalent. Recommended: a
course in comparative or mammalian gross anatomy.

118. Comparative Endocrinology. (3) II. 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) II. Mr. Bern
Prerequisite: course 118 (may be taken concurrently). Enrollment limited to ten
students.
Laboratory exercises and demonstrations illustrating hormonal mechanisms.

* Not to be given, 1961–1962.
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.

119B. The theory and advanced techniques 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 instructor.

123. Physiological Embryology. (2) I. Mr. Berg

Prerequisite: course 100. Recommended: course 103.

Reading of research literature and term paper required.

124. Invertebrate Physiology. (4) II. Mr. Wilson

Lectures, laboratory, and individual reports. Prerequisite: course 108 or a course of comparable level in physiology or entomology. Enrollment limited.

Comparative physiology of the invertebrates, with individual problems on nutrition, respiration, excretion, coordination, and other functions.

125. Animal Ecology. (2) II. Mr. Pitelka

Prerequisite: two semesters of upper division work in biology, or graduate status in a related field.

Structure and dynamics of natural populations of animals; community relations, stressing terrestrial habitats.

*125C. Field Ecology. (2) II. Mr. Pitelka

Prerequisite: course 108 or 113 or 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.

126. Animal Evolution. (2) II. Mr. Miller

Prerequisite: course 1B. Recommended: Course work in taxonomy and elementary genetics.

128. Vertebrate Reproduction. (3) II. Mr. Lidicker

Lectures and laboratory. Prerequisite: course 100 or 106.

Reproductive biology of vertebrate animals, with a consideration of the factors influencing reproduction in natural populations.

135. Systematic Mammalogy. (2) I. Mr. Benson

Lectures and laboratory. Prerequisite: course 106 and 113.

136. Advanced Ornithology. (2) I. Mr. Miller

Lectures and laboratory. Prerequisite: course 113. Enrollment limited to ten students.

Classification, anatomy and function in birds.

137. Herpetology. (2) II. Mr. Stebbins

Lectures and laboratory. Prerequisite: course 113.

Advanced study of amphibians and reptiles.

138. Ichthyology. (4) II. Mr. Needham

Lectures and laboratory. Prerequisite: course 1B and two semesters of upper division work in zoology. Recommended: course 106 and 116.

145. Wildlife Populations. (3) II.

Prerequisite: course 116 or 125 or equivalent.

Dynamics of game birds and mammal populations; mechanisms regulating natality, mortality, and population density; research techniques.

* Not to be given, 1961–1962.
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*146. Field Course in Wildlife and Fisheries. (4) Mr. Needham, Mr. Leopold

Lectures, laboratory and field work. Given in Summer Session I at Sagehen Creek Experiment Station, California. Prerequisite: course 1B or equivalent and consent of instructor.

*151. Comparative Population Ecology. (2) I. Mr. Pitelka

Prerequisite: an upper division course in animal ecology (course 125 or 145, Biology 150, or Entomology 127 or an equivalent), or graduate status.

A comparative review of population and life cycle characteristics; types of population organization evolved among higher animals, especially vertebrates.

H196. Thesis Course. (2) II. Mr. DeOme

Prerequisite: restricted to candidates for honors with the A.B. degree.

Preparation of a thesis, to be chosen from a list of broad topics provided by the staff member in charge, who will also consult with students during the semester.

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 staff member.

198. Proseminar in Zoology. (1) I. Mr. Berg

Prerequisite: upper division standing with at least a B average in upper division courses in zoology.

Reporting and group discussion on selected topics. Although organized by designated faculty member, others will participate.

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: course 101 and 102 or consent of instructor. Seminar discussion of recent literature.

202. Chordate Neurology. (2) I. Mr. Quay

Lectures, demonstrations and discussions. The organization and regulatory mechanisms of chordate nervous systems.

204. Seminar in Animal Behavior. (2) II. Mr. Marler

Prerequisite: course 104 or Psychology 150A and consent of instructor. Relationships of animal behavior to ecology, physiology, and evolution.

207. Seminar in Cytology. (1-2) I. Mr. Alfert

Prerequisite: course 107.

Critical discussion of basic problems and recent literature in descriptive cytology and cytchemistry.

* Not to be given, 1961–1962.
208. Seminar in Invertebrate Zoology. (2) II.  
Topics will vary from year to year.  
Mr. Hand

209. Seminar on the Biology of Tumors. (1) I.  
Recommended: course 117 and 217.  
Mr. DeOme, Mr. Nandi

*212. Advanced Marine Invertebrate Natural History. (4)  
Given at the seashore in Summer Session I. Prerequisite: course 108 or 112.  
Mr. Hand, Mr. Smith

*213. Advanced Invertebrate Zoology. (4) II.  
Lectures and laboratory. Prerequisite: course 108 or 112.  
The biology of major invertebrate groups.  
Mr. Hand, Mr. Smith

*217. Comparative Histopathology. (3) II.  
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.  
Mr. DeOme

*218. Seminar in Comparative Endocrinology. (1) I.  
Prerequisite: course 118 or equivalent.  
Topic changes from year to year.  
Mr. Bern

Review of special topics, with emphasis on current literature.  
Mr. Pitelka

220. Seminar on Speciation in Vertebrates. (2) I.  
Prerequisite: course 113.  
Problems of speciation and isolating mechanisms in vertebrates.  
Mr. Benson

*221. Seminar in Optics and Metrology. (2) II.  
Prerequisite: course 119A and 119B.  
Recent advances in instrumentation in biological research fields.  
Mr. Gullberg

*222. Seminar in Wildlife Ecology and Population Dynamics. (1) II.  
Mr. Leopold

223. Seminar in Fisheries Management. (2) I.  
Prerequisite: course 116 and 138.  
Analysis of fish population problems, including review of recent research.  
Mr. Needham

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

243. Vertebrate Review. (1) II.  
Review of current literature on ecology and evolution of higher vertebrates.  
Mr. Benson

* Not to be given, 1961–1962.
*244. Genetics Review. (1–2) I and II.  
Prerequisite: one course in genetics.  
Review of current literature and of special topics.  
Mr. Stern

*245. Seminar in Advanced Genetics. (2) II.  
Prerequisite: one course in genetics.  
Topics will vary from year to year.  
Mr. Stern

299. Special Study for Graduate Students. (1–4) I and II.  
Reading or other advanced study by arrangement with a staff member.  
The Staff (Mr. Harris in charge)

Zoology Seminar. (No credit) I and II.  
Meetings for the presentation of original work by the faculty, visiting lecturers, and graduate students.  
The Staff

Cancer Research Genetics Laboratory

The Cancer Research Genetics Laboratory was established in 1950 within the Department of Zoology. The laboratory carries on a research, teaching, and service program designed to foster faculty and graduate student participation in cancer research. The research program is designed to investigate the factors involved in the neoplastic change, and is carried out by the laboratory staff and in cooperation with other faculty members. The laboratory staff participates directly in the regular teaching program of the Department of Zoology. In addition, the laboratory houses, supports, and supervises several graduate students.

Sagehen Creek Wildlife and Fisheries Station

Located at an elevation of 6,500 feet, 12 miles north of Truckee, California, on Sagehen Creek, this station was developed primarily for year-round, basic field research on fish and game problems by both faculty members and graduate students. The main problems under attack are concerned with cycles in game animals, birds, and fishes, with special effort being directed toward the study of the causes of winter mortality in fishes. The work is supported in part by grants (Max C. Fleischmann Foundation), by the California Department of Fish and Game, and by regular appropriations in the University budget.

* Not to be given, 1961–1962.
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PURPOSES OF A UNIVERSITY...

...to serve the whole society...

* The dynamics of progress have changed the university from a tiny band of scholars situated on the periphery of society to a large group of teachers and investigators operating at an intersection crossed by nearly all the paths of human activity: from a debating forum to a research laboratory; from an isolated retreat restricted to the contemplation of history, philosophy, the classics, and the arts to a vast intellectual enterprise devoted also to the social, physical, and biological sciences. Some professors have transferred their investigations from the library into the factory and onto the farm. Today the university is much more an integral part of society than ever before.

CLARK KERR
President of the University

* This is one of a series of statements explaining the rôle of the University of California.