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; 104, Essentials of Human Anatomy.

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, Fossil Man; 153, Living Races of Man.


Bacteriology: 105, The Biology of Infectious Disease.

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, 1962–1963.
COURSES FOR UPPER DIVISION STUDENTS


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; 120A–120B, Medieval Literature; 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; 141, Modes of Writing (Exposition, Fiction, Verse, etc.); 149, The English Lyric; 152, Chaucer; 155, The Age of Chaucer; 155A–155B, The English Renaissance; 160, British Literature from 1900 to the Present; 161, Recent British and American Poetry; 166, The Augustan Age.

* Not to be given, 1962–1963.
**Range Management:** 101, Introduction to Range Management.

**Scandinavian:** 100A*–100B–100C, History of Scandinavian Literature (*100A, From 1300 to 1850; 100B, From 1850 to World War I; *100C, From World War I to the Present); 106, History of Scandinavian Drama 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, The Reformation and Counter-Reformation in Polish Literature; 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; 182A–182B, Survey of Polish Cultural History; 185, Survey of Hungarian Culture; 188, The Slavic-Speaking World.


**Sociology:** Many upper division courses in Sociology have no specific prerequisites although preparation such as that provided by the appropriate lower division course is generally desirable.

**Speech:** 119, Analysis of Communication Content; 123, Freedom of Speech; 135, British Public Address during the Eighteenth and Nineteenth Centuries; 136, Latin-American Spokesmen; 137, American Public Address during the Eighteenth and Nineteenth Centuries; 138, Modern Public Address; 139, Modern Spokesmen; *141A–141B, Classical Rhetoric; 147, Modern Rhetoric; 149, Comparative Discourse.

**Statistics:** 130A–130B, Statistical Inference.

**Zoology:** 101, Introduction to Physicochemical Biology; *114, Genetics; 115, Human Genetics; 116, Introduction to Wildlife and Fisheries Management; 126, Animal Evolution.

* Not to be given, 1962–1963.
Courses of Instruction
Fall and Spring Semesters, 1962–1963

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 a 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 may be permitted to register in upper division courses when they have met the general prerequisites of the department offering the courses and have completed the prerequisites named for a specific course. 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 Science and Technology (Chairman of the Executive Committee), Davis.
Harold T. Gordon, Ph.D., Lecturer in Entomology, Berkeley.
Walter G. Jennings, Ph.D., Associate Professor of Food Science and Technology, Davis.
Richard E. Kepner, Ph.D., Professor of Chemistry, Davis.
David H. Volman, Ph.D., Professor of Chemistry, Davis.

Graduate Course

(Concerning conditions for admission to graduate courses, see page 165)

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 (Vice-Chairman of the Department).
Siegfried V. Wanstrup, 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.

Harold O. Carter, Ph.D., Associate Professor of Agricultural Economics, Davis. 
Theodore J. Goering, M.S., Acting Assistant Professor of Agricultural Economics.

Davis McEntire, Ph.D., Lecturer in Agricultural Economics and Professor of Social Welfare.

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 96.

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 64). 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. Bacteriology, botany, geology, physics, physiology, or zoology or additional chemistry or mathematics, 7 units. Business law, 3 units. Chemistry, 5 units. English and/or speech, 6 units. Mathematics, 3 units. Principles of economics, 6 units. Statistics, 3 units. (b) Agriculture. Agriculture (other than agricultural economics and botany), 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, available without charge.

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 60). 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. 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.

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

Lower Division Courses

2. Introduction to Agriculture. (3) II. Mr. Fuller
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. Sammet
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. Goering
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. Mr. Boles
Lectures and laboratory. Prerequisite: Economics 2, Mathematics 16A, or the equivalent, or consent of the instructor
Evaluation and treatment of economic data in agriculture, with emphasis on methods of analyzing relations among economic variables.

110. Agricultural Finance. (3) I.
Prerequisite: Economics 1A or 1B.
Farmers' credit needs, methods of financing the agricultural industry, agencies supplying agricultural credit.
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. Hoch
Prerequisite: Economics 1A–1B.

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

140. Fundamentals of Farm Management. (4) II. Mr. Goering
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. Mr. Goering
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. Lee
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. Clarke
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. Mr. Goering
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.

* Not to be given, 1962–1963.
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 165)

200A–200B. Economics of Agricultural Production and Consumption. (3–3) Yr.
   200A. Mr. Hoch.
   200B. Mr. Hoos.
   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.
   210A. II. Mr. Boles.
   210B. I. Mr. Lee.
   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. Collins
   Growth trends and cyclical variation in agriculture and in the national economy; comparative income level and distribution; production trends, variations, and projections; changing organization and structure of agriculture in relation to the general economy.

221. Formation and Administration of Agricultural Policy. (3) II.
   Mr. Fuller
   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.
   Mr. Allee
   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
   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
   A seminar on the literature, current research problems, and methods of analysis in agricultural marketing.

240A–240B. Farm Management Research. (3–3) Yr.
   Mr. Carter
   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.  
Mr. Brewer, 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.

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, agricultural statistics and prices, agricultural prices and commodity studies. It is an integral part of the Division of Agricultural Sciences. Although it is housed in Giannini Hall on the Berkeley campus, many of its staff members are resident at Davis.

Appointments in the Giannini Foundation are held by most members of the Department of Agricultural Economics, and the Director of the Foundation is also Chairman of the Department. Some members of the School of Forestry staff and members of the Agricultural Extension Service also hold appointments in the Foundation.

AIR SCIENCE

(Department Office, 218 Building T-9)

William J. Davitt, Colonel, U.S.A.F., Professor of Air Science (Chairman of the Department).

Gayle M. Bennett, Major, U.S.A.F., Associate Professor of Air Science.

Philip C. Limbacher, Major, U.S.A.F., Associate Professor of Air Science.
Lower Division Courses

The lower division courses in air science, together with electives (see page 52, 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. (3) I and II. The Staff (Mr. Limbacher in charge)
One section meeting per week. Application of leadership techniques through military drill and command.

1B. Air Science 1. (2) II. The Staff (Mr. Limbacher 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. Limbacher 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. (2) I and II. The Staff (Mr. Limbacher 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 and senior years. 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 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.

† To be taken concurrently with an elective course. See page 52.
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, upon completion of Air Science 131A and 131B. 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 $600.

Successful completion of the advanced course and attainment of a bachelor's or higher 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. Qualified A.F.R.O.T.C. graduates are encouraged to apply for graduate education 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. Bennett 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. Bennett 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.
141A. Air Science 4. (½) I.  The Staff (Mr. Grogan 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. Grogan in charge)
Prerequisite: course 131A and 131B, or equivalent.
Military aspects of world political geography; the Air Force officer; leadership laboratory.

142. Air Science 4. (3) I.  The Staff (Mr. Grogan in charge)
Prerequisite: course 131A and 131B, or equivalent.
Global relations of special concern to Air Force officers, emphasis on international relations, seminar on commissioned service for graduating seniors.

ANATOMY AND PHYSIOLOGY

ANATOMY

(For courses in physiology, see page 490.)
(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.
Miriarn 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 (Vice-Chairman for Anatomy).

Marian C. Diamond, Ph.D., Lecturer in Anatomy.
Marjorie M. Nelson, Ph.D., Lecturer in Anatomy.
Robert A. Schooley, M.A., Associate 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 96.

Departmental Adviser: Mr. E. S. Evans.

Lower Division Courses

25. General Human Anatomy. (3) II.
Lectures and laboratory. Prerequisite: Physiology 1, 1L (recommended) or Zoology 1A or Biology 11A–11B. Enrollment limited to one hundred sixty students.
Prepared human dissections, models, and microscope slides.

Upper Division Courses

101A–101B. Histology and Microscopic Organology. (3–3) Yr.
Mr. E. S. 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.
Mrs. Diamond
Lectures and laboratory. Prerequisite: junior standing with major in animal biological sciences.
The structure, functional relationships, and development of the human nervous system.

104A–104B. Essentials of Human Anatomy. (3–3) Yr.
Mr. Srebnik (in charge), Mr. E. S. Evans
Prerequisite: upper division standing with major in animal biological science (or, with consent of the instructor, in a behavioral science plus one of the following: Biology 11A–11B, Physiology 1, 1L, or Zoology 1A).
Lectures and laboratory exercises on dissection and microscopic study of the adult human body and its development.

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. Srebnik in charge)
Prerequisite: senior standing, with B average, and consent of the instructor.

Graduate Courses

Concerning conditions for admission to graduate courses, see page 165

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. E. S. Evans in charge)
Hours and credit to be arranged.

214. Anatomy for Advanced Students. I and II. The Staff (Mr. E. S. Evans in charge)
Hours and credit to be arranged. Special study in selected areas of human anatomy.

**Anthropology**

(Department Office, 252 Kroebner 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.
Theodore D. McCown, Ph.D., Professor of Anthropology (Vice-Chairman of the Department), Curator of Physical Anthropology and Coordinator, Archaeological Research Facility.
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.
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.

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.
John A. Graham, A.B., Acting Instructor in Anthropology.
Jasper C. Ingersoll, A.B., Lecturer in Anthropology.
Edward J. Jay, M.A., Lecturer in Anthropology.
Kenneth A. R. Kennedy, M.A., Acting Instructor in Anthropology.
Bernd Lambert, A.B., Acting Instructor in Anthropology.
George A. Pettitt, Ph.D., Lecturer in Anthropology.
David Plath, M.A., Lecturer in Anthropology.

Letters and Science List. All undergraduate courses in anthropology are included in the Letters and Science List of Courses. For further information concerning this list, see page 96.

Departmental Major Advisers: Mr. Rowe, Miss Nader, Mr. Lambert.
The Major. Required: Anthropology 1, 2A–2B, Linguistics 35, Anthropology 125, and a one-semester course from each of the following groups: (A) 151, 152, 153; (B) 103, 106, 107, 111; (C) 101A, 101B, 105A, 105B, 115, 139, 143A, 143B, 147; (D) 120, Linguistics 100. Also required are additional elective courses so that a total of 24 units of upper division courses in anthropology are completed.

1 In residence fall semester only, 1962–1963.
2 In residence spring semester only, 1962–1963.
Substitutions may be permitted among these additional elective courses of not more than 6 units in allied subjects approved by the department.

Honors Program: Students admitted to the honors program will include in their major program H198 (3 units) and will write a senior thesis under the direction of a member of the staff (199, 3 units).

Lower Division Courses

1. General Anthropology: Physical and Biological Factors. (3) I and II.
   Three lectures and one section meeting.
   Mr. McCown, 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.
   Mr. Heizer, Mr. Murphy
   2A. Prehistory and cultural growth. Mr. Heizer.
   2B. Structure and dynamics of culture. Mr. Murphy.
   2A is not prerequisite to 2B.

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 or courses 1, 2A–2B.

   Survey of primitive, folk, and complex societies. Either half of the course may be taken independently.
   Mr. Lambert

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.
   Mr. Rowe

   Native peoples and cultures of the New World.
   105A. Central America, Mexico, and North America. Mr. Heizer.
   105B. South America. Mr. Rowe.
   Either half of the course may be taken independently.

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

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

110. Prehistory Laboratory. (2) I.
   Prerequisite: consent of the instructor.
   Descriptive and analytical methods used in classification and discussion of prehistoric cultural material.
   Mr. Clark

111. Prehistory. (3) I.
   Origin, development, and distribution in space and time of the prehistoric cultures of the Old World.
   Mr. Clark, Mr. McCown
115. Peoples of Southeast Asia. (3) I.  
Mr. Ingersoll  
Races, languages, and cultures of Indonesia, the Philippines, and the adjacent mainland.

118. The Nature of Culture. (3) I and II.  
Mr. Jay, Mr. Lambert, 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.  
Relationships of cultural, social, and personality factors in human behavior; personality in representative societies; techniques for studying culture-personality relations.

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

121. Folklore. (3) II.  
Mr. Bascom  
An introduction to the study of folktales, myths, legends, proverbs, riddles, and other forms of verbal tradition. Methods and theories of folklore.

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

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. Jay  
Comparative survey of religion and magic.

125. Comparative Society. (3) I and II.  
Miss Nader, Mr. Jay  
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.

128. Art and Culture. (3) II.  
Mr. Bascom  
Graphic and plastic arts and their relations to culture in nonliterate societies; illustrative material from the Lowie 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.  
Tribes, culture types, and culture history of aboriginal peoples west of the Rocky Mountains.

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

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

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

* Not to be given, 1961–1962.
143A–143B. Peoples of India. (3–3) Yr. Mr. Mandelbaum
143A. Development of Indian cultural traditions.
143B. Social organization and social trends.

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

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

150. Physical Anthropology Laboratory. (2) I. Mr. Kennedy
Prerequisite: course 151, or 152, or 153 (may be taken concurrently). Enrollment limited to twelve students; primarily for majors in anthropology and the life sciences. Descriptive and analytical techniques and methods applicable to the study of intra- and intergroup resemblances and differences.

151. Primate Evolution. (3) I. Mr. Washburn
Prerequisite: course 1 or equivalent. A consideration of the major groups of primates with emphasis on the evolution of behavior.

151L. Primate Evolution Laboratory. (2) I. Mr. Washburn
Lecture and laboratory. Prerequisite: course 151 (preferably taken concurrently). Enrollment limited to twelve students; primarily for majors in anthropology and the life sciences.

152. Fossil Man. (3) I. Mr. Kennedy
Prerequisite: course 1 or equivalent. Origin and relationships of the extinct forms of mankind.

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

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

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

161. European Peasant Societies. (3) I. Mrs. Diaz
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. Foster, Mr. Ingersoll
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.

* Not to be given, 1962–1963.
186. Ethnology of Japan. (3) II. Mr. Plath
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. Mr. Foster
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.

II198. Preceptorial and Reading Course. (3) I and II. Mrs. Diaz, Mr. 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. Rowe, Mr. Lambert, Miss Nader

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 165)

204A–204B. Fundamentals of Anthropological Theory. (3–3) Yr. Mr. McCown, Mr. Graham, Mr. Foster, Mr. Hymes, Miss Nader

204A. Physical anthropology, human evolution, and prehistory and archaeology: Mr. McCown, Mr. Graham, Mr. Foster, Mr. Hymes, Miss Nader.

204B. Cultural anthropology and ethnography: Mr. Foster, Mr. Hymes, Miss Nader.

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

*206. Proseminar. (2) I. Mr. Berreman
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. Mr. Hymes
Prerequisite: consent of the instructor.
Concepts and problems in such major phases of culture as religion, economics, law, art, and folklore.

* Not to be given, 1962–1963.
215. Ethnological Field Techniques. (2) I. Mr. Foster
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. _____
Prerequisite: consent of the instructor.
Problems in culture change and stability.

*218II. 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.

223. Law and Anthropology. (2) II. Miss Nader, Mrs. Schreter
To acquaint the student of anthropology and law with the range of data that is pertinent to the study of law and society.

225. Kinship and Social Structure. (2) I. Mr. Murphy
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. Mr. Heizer
Work on problems of tribal distribution and cultures.

239. Problems in African Society and Culture. (2) II. Mr. Bascom, Mr. Murphy
Prerequisite: consent of the instructor

*242. Problems in African Prehistory. (2) II. Mr. Clark
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, Mr. Washburn
Systematic treatment of concepts in historical perspective and of continuing and new problems in the field of human biology as this concerns physical anthropology.

*261A–261B. Problems in Acculturation. (2–2) Yr. _____, _____
Prerequisite: consent of the instructor.
Processes and results of culture change originating in the contact of distinct ethnic groups.

* Not to be given, 1962–1963.
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 Gayton
The materials, techniques of manufacture, decorative elements, and the uses of the
total material manufactures of selected culture areas.

290. Problems in the Culture History of Mesoamerica. (2) II. Mr. Graham

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. Hymes in charge)
Prerequisite: advanced graduate status; consult graduate adviser for details.

299. Directed Research. (2–6) I and II.
The Staff (Mr. McCown, Mr. Hymes 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.

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 stu-
dents 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 pur-
poses, 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.

* Not to be given, 1962–1963.
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.
Joseph Escherick, 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 W. Wurster, A.B., Professor of Architecture.
William C. Hays, B.S., Professor of Architecture, Emeritus.
Raymond W. Jeans, M.A., Professor of Architecture, Emeritus.
Stafford L. Jory, G.Arch., Professor of Architecture, Emeritus.
Howard Moïse, B.S., M.Arch., Professor of Architecture, Emeritus.
Warren C. Perry, B.S., 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 (Chairman of the Department).

*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.
Donlyn R. Lyndon, M.F.A., 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.
Sim H. Van der Ryn, B.Arch., Instructor in Architecture.

*Lawrence Ayer, A.B., Lecturer in Architectural Mechanics.
*Scott Beamer, B.S., Lecturer in Architectural Mechanics.
Theodore Bernardi, A.B., Lecturer in Architecture.
Anthony Candido, A.B., Acting Assistant Professor of Architecture.
T. J. Kent, Jr., A.B., M.C.P., Professor of City Planning.
Lois Langhorst, A.B., M.Arch., Lecturer in Architecture.
Gerald M. McCue, M.A., Lecturer in Architecture.
George Matsumoto, M.A., Lecturer in Architecture.
Carlo Pelliccia, Dr.Arch., Lecturer in Architecture.
James L. Prestini, B.S., Lecturer in Design.
Benedetto J. Puccio, B.Arch., Lecturer in Architecture.
Walter W. Soroka, Sc.D., Professor of Mechanics and Design.
Karl V. Steinbrugge, B.S., Lecturer in Structural Design.
Francis J. Violich, B.S., Professor of City Planning and of Landscape Architecture.
Charles D. Wiley, M.Arch., Lecturer in Architecture.

*Letters and Science List. Courses 110, 121, 122, 126, 127, 128 are included in the Letters and Science List of Courses. For regulations governing this list see page 96.

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, 127, and 128 are presently established.
Credit in courses 11, 12, 13 will be allowed up to a total of 5 units; 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. Lyndon, Mr. Prestini, Mr. Quinn, Mr. Reichek, Mr. Lubicz-Nycz, Mr. Tuley, Mr. Van der Ryn

(Formerly numbered 1N.)
Six hours per week.
Tools and materials: line, plane, color, texture, tone. Visual and physical structures in two and three dimensions.

* In residence spring semester only, 1962–1963.
2. Design. (3) I and II. Mr. Prestini, Mr. Reichek, Mr. Puccio  
(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. Dodge, Mrs. Langhorst, Mr. Lubicz-Nycz, Mr. Pelliccia,  
Mr. Peters, Mr. Puccio, Mr. Quinn  
(Formerly numbered 3N.)  
Six hours per week. Prerequisite: course 2.  
Elementary design of buildings.

4. Design. (4) I and II. Mr. Lyndon, Mr. McCue  
(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. Violich  
(Formerly numbered 5N.)  
Lectures in charge of each department chairman introductory to each professional field.

6. Descriptive Geometry. (2) I and II. Mr. Van der Ryn,  
(Formerly numbered 6N.)  
Four hours per week. Prerequisite: solid geometry.

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

11. Graphics. (1) I and II. Mr. Candido, Mrs. Langhorst, Mr. Lubicz-Nycz, Mr. Matsumoto, Mr. Puccio, Mr. Reay  
Three hours per week.  
Freehand drawing and rendering in pencil, crayon, charcoal.

12. Graphics. (1) I and II. Mr. Candido, Mr. Czaja, Mr. Goodman, Mrs. Langhorst  
Three hours per week.  
Painting and rendering in color.

13. Graphics. (1) I and II. Mr. Goodman, Mr. Stump, Mr. Candido  
Three hours per week.  
Freehand drawing and rendering in black and white.

23. Design. (5) I and II. Mr. Czaja  
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. Candido, Mr. Pelliccia, Mr. Robbins  
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. Cardwell, Mr. Marshall, Mr. Stump
Eight hours per week. Prerequisite: course 101.
Architectural design problems of increasing complexity.

103. Advanced Design. (6) I and II.
Mr. Goodman, Mr. Bernardi, Mr. DeMars, Mr. Mocine
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. Simonds, Mr. Hassid, Mr. Matsumoto, Mr. Wiley
Prerequisite: fifth-year standing; courses 103, 151, 152, Civil Engineering 126 and
Design (exterior and interior) of a large fire-resistive building and preparation of
working drawings. Students work in teams of two.

105. Detail and Color Study. (1) I and II.
Mr. Simonds, Mr. Hassid, Mr. Matsumoto, Mr. Wiley
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 prepara-
tion of working drawings. Students work in teams of two.

107. Fifth-Year Design Preparation. (2) I and II.
Mr. Reay, Mr. Cardwell, 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. Peters, Mr. Stoller, Mr. Reay
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, Mr. Goodman
Development, planning, and esthetic qualities of the single-family dwelling.

121. Architectural History. (3) I. Mr. Jacobus
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. Moore
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 con-
sent of the instructor.
Architecture, principally European, from the French Revolution to the present day.
128. Architectural History—Oriental. (3) II. Mr. Moore, Mr. Lyndon
Prerequisite: course 121 and 123 (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. Mr. Foley
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. ———
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.

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. Moore in charge)

199. Special Study for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. Moore 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 165.

201. Seminar in Architectural Research. (2) I. Mr. Hassid
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. Esherick,
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. Mr. Esherick,
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.
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. Moore in charge)

Required Courses in Other Departments

City Planning for Architects and Landscape Architects (City and Regional Planning 100 and 100L).
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.
Harold Paris, Assistant Professor of Art.
Juergen Schulz, Ph.D., Assistant Professor of Art.

Alfred Frankenstein, Ph.B., 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 96.

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: Art 2A, 2B, 14A, and 6 units chosen from courses 1A, 1B, 1C, 1D. The painting and sculpture majors also require Art 3 and 2 units selected from Art 4 or Art 14B. Recommended for majors in history of art: History 4A–4B. (Art 2A is prerequisite to Art 2B and Art 3; Art 2A and 2B are prerequisite to Art 4; Art 14A is prerequisite to 14B.)

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.

2 In residence spring semester only, 1962–1963.
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 in the Department of Art during Registration Week. The department reserves the right to deny admission to applicants who enroll in courses for which they lack adequate preparation.

Transfer Students. All transfer students, undergraduate and graduate, are required to take either Art 2A or Art 120, depending on their previous art training, during their first semester in residence. In painting and sculpture, admission to graduate seminar courses will be based upon a review of work done under at least three members of the regular faculty. See pages 60 and 165.

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) II.
Lectures and weekly section meetings to be arranged.
The art of India, China, and Japan.

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. Mr. McCray
Lectures, illustrated with lantern slides. Open to nonmajors.

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

### Group A: Painting

Prerequisite: courses 2A, 2B, 3, 14A, and either 4 or 14B. 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Professor</th>
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</thead>
<tbody>
<tr>
<td>104A–105B</td>
<td>Advanced Drawing and Painting</td>
<td>Mr. Haley</td>
</tr>
<tr>
<td>105A–105B</td>
<td>Advanced Drawing and Painting</td>
<td>Mr. Loran</td>
</tr>
<tr>
<td>106A–106B</td>
<td>Advanced Drawing and Painting</td>
<td>Mr. McCray</td>
</tr>
<tr>
<td>107A–107B</td>
<td>Advanced Drawing and Painting</td>
<td>Mr. Hartman</td>
</tr>
<tr>
<td>108A–108B</td>
<td>Advanced Drawing and Painting</td>
<td>Mr. Kasten</td>
</tr>
<tr>
<td>109A–109B</td>
<td>Advanced Drawing and Painting</td>
<td>Mr. Ruvolo</td>
</tr>
<tr>
<td>111A–111B</td>
<td>Advanced Drawing and Painting</td>
<td>Mr. Loran</td>
</tr>
<tr>
<td>112A–112B</td>
<td>Advanced Drawing and Painting</td>
<td>Mr. Wessels</td>
</tr>
<tr>
<td>113A–113B</td>
<td>Advanced Drawing and Painting</td>
<td>Mr. Wessels</td>
</tr>
</tbody>
</table>

### 120. Advanced Drawing and Composition. (2) I and II.

Required of transfer students in painting and sculpture. Open to nonmajors who have completed the equivalent of prerequisites stated for Group A and Group D.

### 128. Mural Composition. (2) I and II.

Prerequisite: 6 units of upper division painting courses. Limited to ten students.

### 129A–129B. Practice in the Graphic Arts. (2–2) Yr.

Mr. Kasten, Mr. Paris

### Group B: Theory and Criticism

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>132</td>
<td>Picture Analysis. (2) II.</td>
<td>Mr. Wessels</td>
</tr>
</tbody>
</table>

Prerequisite: course 2A–2B, 14A, and 6 units of Art History. 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>The Art of Primitive Peoples. (3) I.</td>
<td>Mr. Chipp</td>
</tr>
</tbody>
</table>

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.

*150. The Art of Primitive Peoples. (3) I. Mr. Chipp

An analysis of style and an aesthetic evaluation of forms in the art of several primitive cultures, developed according to art-historical principles. Special consideration is given to an integration of the art with the cultural background.

* Not to be given, 1962–1963.
153. Aegean Art. (2) II. Mr. Amyx
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. Mr. Amyx
Prerequisite: course 1A.
From the Geometric Period to the beginning of the Roman Empire.
154A. From 1100 to 450 B.C.
154B. From 450 to 30 B.C.

159. Roman Art. (3) II. Mr. Amyx
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. Mr. d'Argencé
160A. II.
From Shang to T'ang.

161. History of Later Chinese Art. (2) I. Mr. d'Argencé
From Sung to Ch'ing.

162. The Art of Japan. (3) I. Mr. d'Argencé
From prehistoric times to Hokusai.

163. The Art of India. (3) II. Mr. d'Argencé

164. The Art of Greater Iran. (2) I. Mr. d'Argencé
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. Baransky-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.

177A–177B. The Renaissance of Northern Europe. (3–3) Yr. Mr. Schulz
177A is not prerequisite to 177B.
177A. Art of the fourteenth and fifteenth centuries in Northern Europe.
177B. Art of the sixteenth century in Northern Europe.

178. Baroque Art. (3) II. Mr. Schulz
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.

* Not to be given, 1962–1963.
83A–83B. Modern Art—Emphasis on Painting. (3–3) Yr. Mr. Chipp
83A is not prerequisite to 83B.
83A. Art of the nineteenth century.
83B. Art of the twentieth century. II.

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

Group D: Sculpture

General prerequisite for Group D sculpture courses: courses 2A, 2B, 3, 14A, and either 4 or 14B. The various courses in Group D differ in content, use of materials and type of subject matter, depending upon the 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.

140A–140B. Advanced Sculpture. (2–2) Yr. Mr. Schnier
141A–141B. Advanced Sculpture. (2–2) Yr. Mr. Zogbaum
142A–142B. Advanced Sculpture, the Human Figure. (2–2) Yr.
   Mr. Gordin, Mr. O’Hanlon, Mr. Paris, Mr. Schnier, Mr. Zogbaum
   Open to advanced architecture and landscape architecture majors who have had Art 44A.
143A–143B. Advanced Sculpture. (2–2) Yr. Mr. Paris
144A–144B. Advanced Sculpture. (2–2) Yr. Mr. Gordin
145A–145B. Advanced Sculpture. (2–2) Yr. Mr. O’Hanlon

Special Study Courses

90. Senior Proseminar in the History of Art. (3) I. Mr. Schulz
   Lectures, discussions, and reports. An introduction to research techniques.

98. Special Studies in Painting or Sculpture. (1–4) I and II.
   The Staff (Mr. Haley in charge)
   Restricted to honor seniors for selected projects. Staff approval required.

   (1–4) I and II.
   The Staff (Mr. Schulz in charge)

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 165)

General prerequisite for graduate courses in painting and sculpture: at least a B average in the undergraduate major in art. Also, admission to graduate seminar courses will be based upon a review of work done under at least three members of the regular faculty.

201A–201B. Form in Painting. (3–3) I and II. Mr. Haley, Mr. Ruvolo
   Experimental studio work emphasizing various aspects of form. Group criticism.

To be offered, 1962–1963 only.
220A–220B. Seminar in Painting. (3–3) I and II. Mr. Loran, Mr. Wessels
Emphasis upon original works; group discussion and criticism. Ancillary topics of a
contemporary or historical nature will be introduced.

240A–240B. Form in Sculpture. (3–3) Yr. Mr. O’Hanlon, Mr. Zogbaum
Experimental studio work emphasizing various aspects of form. Group criticism.

245A–245B. Seminar in Sculpture. (3–3) Yr. Mr. Gordin, Mr. Schnier
Emphasis upon original works; group discussion and criticism. Ancillary topics of a
contemporary or historical nature will be introduced.

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. Mr. d’Argencé
May be repeated for credit.

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

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

277. Seminar in the History of Northern European Art. (3) II.
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).
Classical Archaeology: Elementary Classical Archaeology (Classics 17A–17B); Vase Painting (Classics 170A–170B–170C).
Seminar in Classical Archaeology (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. The gallery presents a regular program of loan exhibitions dealing with both historical periods and modern art, drawn from a variety of sources, such as the major circulating agencies, museum collections, and private sources. Exhibitions are scheduled continuously throughout the calendar year. Those interested in the gallery's activities may address Professor Herschel B. Chipp, Chairman of the Art Exhibition program of the Committee on Arts and Lectures, at the Department of Art.

The Worth Ryder Art Gallery was established in 1960 in memory of the late Worth Ryder, artist and Professor Emeritus. It is located in Kroober Hall as an adjunct to the teaching functions of the Department of Art, and provides a continuous program of contemporary painting and sculpture exhibitions.

**astronomy**

(Department Office, 601 Campbell Hall)

Louis G. Henyey, Ph.D., Professor of Astronomy and Director of the Leuschner 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 Leuschner 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.
Paul W. Hodge, Ph.D., Instructor in Astronomy.

Albert E. Whitford, Ph.D., Director of the Lick Observatory and Astronomer.

Letters and Science List. All undergraduate courses in astronomy are included in the Letters and Science List of Courses. For regulations governing this list, see page 96.

Departmental Major Advisers: Mr. Henyey, Mr. Weaver.
220A–220B. Seminar in Painting. (3–3) I and II. Mr. Loran, Mr. Wessels
Emphasis upon original works; group discussion and criticism. Ancillary topics of a
contemporary or historical nature will be introduced.

240A–240B. Form in Sculpture. (3–3) Yr. Mr. O’Hanlon, Mr. Zogbaum
Experimental studio work emphasizing various aspects of form. Group criticism.

245A–245B. Seminar in Sculpture. (3–3) Yr. Mr. Gordin, Mr. Schnier
Emphasis upon original works; group discussion and criticism. Ancillary topics of a
contemporary or historical nature will be introduced.

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. Mr. d’Argencé
May be repeated for credit.

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

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

277. Seminar in the History of Northern European Art. (3) II.
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).
Classical Archaeology: Elementary Classical Archaeology (Classics 17A–17B); Vase Painting (Classics 170A–170B–170C).
Seminar in Classical Archaeology (Classics 270A–270B).
History of Design since the Industrial Revolution (Decorative Art 167).
Italian Culture in Transition (History 130).
Aesthetics (Philosophy 136A).
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ASTRONOMY

(Department Office, 601 Campbell Hall)

Louis G. Henyey, Ph.D., Professor of Astronomy and Director of the Leuschner Observatory (Chairman of the Department).

John G. Phillips, Ph.D., Professor of Astronomy.

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George Wallerstein, Ph.D., Assistant Professor of Astronomy.

Paul W. Hodge, Ph.D., Instructor in Astronomy.

Albert E. Whitford, Ph.D., Director of the Lick Observatory and Astronomer.

Letters and Science List. All undergraduate courses in astronomy are included in the Letters and Science List of Courses. For regulations governing this list, see page 96.

Departmental Major Advisers: Mr. Henyey, Mr. Weaver.
The Major. Physics 4A–4B–4C, or the equivalents; Mathematics 3A–3B, 4A–4B, or the equivalents; 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. Brandt, Mr. Wallerstein, Mr. Hodge, 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. Hodge, Mr. Phillips
   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. Hodge
   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, 1962–1963.
Graduate Courses

(Corning conditions for admission to graduate courses, see page 165)

204. Spherical and Positional Astronomy. (3) I. Mr. Wallerstein
Prerequisite: course 107A–107B 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) I. Mr. Cunningham
Prerequisite: course 215A–215B, or consent of the instructor.

206. Astronomical Dynamics. (3) I. Mr. Michie
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) II. Mr. Brandt
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 105A–105B 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.
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.

Prerequisite: consent of the instructor. Mr. Phillips, Mr. Wallerstein
Application of atomic and molecular spectroscopy to the spectra of astronomical sources.

* Not to be given. 1962–1963.
245. Satellite Theory. (3) I. 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.

Prerequisite: consent of the instructor. Mr. Phillips, Mr. Wallerstein
Advanced topics in astronomical spectroscopy: spectra of Wolf-Rayet stars, novae,
Cepheid variables, spectrum variables, late-type stars, comets, planets, night sky, inter-
stellar 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)
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 Obs-
ervatory 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 Ob-
servatory 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 dis-
sertation.

Radio Astronomy Laboratory

The Radio Astronomy Laboratory, a unit under the Department of Astron-
omy, operates an off-campus observing station at which astronomical observe-
ations are made in the radio wavelength range. No courses are offered by

* Not to be given, 1962-1963.
† To be given if a sufficient number of students enroll.
the Laboratory; it is not a teaching organization. The research facilities are available to properly qualified students and faculty members of the University of California. At present two parabolic reflectors, one of diameter 33 feet, the other of diameter 85 feet, are available. 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)

*M. Doudoroff, Ph.D., Professor of Bacteriology.*
Sanford S. Elberg, Ph.D., Professor of Bacteriology.
Jacob Fong, Ph.D., Professor of Bacteriology.
Stewart H. Madin, D.V.M., 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.*

*Horace A. Barker, Ph.D., Professor of Biochemistry.*
Kenneth B. DeOme, Ph.D., Professor of Zoology.
Mary I. Human, M.A., Lecturer in Bacteriology.
Adrien Larson, A.B., 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 96.

*Departmental Major Adviser:* Mr. Stanier.

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, 1962–1963.
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 145; 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 100; Zoology 101, 102, 107, 107C; Zoology 114 or 115 or Genetics 100; Genetics 104; Soil Science 111; Plant Pathology 126; 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. Fong.

**Lower Division Courses**

1. **General Bacteriology. (3) II.**
   - 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.**
   - Two lectures per week. Prerequisite: Chemistry 1A. Course 4 must be taken concurrently.
   - Primarily for students not majoring in biological science.

3. **Laboratory Course in General Bacteriology. (2) II.**
   - 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. Doudoroff  
Two lectures and three three-hour laboratory periods per week. Prerequisite: course 1 or 2; course 4; Chemistry 5; Biochemistry 102 or the equivalent.  
Selected topics in bacterial physiology, with primary emphasis on quantitative aspects of growth, nutrition, metabolism, and genetics.

101. The Pathogenic Bacteria. (6) I.  
Mr. Elberg, Mr. Fong  
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. (2) II.  
Mr. Elberg  
Two three-hour laboratory periods per week. Prerequisite: course 102 (may be taken concurrently).

103. Immunochemistry. (4) I.  
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.  
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.
H195. Independent Study. (2–4) I and II.

The Staff (Mr. Stanier 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. Stanier 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) I and II.

Mr. Stanier

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 165)

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. Doudoroff

An introduction to the analysis of scientific literature. Required of all first-year graduate students in bacteriology.

213. Seminar in Microbial Genetics. (1) II.

Mr. Stent

Prerequisite: course 107

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

Mr. Fong

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 (Chairman of the Department).

† William Z. Hassid, Ph.D., Professor of Biochemistry.

* Not to be given, 1962–1963.
† In residence spring semester only, 1962–1963.
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.
*Emond E. Snell, Ph.D., Professor of Biochemistry.
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.
Jesse C. Rabinovitz, Ph.D., Associate Professor of Biochemistry.
R. David 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.
Elizabeth F. Neufeld, Ph.D., Lecturer in Biochemistry.

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 96.

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 206). 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 206).

Upper Division Courses

100A-100B. General Biochemistry. (3-3) Yr. Mr. Dekker, Mr. Barker

100A. Mr. Dekker.
100B. Mr. Barker.

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. Mr. Cole, Mr. Neilands,

101A. Mr. Cole.
101B. Mr. Neilands.

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.
Mr. Ballou, Mr. Cole, Mr. Hackett, Mr. Rabinowitz

I. Mr. Ballou, Mr. Hackett; II. Mr. Cole, 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. Jenkins, Mrs. Neufeld

I. Mr. Jenkins; II. Mrs. Neufeld.
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 165)

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, 1962–1963.
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 1962–1963 will include four sections each semester, each emphasizing a somewhat different area: I. Mr. Barker, Mr. Carpenter, Mr. Rabinowitz, Mr. Schachman; II. Mr. Bailou, Mr. Cole, Mr. Dekker, Mr. Hassid.

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.
Entomology 110 (3).
Genetics 100 (3), 100C (1), 104 (3).


Public Health 160A (3), 160B (3).

Soils and Plant Nutrition 111 (3), 114 (3), 115 (2), 117 (2).


Virology 100A–100B (3–3), 177 (3).


**BIOLOGICAL CONTROL**

(Department Office, University of California Gill Tract, 1050 San Pablo avenue, Albany)

(See Entomology and Parasitology for courses offered by staff members of the Department of Biological Control.)

**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. Pappenfuss, 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.

1 In residence fall semester only, 1962–1963.
2 In residence spring semester only, 1962–1963.
Johannes M. Proskauer, Ph.D., Associate Professor of Botany.
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.
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 96.

*Departmental Major Adviser:* Mr. Proskauer.

*The Major.* General Requirements: (a) Botany 1; Chemistry 1A, and 8A; Biochemistry 102; Physics 2A–2B; 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.

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

2. **Physiological Botany:** (a) Chemistry 1B, and 5. 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

Mr. Snider (in charge fall semester),
Mr. Strohman (in charge spring semester)

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.

BOTANY

Lower Division Courses

1. General Botany. (5) I.

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. Jensen

I: Mr. Jensen; II: Mr. Cleland.

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 1. Biology 11A–11B may fulfill this requirement with the consent of the instructor.

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

Lectures and laboratory.

Mr. Proskauer

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

Lectures and laboratory.

112. Plant Anatomy. (4) II.

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
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.
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. Jensen
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. Park
I: Mr. Machlis; II: Mr. Park.
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.

1195. Special Study for Honors Candidates. (1–4) I and II.
The Staff (Mr. Proskauber in charge)
Restricted to junior and senior botany majors.

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

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

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

202. Biology of Higher Fungi. (4) I. Mr. Snider
(Formerly numbered 102.)
Lectures and laboratory. Prerequisite: course 100. Course 201 recommended but not required. Offered every other year.
Comparative morphology, development, and activities of Basidiomycetes and Fungi Imperfecti.

* Not to be given, 1962–1963.
204. Algology. (4) II. Mr. Papenfuss
Lectures and laboratory. Prerequisite: course 100. Offered every other year.
Advanced morphology and taxonomy of the algae.

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

221. Phylogenetic Taxonomy: Systematics. (3) I. Mr. Mason
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.

222. Phylogenetic Taxonomy: Biosystematics. (3) II. Mr. Mason
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.

238. Molecular Cytology. (4) I. Mr. Park
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.

242. Physiology of Lower Plants. (2) II. Mr. Snider
Prerequisite: course 140. Course 100 and Biochemistry 102 recommended. Offered
every other year.
An intensive treatment of selected topics on algal, fungal, or lower archegoniate physiology.

242L. Physiology of Lower Plants. (2) II. Mr. Snider
Prerequisite: course 140, 245 (must be taken concurrently), Chemistry 5. Offered every
other year.
To accompany course 242.

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

244L. Hormonal Control of Growth and Development. (2) I. Mr. Cleland
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.

280. Seminar in Cryptogamic Botany. (1) II. Mr. Snider (in charge), Mr. Emerson, Mr. Papenfuss, Mr. Proskauer

282. Seminar in Morphology and Taxonomy of Vascular Plants. (1) I. Mr. Constance (in charge), Mr. Baker, Mr. Fry, Mr. Mason.

284. Seminar in Plant Cytology. (1) II. Mr. Baker (in charge), Mr. Jensen

* Not to be given, 1962-1963.
286. Seminar in Plant Physiology. (1) II.
Mr. Broyer (in charge), Mr. Arnon, Mr. Babcock, Mr. Cleland,
Mr. Hackett, Mr. Jacobson, Mr. Machlis, Mr. Mackinney,
Mr. Overstreet, Mr. Park, Mr. Stone, ——, Mr. Whatley
Prerequisite: qualified graduate students, with consent of the staff member in charge.
A seminar on problems of plant physiology in the fields of botany, food technology,
forestry, plant nutrition, and soil science.
The fall semester of this seminar is listed under Plant Nutrition 206.

299. Research. I and II.
The Staff (Mr. Jensen 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, L.L.B., Ph.D., Professor of Business Administration (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 Galenson, C.P.A., Ph.D., Professor of Business Administration.
Joseph W. Garbarino, Ph.D., Professor of Business Administration.
Robert A. Gordon, Ph.D., Professor of Economics.
Ewald T. Grether, Ph.D., LL.D., ekon. dr. (hon.c.), 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.
David A. Revzan, Ph.D., Professor of Business Administration.
Arthur M. Ross, Ph.D., Professor of Industrial Relations.
George Strauss, Ph.D., Professor of Business Administration.
Lloyd Ulman, Ph.D., Professor of Economics and Industrial Relations.
Lawrence L. Vance, C.P.A., Ph.D., Professor of Accounting.

William J. Vatter, C.P.A., Ph.D., Professor of Business Administration.
Dow Votaw, M.B.A., LL.B., Professor of Business Administration.
Paul F. Wendt, 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.B., Flood Professor of Economics, Emeritus.
Charles C. Staehling, 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.
K. Roland A. Artle, ekon.dr., Associate Professor of Business Administration.
Alan R. Cerf, C.P.A., Ph.D., Associate Professor of Business Administration.
Earl F. Cheit, Ph.D., LL.B., 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.
Louis P. Bucklin, Ph.D., Assistant Professor of Business Administration.
Thomas R. Dyckman, Ph.D., Assistant Professor of Business Administration.
Edward A. Feigenbaum, Ph.D., Assistant Professor of Business Administration.
*Julian Feldman, Ph.D., Assistant Professor of Business Administration.
Tillo E. Kuhn, Ph.D., Assistant Professor of Business Administration.
*Thomas A. Marschak, Ph.D., Assistant Professor of Business Administration.
Jacob B. Michaelson, Ph.D., 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.
Herman O. Stekler, Ph.D., Assistant Professor of Business Administration.
John A. Tracy, Ph.D., Assistant Professor of Business Administration.

* In residence spring semester only, 1962–1963.
George W. Aljian, B.S., Lecturer in Business Administration.
Samuel R. Arnold, B.S., Associate in Business Administration.
Dawson E. Brewer, M.B.A., Acting Assistant Professor of Business Administration.
Eugene W. Burgess, Ph.D., Lecturer in Industrial Relations.
Edwin H. Caplan, M.B.A., Associate in Business Administration.
James M. Carman, M.B.A., Acting Assistant Professor of 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., J.D., J.S.D., Professor of Law.
William Goldner, Ph.D., Lecturer in Business Administration.
Roy J. Hensley, Ph.D., Lecturer in Business Administration.
George W. Hilton, Ph.D., Lecturer in Business Administration.
John P. Holland, Jr., C.P.C.U., M.B.A., Lecturer in Business Administration.
Ralph C. James, Ph.D., Lecturer in Business Administration.
Raymond W. Kettler, M.A., Lecturer in Business Administration.
Richard K. Lynn, M.B.A., Acting Assistant Professor of Business Administration.
Norman P. Monson, M.S., 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, Ph.D., Acting Assistant Professor of Business Administration.
Robert M. Olsen, M.B.A., Associate in Business Administration.
Wallace F. Smith, Ph.D., Lecturer in Business Administration.
Franklin C. Stark, J.D., Lecturer in Business Law.
Donald L. Thompson, M.S., Associate in Business Administration.

The requirements for the curriculum in the School of Business Administration are listed on page 98.

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 96.

Lower Division Courses

1A–1B. Principles of Accounting. (3–3) Yr. Beginning each semester.
   Mr. Arnold, Mr. Caplan, Mr. Cerf, Mr. Dyckman,
   Mr. Tracy, 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.
Accounting principles and procedures.

Prerequisite: at least sophomore standing. Not open to students planning to enter the School of Business Administration.
Introduction to law; contracts; sales; and agency.

Upper Division Courses

Prerequisite: Economics 1A–1B, 2 or equivalent, Mathematics 16A or equivalent 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. Carman, Mr. Bucklin, Mr. Margolis, Mr. Monson, Mr. Nicosia, Mr. Olsen, Mr. Preston, Mr. Schaaf, Mr. W. Smith, Mr. Stekler
Prerequisite: 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. Goldner, Mr. Margolis, Mr. Monson, Mr. Stekler, Mr. Tyndall
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. Artle
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 18.
A review of the legal implications of certain common business transactions and situations, including problems arising in sales, installment buying, inventory financing, obtaining and extending credit, negotiable instruments and insolvency.

118. Legal Environment of Business. (3) I and II. 
Mr. Smith, Mr. Conant, Mr. Cheit, Mr. Votaw
An analysis of the legal processes and techniques of legal reasoning, followed by applications to the law of contracts, sales, agencies, and business organizations. Not open to students who have taken course 18.

119. Social and Political Environment of Business. (3) I and II. 
Mr. Cheit, Mr. Kennedy, Mr. Votaw
Evolution of American business and the changing framework of its operation, responsibilities, and social control. Analysis of current problems in the light of different philosophies of business and changing political and social goals.
121A–121B. Advanced Accounting. (3–3) Yr. Beginning each semester.
   Mr. Cerf, Mr. Anton, Mr. Mattessich, ———
   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. Dyckman, Mr. Mattessich, ———
   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. Tracy
   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.
   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. Anton
   Prerequisite: course 121A–121B.
   Consolidated statements, funds statements, index numbers in accounting, special problems.

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

132. Interpretation of Financial Statements. (3) I. Mr. Tracy
   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. Brewer, 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.
   Economic risk and business management’s alternatives in dealing with it.

136. Life Insurance. (3) II.
   Prerequisite: course 137.
   A nontechnical study of theory and practice.

137. Economics of Insurance. (3) I and II. Mr. Holland
   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.

Primarily for juniors.
Theory and practice of production management; internal organization; physical facilities; product development; materials control; production control; production standards; managerial controls.

Mr. Gotterer, Mr. Rogers, ———,

141. Facilities Planning. (3) II.

Prerequisite: course 140.
Economic and administrative aspects of the conception and establishment of industrial facilities.

Mr. Gotterer

142. Production Planning and Control. (3) I and II.

Prerequisite: course 140. Recommended: course 145. Mr. Rogers, Mr. Gotterer
Production planning and budgeting; development of the production control system; control of production quantity; quality control; measurement of production efficiency.

145. Industrial Procurement. (3) II.

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.

Mr. Aljian

150. Industrial Relations. (3) I and II.

Mr. Garbarino, Mr. Kennedy, Mr. James, Mr. Burgess, 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. Strauss, ———
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. Garbarino, Mr. James
Prerequisite: course 150 or Economics 150.

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

Mr. Davisson
Prerequisite: course 150 or Economics 150.
A study of federal and state laws and court decisions affecting hours, wages, strikes, boycotts, picketing, union recognition and operation, legality of collective agreements, etc.

160. Marketing. (3) I and II.

Mr. Bucklin, Mr. Carman, Mr. Holton, Mr. Nicosia, Mr. Olsen, Mr. Thompson
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. Holton
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. Olsen
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. Mr. Thompson
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) I. 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. 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.

170A–170B. Transportation Management and Policy. (3–3) Yr. Beginning each semester. Mr. Hilton, Mr. Kuhn
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. Schaaf, Mr. Maisel
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
Prerequisite: course 180.
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) II. Mr. Schaaf
Prerequisite: course 180.
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.  
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. Feigenbaum, Mr. Hoggatt, Mr. McGuire, Mr. Strauss.  
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.  
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. Votaw in charge)

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

Designed for senior students with at least a B average.

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. 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, Mr. Margolis  
Intensive development of the economic analysis necessary for decision making in the firm. Topics covered are: decision theory; output, scale and price decision under conditions of certainty, uncertainty, and different market structures; forecasting; asset preferences; complementary relations through income effects.
103G. Statistical Analysis. (2) I and II. Mr. Hoggatt, 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, Mr. Votaw
Legal problems of organizing, operating, and terminating a business.

120G. Managerial Accounting. (3) I and II. Mr. Sprouse, Mr. Vatter
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 120G 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. 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.
Mr. Kennedy, Mr. Ross
Prerequisite: course 100G or equivalent.
Objectives and problems of management and labor in the modern industrial enterprise. Historical development of American industrial relations, unionism, collective bargaining, and industrial conflict. Elements of personnel administration.

160G. Marketing Organization and Policies. (3) I and II.
Mr. Preston, Mr. Carman
Prerequisite: course 100G or equivalent.
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 165)

210. Seminar in Application of Digital Computers to Problems in the Social Sciences. (3) I and II. Mr. Feigenbaum, 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.
Prerequisite: course 121A–121B, 122.
Cost accounting practice from the viewpoint of the theory and objectives of cost analysis. The relations between cost accounting, statistics, economic theory and management philosophy.

222B. Seminar in Controllership. (3) II.
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.

223A. 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.

223B. Public Accounting Practice and Problems. (3) I.
Prerequisite: course 123. Mr. Kettler, Mr. Vance
Accounting methods used by governmental and nonprofit institutions and concerns in particular lines such as banks, stock and grain brokers, insurance companies, and regulated public utilities.

228A. Income Taxation. (3) I and II. Mr. Cerf
Prerequisite: course 1A–1B, or the equivalent.
Income determination; sources of law; rates and returns; personal, corporation, estate and gift taxes; tax planning.

228B. Income Taxation. (3) 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 procedures.

229A–229B. Seminar in Accounting Theory. (3–3) Yr. Mr. Anton, Mr. Vatter, Mr. Mattessich,
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. Mr. Alhadeff,
Prerequisite: Economics 135.
Structure and operations of commercial banks and other financial intermediaries. Impact of money and capital market developments and of monetary authorities upon interest rates and financial institutions.

232. Money Markets and Capital Markets. (3) I and II. Mr. Michaelsen
Prerequisite: course 131 and Economics 135.
The organization and functions of, and the important influences upon, money and capital markets in the United States—primarily 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. Lynn

233B. Security Analysis and Selected Investment Problems. (3) I and II. Mr. Wendt
Prerequisite: 233A or consent of the instructor.
Consideration of selected investment problems. Cases and readings in analysis of railroad, public utility, municipal, industrial, bank, insurance, and investment companies' securities.

234. Problems in Business Finance. (3) I and II. Mr. 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.
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 and II. Mr. Garbarino, Mr. Ross
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) II. Mr. Kennedy
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. Strauss, 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. Ross, Mr. Ulman
260. Advanced Marketing. (3) I and II.  
Mr. Revzan
Prerequisite: course 160 and graduate standing. Intended primarily for graduate students in business administration who are candidates for the professional M.B.A. degree but are not qualified for course 269A–269B.

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) II.  
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.

268. Marketing Investigation. (3) II.  
Mr. Balderston
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. Grether
269A. Critical review of the literature of marketing, including background and historical materials, market organization (the marketing channel, agency structure and vertical integration), marketing functions.
269B. Prices and price policies, area structure, costs and efficiency, commodity marketing, and public and private regulation.

270. Transportation Management and Government Regulations. (3) I.  
Mr. 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, Mr. Schaaf
Intensive review of literature in theory of land utilization and urban growth; property rights and valuation; commercial, residential, and industrial real estate markets; government housing policy; and public controls over land use.
289. Seminar in Real Estate and Urban Land Economics. (3) II.  
Mr. Wendt  
Analysis of selected problems and special studies; cases in residential, commercial, and industrial real estate financing, investment, and 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. Feigenbaum, Mr. McGuire.  
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.


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.  
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. Balderston, Mr. Churchman, Mr. Jastram.  
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 298 research project.

298. Seminar in Business Administration. (3) I and II.  
Prerequisite: graduate standing.  
Advanced study in various fields of business administration. Topics will vary from year to year and will be announced at the beginning of each semester.

299. Research in Business Problems. (1–6) I and II.  
The Staff (Mr. ——— in charge)
CELL PHYSIOLOGY

(Department Office, 251 Hilgard Hall)

(See Soils and Plant Nutrition for courses offered by staff members of the department of Cell Physiology.)

CHEMICAL ENGINEERING

(Department Office, 211 Gilman Hall)

Michel J. Boudart, Ph.D., Professor of Chemical Engineering.
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 Acivos, Ph.D., Associate Professor of Chemical Engineering.
Eugene E. Petersen, Ph.D., Associate Professor of Chemical Engineering.
John M. Prausnitz, 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. Gens, M.S., Lecturer in Chemical Engineering.
David N. Lyon, Ph.D., Lecturer in Chemical Engineering.
Charles F. Oldershaw, M.S., Lecturer in Chemical Engineering.
Otto Redlich, Ph.D., Lecturer in Chemical Engineering.

Degree Requirement. For curriculum for the Bachelor of Science degree in chemical engineering, see under College of Chemistry, page 71.

Higher Degrees. See the Announcement of the Graduate Division, at Berkeley.

Upper Division Courses

143. Introduction to Chemical Engineering. (3) I and II.

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.

+ In residence fall semester only, 1962–1963.
144. Chemical Engineering Thermodynamics. (3) I and II.

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. Mr. Foss, 

Prerequisite: course 146A, 146B, 146C (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. Mr. Foss, 

Prerequisite: course 146C; 145A (may be taken concurrently); and Mechanical Engineering 107.

Continuation of course 145A.

145C. Unit Operations Laboratory. (1–2) I. 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. (3) I and II. Mr. Petersen

Prerequisite: Chemistry 110B (may be taken concurrently); course 143 (with a grade of C or higher), or consent of the instructor.

Elementary fluid mechanics and heat transfer and their application to chemical engineering problems.

146B. Chemical Engineering Unit Operations. (2) I and II. Mr. Hanson

Prerequisite: course 143, 146A (may be taken concurrently), or consent of the instructor.

Principles of equilibrium stage separation processes. Multistage calculation techniques for distillation, absorption, and extraction. Column design.

146C. Chemical Engineering Unit Operations. (2) I and II. Mr. Wilke

Prerequisite: course 146A, 146B (may be taken concurrently).

Mass transfer theory and its application to separation processes. Design principles for countercurrent differential contacting operations.

146D. Chemical Engineering Unit Operations. (2) II. Mr. Boudart

Prerequisite: course 146A or consent of the instructor.

Production and separation of particulate systems in force and flow fields. Applications of surface phenomena to chemical engineering problems.

147. Chemical Kinetics of Industrial Processes. (2) I and II.

Mr. Vermeulen, Mr. Prausnitz

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. Mr. Boudart, 

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.
49–149H. Design of Chemical Process Plants. (3–3) I and II.
Mr. Blue, Mr. Oldershaw, Mr. Wilke
Prerequisite: course 144, 146A, 146B, 146C.
Sources of data and design principles. Individual and team study of selected plant
design and process evaluation problems.

152. Principles of Inorganic and Electrochemical Processes. (3) I and II.
Mr. Lyon, Mr. Redlich
Prerequisite: courses 143 and 144 with a grade of C or better.
Equilibrium considerations in industrial inorganic processes. Estimation of thermo-
dynamic 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 146C. 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. Boudart in charge)
Independent study on theoretical or computational problems.

Graduate Courses

Chemical Engineering 146A, 146B, 146C or equivalent is prerequisite to
all courses in this group.

243. Theoretical Methods in Chemical Engineering. (3) I.
Mr. Acrivos
Prerequisite: open to senior honor students with 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 considera-
tion to design methods for binary and multicomponent distillation.

245. Diffusional Operations. (2) II.
Mr. Wilke
Modes of mass transfer, diffusion in gases and liquids, material transfer in static and
flow systems, momentum-mass transfer analogies, prediction of mass transfer coefficients
for packed column separations, plate efficiency, diffusion and chemical reaction, equip-
ment-design methods.

246. Phase Equilibria. (2) I.
Mr. Prausnitz
Prerequisite: course 144 and 146C 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, 146C, 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.

* Not to be given, 1962–1963.
248. Applied Chemical Kinetics. (2) I. Mr. Boudart
Prerequisite: course 147 or equivalent, or consent of the instructor. Open to senior honor students with consent of the instructor.

249. Special Study for Graduate Students in Chemical Engineering. (1–6) I and II. The Staff (Mr. Acrivos in charge)
Independent study on theoretical or computational problems.

250. Research in Chemical Engineering. (1–9) I and II. The Staff (Mr. Wilke in charge)

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

253. Transport Phenomena. (3) II. Mr. Acrivos
Prerequisite: course 146C, 243, or consent of the instructor. Open to senior honor students with consent of the instructor.
Formulation and rigorous analysis of the laws governing the transport of momentum, heat, and mass with special emphasis on the chemical engineering applications. Detailed investigation of laminar flows. Hydrodynamic stability.

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

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

257. Seminar in Petroleum Processing. (2 or 3) I. Mr. Wilke
Prerequisite: course 146B or consent of the instructor.
Modern petroleum refinery practice. Technology of petroleum processing with emphasis on chemical conversion processes. Plant operation. Study of factors which determine plans 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; transport properties of fluids; selected topics in chemical engineering unit operations; catalysis, process control.

Related Courses in Another Department

Mechanical Engineering 163. Fluid Mechanics (3) II.
Mechanical Engineering 266. Heat Convection. (3).

* Not to be given, 1962–1963.
CHEMISTRY

(Department Office, 419 Latimer 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 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 Orlemann, Ph.D., Professor of Chemistry.
Isadore Perlman, Ph.D., Professor of Chemistry and Associate Director of the Lawrence Radiation Laboratory.
George C. Pimentel, Ph.D., Professor of Chemistry.
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.
William F. Giauque, Ph.D., Sc.D., Professor of Chemistry, Emeritus.
Joel H. Hildebrand, Ph.D., Sc.D., LL.D., Professor of Chemistry, Emeritus.
Charles W. Porter, Ph.D., Professor of Chemistry, Emeritus.
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 Brieser, Ph.D., Assistant Professor of Chemistry.
*Joseph Cerny, Ph.D., Assistant Professor of Chemistry.
Philip E. Eaton, Ph.D., Assistant Professor of Chemistry.

Charles W. Koch, Ph.D., Lecturer in Analytical Chemistry.

*Letters and Science List.* All undergraduate courses in chemistry are included in the Letters and Science List except Chemistry 125 and 125L. For regulations governing this list, see page 96.

*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 67, 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 68.

*Letters and Science Major Advisers:* Mr. Markowitz 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, at Berkeley.

Lower Division Courses

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

Mr. Brewer, Mr. Herschbach, Mr. Johnston, Mr. Jolly,
Mr. Jura, Mr. Markowitz, Mr. Rasmussen, Mr. Strauss,
Mr. Templeton, Mr. Powell, Mr. Sederholm, Mr.
Shirley, Mr. Street, Mr. Tinoco, Mr. Williamson

Lectures and laboratory (I: Mr. Powell, Mr. Williamson; II: Mr. Markowitz).
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. Johnston, Mr. Jolly,
Mr. Jura, Mr. Markowitz, Mr. Powell, Mr. Rasmussen,
Mr. Sederholm, Mr. Shirley, Mr. Strauss, Mr. Street,
Mr. Templeton, Mr. Tinoco, Mr. Williamson

Lectures (I: Mr. Markowitz; II: Mr. Powell, Mr. Williamson).
Prerequisite: course 1A.

4A–4B. General Chemistry. (5–5) Yr.

Mr. Pimentel

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

Lectures and laboratory. Prerequisite: course 1B with a grade of C or higher.
In the fall semester a special section (lecture section 1) will be organized for chemistry majors.
S. A Short Survey of Organic Chemistry. (4) I and II.  
Mr. Calvin, Mr. Brieger, Mr. Eaton

Three lectures and one three-hour laboratory period per week.  
Prerequisite: course 1A or 4A.  
For students not majoring in chemistry, and not planning to take additional courses in  
organic chemistry. A survey of the important classes of organic compounds, with emphasis  
upon materials of interest to students of the biological sciences. Recommended for  
students in curricula requiring 4 units of organic chemistry.

8L. Survey of Organic Chemistry, with Greater Emphasis on Laboratory.  
Work. (5) I and II.  
Mr. Calvin,——

Lectures and laboratory.  
Prerequisite: course 1B or 4B with a grade of C or higher.  
Equivalent to Chemistry 8 plus one additional laboratory period per week. This course  
will place greater emphasis on the identification of organic compounds, and substitutes  
for the former courses 8 and 9. Recommended for students in curricula requiring 5 units  
of organic chemistry.

9. Organic Chemistry—Supplementary Laboratory. (3) I.  
——

Prerequisite: course 1B or 4B with grade of C or higher, and 8.  
Laboratory work (6 hours a week) and one lecture, designed to follow a one-semester  
course in organic chemistry which included a minimum of laboratory work or none.  
Students who have completed course 8L cannot receive credit for course 9.

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. Jensen, Mr. Brieger

Lectures (I: Mr. Jensen; II: Mr. Streitwieser).  
Lectures and laboratory work for students whose major is chemistry or a closely related  
field such as biochemistry or chemical engineering. This course will normally be followed  
by course 112 or 112C. Introduction to the general theory of organic chemistry and the  
chemistry of aliphatic compounds.  
Prerequisite: course 1B or 4B with a grade of C or higher. Students with previous  
credit in course 8 may receive only 1 unit credit for course 12.

Upper Division Courses

104. Inorganic Chemistry. (3) I.  
Mr. Brewer

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

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

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

106. Synthetic Inorganic Chemistry. (3) II.  
Mr. Jolly

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

* Students with 3 units credit in organic chemistry (former course 8) may receive 2 units credit for course 12.
09. Physical Chemistry—Brief Course. (3) I.
Prerequisite: course 5 or 4B and one year of college physics. Primarily for nonchemistry majors.

10A–110B. Physical Chemistry. (3–3) Yr. Beginning each semester.
Mr. Johnston, Mr. Jura, Mr. Myers, Mr. Street,
Mr. Templeton, Mr. Rasmussen
Lectures 110A. I: Mr. Rasmussen, Mr. Templeton, Mr. Street; II: Mr. Johnston.
Lectures 110B. I: Mr. Myers; Mr. Jura; II: Mr. Street, Mr. Templeton, Mr. Rasmussen.
Prerequisite: Mathematics 4A or 1B, Physics 4B, and course 5 or 4B, or junior standing in a curriculum in physical science or engineering.

11. Physical Chemistry—Laboratory. (3) I and II.
Mr. Tinoco, Mr. Jura, Mr. Sederholm
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.

12. Organic Chemistry. (5) I and II.
Lectures and laboratory.
Mr. Eaton, Mr. Noyce, Mr. Jensen
Prerequisite: course 12; or, with consent of the instructor, course 81, or courses 8 and 9. Introduction to the chemistry of aromatic and heterocyclic compounds. Simple enolate condensations.

12C. Organic Chemistry. (3) I and II.
Mr. Eaton, Mr. Jensen
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. Brewer, Mr. Shirley, Mr. Phillips
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. Herschbach
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. 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. Myers
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.
Mr. Perlman
Prerequisite: senior standing.
125. Chemical Instrumentation. (1) II.
Lectures.
Prerequisite: course 111.

125L. Chemical Instrumentation Laboratory. (1–3) II.
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.

127. Advanced Organic Chemistry. (3) I.
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.
Mr. Streitwieser

128. Organic Chemistry—Analytical Methods. (3) I and II.
Lecture and laboratory. Prerequisite: courses 5 or 4B and 112.
Mr. Noyce, Mr. Dauben

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

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 choosing 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 165)

206. Organic Chemistry. (3) II.
Emphasis is placed on typing of reactions according to mechanism, and the application to synthetic studies of current knowledge of reaction mechanism, molecular structures.
Mr. Cason

*Not to be given, 1962–1963.
and steric factors. Particular attention is given to displacement reactions, enolate condensations, and the Grignard reaction.

207B. Organic Chemistry. (3) I.  
Prerequisite: course 206.  
The chemistry of heterocyclic compounds, with emphasis on those of natural origin.  
Mr. Rapoport

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

208. Organic Chemistry. (3) II.  
Prerequisite: course 206.  
Kinetics and mechanism of organic reactions; mechanism of rearrangements.  
Mr. Noyce

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. Intermolecular attraction theory of electrolytic solutions.  
Mr. Phillips

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.  
Mr. Herschbach

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.  
Mr. Johnston

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

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

* Not to be given, 1962–1963.
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 Department of Chemistry are located in Latimer Hall. Also in Latimer Hall are laboratories for freshman chemistry and organic chemistry, and the Chemistry Library of periodicals and reference texts relating to chemistry and chemical engineering. Laboratories for analytical chemistry, advanced inorganic chemistry, and microchemistry, are housed in Lewis Hall. In Gilman Hall are the administrative offices of the Department of Chemical Engineering and laboratories for chemical engineering.

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 Latimer Hall, 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.

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**CITY AND REGIONAL PLANNING**

(Department Office, 100 City and Regional Planning Building)

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 Reichel, *Professor of Design.*

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

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.*

John D. Herbert, Ph.D., *Acting Assistant Professor of City Planning.*

Richard Peterson, M.C.P., *Lecturer in City Planning.*

Mellier G. Scott, Jr., A.B., *Lecturer in City Planning.*

*Letters and Science List.* All undergraduate courses in city and regional planning are open to students with the consent of the instructor.

The Department offers courses in urban and regional planning.

The prerequisites for these courses are listed by members of the qualified staff.

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100. City Planning 4

Prerequisite: consent of instructor.

Introduces problems of city and regional planning.

100L. City Planning Laboratory 2

Prerequisite: 100.

Labs in city planning techniques.

110. Introduction to City Planning 4

Prerequisite: consent of instructor.

Survey of history and development of city and regional planning.

111. Introduction to Urban History 4

Lecture and laboratory. Historical development of urban problems in local, state, and federal planning.

121. Urban Design 2

Open to students with consent of instructor.

Perception of urban form, development of cities, design concepts, management of urban areas.

199. Special Problems 1, 2

Prerequisite: consent of instructor.

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2 In residence spring semester only, 1962–1963.
planning are included in the Letters and Science List of Courses. For regulation governing this list, see page 96.

The Department of City and Regional Planning offers a two-year graduate program of professional education 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. (3) I and II.

Mr. Mocine

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

Introduction to the theory and technique of city planning.

100L. City Planning Laboratory for Architects and Landscape Architects.

(3) I and II.

Mr. Herbert, Mr. Peterson, _______.

Prerequisite: Architecture 102 or advanced standing in landscape architecture. (Not open to students who have taken course 110.) May be taken only concurrently with course 100.

Laboratory: individual and group practice in solving typical city planning problems.

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.

Mr. Scott

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.

The Staff (Mrs. Wurster in charge)

Prerequisite: consent of the instructor.

(Concerning conditions for admission to graduate courses, see page 165)

222. Housing and Urban Redevelopment Policy. (2) I.

Mrs. Wurster

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) I. 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.
The Staff, Mr. Violich, Mr. Peterson
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. (2) II. Mr. Kent
The general physical planning function in city and county governments; general problems of agency organization; metropolitan regional planning.

253. City Planning Analysis. First Course. (2) I. Mr. Foley
The urban community context within which city planning operates. Community structure, values, and decision-making.

254. City Planning Analysis. Second Course. (2) 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.
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. Mrs. Wurster
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.
259. Analytic Models in City Planning. (2) II. Mr. Herbert
Mathematical and other analytic models in urban planning; rationales for the design of models; review of existing models.

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 (Mrs. Wurster in charge)

CLASSICS

(Department Office, 5224 Dwinelle Hall)

Murray B. Emeneau, Ph.D., Professor of Sanskrit and General Linguistics.
Joseph Fontenrose, Ph.D., Professor of Classics (Chairman of the Department).
Arthur E. Gordon, Ph.D., Professor of Latin.
Louis Alexander MacKay, M.A., Professor of Latin.
William Kendrick Pritchett, Ph.D., Professor of Greek and Curator of Classical Epigraphy, Museum of Anthropology.
William M. Green, Ph.D., Professor of Latin, Emeritus.
William C. Helmhold, Ph.D., Professor of Classics, Emeritus.
Ivan M. Linforth, Ph.D., L.L.D., Professor of Greek, Emeritus.
Leon J. Richardson, A.B., L.L.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 and Associate Curator of Classical Archaeology, Museum of Anthropology.
Elroy L. Bundy, Ph.D., Associate Professor of Classics.
W. Gerson Rabinowitz, Ph.D., Associate Professor of Greek.
Anne R. Amory, Ph.D., Assistant Professor of Classics.
William S. Anderson, Ph.D., Assistant Professor of Latin.

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 96.

Departmental Major Adviser (Classics, Greek, Latin): Mr. W. S. Anderson.
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.

1 In residence fall semester only, 1962–1963.
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.

Note. A student enrolled in Latin 1, 1A–1B, 2 or 3 which duplicates courses completed in high school or at another institution of collegiate grade will not be allowed unit credit. The first two years of work in a foreign language in high school is considered to be equivalent to one semester in college (4 units); each successive year in a foreign language in high school is equal to one additional semester in college (4 units).

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. Mr. MacKay
10A. Greek.
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. Mr. Fontenrose

34. Epic Poetry: Homer and Vergil. (2) II. Mr. W. S. Anderson

35. Greek Tragedy. (2) I. Mr. Koniaris

36. Plato: Selected Dialogues. (2) I. Mr. Rabinowitz

Upper Division Courses

100A–100B. Greek and Latin Literature in Translation. (3–3) Yr. Mrs. Amory, Mr. W. S. Anderson
Lectures, essays, and group discussions. Enrollment limited to fifteen students. Course 100A is not prerequisite to 100B.

§135. Greek Drama. (2) II. Mr. Knox
Reading of selected plays.

*138. The Greek and Roman Historians. (2) I. Mr. Pritchett
The five historians, Herodotus, Thucydides, Polybius, Livy, and Tacitus, in English translation: their intellectual background, documentary sources, and philosophy of history.

*151. Ancient Greek Religion. (3) I. Mr. Fontenrose
The worship of the gods in ancient Greece; cults and religious ideas.

170. Classical Archaeology. (2) I. Mr. J. K. Anderson
170A. Vase-painting in Greece and Italy to 600 B.C.
*170B. Vase-painting in Greece and Italy in the sixth century.
*170C. Vase-painting in Greece and Italy from 500 B.C.

175. Pausanias, Book I. (2) II. Mr. J. K. Anderson
An ancient description of the topography of Athens as illustrated by modern archaeological discoveries.

178. Mythology. (3) II. Mr. Fontenrose
An introduction to the study of mythology based upon Greek mythology and its relations to Near Eastern and Indo-European mythologies.

185. Political and Social Thought of the Ancient Greeks. (2) II. Mr. Fontenrose
Greek ideas about society and the State, from Homer to Aristotle.

GREEK
(Courses in this group are designated Greek 1, Greek 1A, Greek 1B, etc.)

Language and Literature

* Not to be given, 1962–1963.
§ To be given, 1962–1963 only.
Lower Division Courses

1. Greek for Beginners. Double Course. (5) II. Mr. Wilson
1A–1B. Greek for Beginners. (3–3) Yr. Mr. Rabinowitz, Mrs. Amory
40A–40B. Greek Prose Composition, first course. (2–2) Yr. Mr. Wilson
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. Bundy
101. Homer. (3) II. Mr. Rabinowitz
102. Plato: Apology and Crito. (3) I. Mr. Rabinowitz
103. Drama. (3) II. Mr. Koniaris
115. Senior Course in Greek Drama. (3) I.
   *115A. Aristophanes.
   115B. Sophocles.
   *115C. Aeschylus.

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

§135. Selected Greek Tragedies. (1) II. Mr. Knox
150A–150B. Advanced Greek Prose Composition. (2–2) Yr.
Prerequisite: Greek 40A–40B. Mr. Koniaris

H195. Honors Course. (3) I and II. Mr. Fontenrose in charge
Advanced and independent study for honors 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. Rabinowitz 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. Koniaris (in charge)

* Not to be given, 1962–1963.
§ To be given, 1962–1963 only.
1A–1B. Elementary Latin. Beginners’ Course. (3–3) Yr.
Mr. W. S. Anderson (in charge), Mr. Wilson, Mr. Bennett

2. Elementary Latin (continuation of 1A–1B). (4) I and II.
Mr. Bennett, Mr. Wilson
Prerequisite: two years of high school Latin or Latin 1 or consent of the instructor.

3. Latin Prose Readings. (3) I and II.
Mr. Gordon, Mr. Bennett
Prerequisite: Latin 2 or the equivalent.

9A–9B. Latin Composition. (2–2) Yr.
Mr. W. S. Anderson, Mr. Bennett
Prerequisite: at least completion of Latin 2. Recommended to accompany Latin 3.

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 and II.
Mr. W. S. Anderson, Mrs. Amory

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

106. Horace: Odes and Epodes. (3) II.
Mr. W. S. Anderson

107. Cicero. (3) II.
Mr. Koniaris

109A–109B. Composition and Sight Reading. (2–2) Yr.
Mr. MacKay
Prerequisite: Latin 9A–9B.

145. Senior Course in Latin Poetry. (3) II.
Mrs. Amory
*145A. Roman Comedy.
145B. Lucretius.
*145C. Elegiac Poets.

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

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. W. S. Anderson 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

* Not to be given, 1962–1963.
199. Special Study for Advanced Undergraduates. (1–5) I and II.
Mr. Emeneau

CLASSES

Graduate Courses
All graduate courses in this department are designated Classics (Classics 200, etc.).

(Concerning conditions for admission to graduate courses, see page 165)

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

210. Homer: Odyssey. (3) I.
Mrs. Amory

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

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

216. Greek Philosophy: Plato, Cratylus and Philebus. (3) II.
Mr. Rabinowitz
Mr. Bundy

218. Hellenistic Poetry. (3) II.

219. Postclassical Greek Prose: Apollodoros’ Library. (3) I.
Mr. Fontenrose

*232. Cicero. (3) II.

234. Augustan Poets: Vergil. (3) II.
Mr. MacKay

235. Roman History: Caesar. (3) II.
Mr. Fontenrose

236. Roman Satire: Horace, Satires and Epistles. (3) I.
Mr. W. S. Anderson

*238. Silver Latin Prose. (3) I.
Mr. MacKay

240. Latin Epigraphy. (3) I.
Mr. Gordon

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.
Mrs. Amory in charge

* Not to be given, 1962–1963.
Latin for Graduate Students, second course. (No credit) I and II.  Mrs. Amory in charge

Readings in Medieval Latin. (English 210). (3) I.  Mr. Jones
The Medieval Mind. (English 220). (3) II.  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

Humanistic Literature in Latin. (Romance Philology 204). (2) II.  Mr. Scaglione

*Medieval Latin and Romance Learning. (Romance Philology 206). (2) II.  Mr. Carmody

COMPARATIVE LITERATURE

Committee in Charge:
Marianne Bonwit, Ph.D., Associate Professor of German.
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-Rioseco, 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 96.

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

* Not to be given, 1962–1963.
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.

Honors. The honors program in comparative literature is open to seniors with a grade-point average of 3.00 or higher who have completed at least 12 upper division units in literature, including Comparative Literature 100 or an equivalent course. In addition to satisfying the requirements for the regular major, candidates for honors must (a) do upper division work in both a modern language and either classical Greek or Latin, and (b) earn a grade of B or higher in Comparative Literature H198. Although candidacy for honors is limited to seniors, students interested in the program should consult their adviser at their earliest opportunity.

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, AT BERKELEY.

Lower Division Course

1A–1B. English Composition in Connection with the Reading of World Literature. (3–3) Yr.
Mr. Renoir (in charge)
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

* Not to be given, 1962–1963.
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. Atherton
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.  Mr. Bundy
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 (in charge)

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

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.) (2) II.
Prerequisite: graduate standing and consent of instructor.  Mr. Scaglione
A study of the growth of Humanism through the reading and interpretation of selected Latin texts, from Petrarch to Erasmus.

The Medieval Mind. (English 220) (3) II.  Mr. Jones
(Formerly numbered 220B.)
Prerequisite: English 210 or equivalent.
Literary culture of Western Europe without accent on geographical or linguistic distinctions.

The Popular Ballad. (English 225A–225B.) (3–3) Yr.  Mr. Bronson

* Not to be given, 1962–1963.
CRIMINOLOGY

(Department Office, 218 Building T-2)

Edward L. Barrett, Jr., B.S., LL.B., Professor of Criminology and of Law.
Paul L. Kirk, Ph.D., Professor of Criminalistics.
Joseph D. Lohman, M.A., Professor of Criminology (Chairman of the Department).
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'Neill, M.S., Associate Professor of Criminalistics.

Richard H. Blum, Ph.D., Lecturer in Criminology.
Herbert S. Breyfogle, M.D., Lecturer in Criminology.
Edward V. Comber, M.A., Lecturer in Criminology.
Joel Fort, M.D., Lecturer in Criminology.
John D. Holstrom, A.B., Lecturer in Criminology.
John A. Lindquist, A.B., M.C., 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 104.

Letters and Science List. Courses 100A, 100B, 102, 106, 112, and 119 are included in the Letters and Science List of Courses. For regulations concerning this list see page 96.

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.  Mr. Lohman
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. 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) Mr. Blum

Prerequisite: course 102 or consent of the instructor.

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) Mr. Lohman

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

*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) Mr. Lohman

Prerequisite: senior standing or consent of the instructor.

A systematic analysis of criminal associations in their various manifestations, informal types of cliques and mobs and formal organizations of industry and area-wide racketeers, 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 1, 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. Holstrom

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.

* Not to be given, 1962–1963.
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.

Prerequisite: senior standing.  
Mr. Barrett  
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) I.  
Mr. Fort  
Selected studies of types of social deviants and criminal offenders.

119. Ethnic Tension and Conflict in Relation to Law Enforcement. (3) II.  
Prerequisite: senior standing or consent of the instructor.  
Mr. Blum  
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, micro-chemical 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.

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.  
The Staff  
* Not to be given, 1962–1963.
Graduate Courses

(Concerning conditions for admission to graduate courses, see page 165)

*280. Crime and the Political Process. (2) Mr. Lohman
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) Mr. Blum
Ambivalence in the social processes of the law, the courts and corrections is evaluated; empirical analysis of latent and manifest functions; identification of criminogenic and otherwise abortive characteristics of the institutions of criminal justice.

282. Prediction Methods in Parole and Probation. (2) II. Mr. Blum
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) Mr. Blum
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) Mr. Lohman
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) I. Mr. Sherry
(Open also to students in the School of Law.)

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) Mr. Blum
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

* Not to be given, 1962–1963.
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 Puybroeck Miller, M.F.A., Professor of Design.
Lucretia Nelson, M.A., Professor of Design.
Herwin Schaefer, Ph.D., Professor of Decorative Art.
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.
William R. McIntyre, M.S., Assistant Professor of Design.
Alan R. Meisel, M.F.A., Assistant Professor of Design.
Joseph A. Pugliese, Ph.D., Assistant Professor of Decorative Art.
Donald M. Haskin, M.F.A., Instructor in Design.
Ragnhild L. Kingsbury, Instructor in Design.

Letters and Science List. All undergraduate courses in decorative art are included in the Letters and Science List of Courses. For regulations governing this list, see page 96.

Departmental Major Advisers: Mrs. Kingsbury, Mr. Meisel, Mr. McIntyre

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 1A or 1B or 1C or 1D; History 4A–4B. Recommended: Anthropology 2A–2B; Art 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).

2 In residence spring semester only, 1962–1963.
† Prerequisites for this course should be noted, as they must be included in the maximum of 30 upper division units offered for the degree.
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.

Miss Dumas, Mr. McIntyre, Mr. Meisel, Mr. Rosenquist, Mr. Rossbach, Mrs. Kingsbury, Mr. Pugliese, Mr. Haskins, Mr. Kabak, ———
Survey of the elements and principles of two- and three-dimensional design.
6B. Emphasis on color.

Miss Dumas, Mrs. Miller, Mr. McIntyre, Mr. Meisel
Prerequisite: course 6A–6B.
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.

127A–*127B–*127C. Primitive Art. (3–3–3) 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.

* Not to be given, 1962–1963.
130A–130B. Interior Design. (2–2) Yr.  
Mr. Wellington  
130A not prerequisite to 130B.  
Design, selection, and arrangement of furniture, with consideration for its relation to the architectural background.

140A–140B–*140C. Survey of Ceramic and Glass Forms. (3–3–3)  
Mr. Pugliese  
140A not prerequisite to 140B or 140C.  
Their design as expressions of aesthetic and social values.  
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.

175A–175B. History of the Textile Arts. (2–2) Yr.  
Miss Gayton  
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.  
Mrs. Boyer  
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.

195A–*195B. The History of Interior Design. (3–3) Yr.  
Mr. Schaefer  
195A not prerequisite to 195B.  
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. Voulkos, Mr. Meisel, Mr. Pugliese  
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  
Prerequisite: 175A or 175B which may be taken concurrently.  
The development of pattern through the processes of stencil, screen, block, and batik.

* Not to be given, 1962–1963.
166A-166B. Advanced Design: Principles of Three-Dimensional Design.
Mr. Rosenquist, Mr. Haskin, Mr. McIntyre
(2-2) Yr. Beginning each semester.
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.

Prerequisite: 175A or 175B which may be taken concurrently.
Mrs. Miller, Mr. Rossbach
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.
Prerequisite: 6A-6B and 7A-7B. Enrollment limited.
Designed to acquaint majors with the critical literature of the decorative arts.

179. Textile Analysis. (2) I.
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.
Miss Gayton

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.
The Staff
(Formerly numbered 197.)
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.
198B. Metal design. (2) II.
*198C. Design of woven textiles. (2) II.
198D. Design of printed textiles. (2) I.
*198E. Ceramic design. (2) II.
Mr. Rosenquist
Mr. Rossbach
Miss Dumas
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.

* Not to be given, 1962-1963.
Graduate Courses

Concerning conditions for admission, see the ANNOUNCEMENT OF THE GRADUATE DIVISION, AT BERKELEY. 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.
294B. Textiles. (2) II.
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.
294D. Components of Costume. (2) I.
Analysis of the tangible and intangible determinants of style in ethnic and historic costume.

*294E. Studies of Form in Primitive Art. (2) I.
*294F. Industrial Design. (2) I.
*294G. Ceramic Design. (2) II.

*298. Special Study in the Practice of Design. (2) I and II.
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 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, 120 Dwinelle Hall Annex)

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.

* Not to be given, 1962–1963.
Harry W. Smith, Jr., M.A., Instructor in Dramatic Art.

Dunbar H. Odgen, III, Ph.D., Acting Assistant Professor of 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 96.

Departmental Major Adviser: Mr. Ritchie.

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.

Higher degrees. Consult Mr. Bogard; see also the ANNOUNCEMENT OF THE GRADUATE DIVISION, AT BERKELEY.

The University Theater

Under the direction of the Department of Dramatic Art, the University Theater presents a major and studio series of play productions, extending into the laboratory of stage practice the theories of dramatic literature, criticism and production studied in the departmental curriculum. These productions are selected so as to present to the University community a program of distinguished dramas of all times and countries. The repertory for 1962–1963 includes the first English language production of Friedrich Duerrenmatt’s An Angel Comes to Babylon, Ben Jonson’s Bartholomew Fair, and three plays on the Don Juan legend: Molière’s Don Juan, G. B. Shaw’s Man and Superman in its entirety, and a new play by William Oliver, The Antiforce of John and Leporello. Participation is open to all registered students interested in acting, design or stagecraft.

Lower Division Courses

11A–11B. English Composition in Connection with Reading of Dramatic Literature. (3–3) Yr. Mr. Ogden

Prerequisite: Subject A, examination or course.

Expository writing based on analysis of masterpieces of dramatic literature and related expository works.

10A–10B. Theory of Acting. (3–3) Yr. Mr. Harris, Miss Harris

10A. Resources for Acting. I. A study of physical, psychological, and spiritual resources for acting. Mr. Harris, Miss Harris.

10B. Methods of Acting. II. Approaches and practises in characterization. The fundamentals of stage speech and movement. Mr. Harris.
10C. Theory of Acting: Vocal Resources for Acting. (3) I and II. Miss Harris

Study of the use of the voice as an element in stage characterization, involving physical, intellectual and emotional resources.

20A–20B. Introduction to Dramatic Literature. (3–3) Yr. Mr. Ogden
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, Miss Harris, Mr. Goldsby, Mr. Ritchie
Prerequisite: course 10A, 10B, 10C, 20A, 20B, and junior standing.
110A. Acting in Classical Styles. (2) II. Miss Harris
110B. Acting in Renaissance Styles. (2) I. Mr. Goldsby
110C. Acting in Major Modes, 1700–1900. (2) I. Mr. Ritchie
110D. Acting in Twentieth-Century Plays. (2) II. Mr. Harris

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. Ogden,
125A. Greek and Roman Dramatic Literature. (3) II.
125B. Dramatic Literature of Western Europe from the Middle Ages to 1600. (3) I.
125C. Dramatic Literature of Western Europe from 1600 to 1700. (3) I.
125D. Dramatic Literature of Western Europe and the United States from 1700 to 1900. (3) I.
125E. Dramatic Literature of Western Europe and the United States from 1900 to the Present. (3) II.

139A–139B. Playwriting. (3–3) Yr. 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.  
Prerequisite: course 20A–20B, or consent of instructor.  
The development of the American theater from colonial times to the twentieth century.  
Mr. Wilson

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

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

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.  
Mr. Rosenberg

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

199. Special Study for Advanced Undergraduates. (1–3) I and II.  
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.  
The Staff (Mr. Bogard in charge)

Graduate Courses

(Concerning admission to graduate courses, see page 165.)

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.

210A–210B. Advanced Acting. (3–3) Yr.  
Prerequisite: course 220; may be taken concurrently. Course 221A is not prerequisite to 221B.  
Mr. Oliver, Mr. Goldsby

220. Theater Research. (2) I and II.  
Prerequisite: course 220; may be taken concurrently. An introduction to bibliographical methods and materials for theater research projects.  
Mr. Rosenberg

221A–221B. Studies in the Modern Theater. (3–3) I and II.  
Prerequisite: course 220; may be taken concurrently. Course 221A is not prerequisite to 221B.  
221A. Realism in Twentieth Century Drama. I.  
221B. Anti-Realistic Trends in Twentieth-Century Drama. II.  
Mr. Rosenberg

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.  
Mr. Rosenberg
224. Studies in the French Theater. (3) I. Mr. Goldsby
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. Mr. Oliver
Prerequisite: consent of instructor, not open to undergraduates.

245. Studies in the American Theater. (3) II. Mr. Wilson
Prerequisite: course 220; may be taken concurrently.

250. Theater Design. (3) I. Mr. Smith
Open to qualified seniors with the consent of the instructor.
Theory and practice of design for the visual theater.

260. Advanced Directing. (3) II. Mr. Ritchie
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).
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 105).
Italian Literature of the Eighteenth Century (Italian 114).
Italian Literature of the Twentieth Century (Italian 116).
Roman Comedy (Latin 145A).
Introduction to Opera (Music 127A).
Survey of Chinese Vernacular Literature (Oriental Languages 172).

* Not to be given, 1962–1963.
Rhythmic Basis of Dance and Allied Arts (Physical Education 35).
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. Davison, J.D., Ph.D., Professor of Economics.
Gerard Debreu, D.Sc., 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., ekon dr.(hon.c.) 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., LL.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. Rolph, Ph.D., Professor of Economics.

Tibor Scitovsky, M.Sc., J.D., Professor of Economics.

# In residence fall semester only, 1962–1963.
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.
Paul S. Taylor, Ph.D., Professor of Economics, Emeritus.
George F. Break, Ph.D., Associate Professor of Economics.
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 Safran, B.A., Acting Assistant Professor of Economics.
Benjamin N. Ward, Jr., Ph.D., Assistant Professor of Economics.

George C. Archibald, M.A., Visiting Associate Professor of Economics.
K. Roland A. Artle, ekon.dr., Associate Professor of Business Administration.
Antonius P. Barten, doctorandus, Lecturer in Economics.
Melvin K. Bers, Ph.D., Lecturer in Economics.
Burgess D. Cameron, Ph.D., Visiting Professor of Economics.
Hugh W. Folk, Ph.D., Lecturer in Economics.
Richard H. Holton, Ph.D., Professor of Business Administration.
Saul H. Hymans, M.A., Acting Instructor in Economics.
Chh-Ming Li, Ph.D., Professor of Business Administration.
Julius Margolis, Ph.D., Professor of Business Administration.
Richard V. Mattessich, Dr. rer. pol., Associate Professor of Business Administration.
James L. Pierce, B.A., Acting Instructor in Economics.
Lee Egan Preston, Jr., Ph.D., Assistant Professor of Business Administration.
Arthur M. Ross, Ph.D., Professor of Industrial Relations.
John Wiseman, B.S., Visiting Professor of Economics.

Letters and Science List. All undergraduate courses in economics are included in the Letters and Science List. For regulations governing this list, see page 96.

Departmental Major Advisers: Mr. Minsky (chairman), Mr. Fishlow, Mr. Rosovsky, Mr. Safran, Mr. Ward.

The Major. Required: either (A) Economics 1A–1B, 2, and 24 units of upper division economics; or (B) Economics 103A–103B, 2, and 18 units of upper division economics. For students electing alternative (A) above, Economics 100A–100B and either 112A or 112B, or 113 are required and should be taken prior to the senior year. For students electing alternative (B) above, Economics 100B and either 112A or 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 include one year-course or two one-semester courses in the same field. Economics 112A–112B may be used to satisfy the sequence requirement provided 113 is also taken. A course (3 units) in another department may be included if 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. Break, Mr. Ward, Mr. Papandreou
1A: I: Mr. Papandreou, Mr. Ward; II: Mr. Break; 1B: I: Mr. Break; II: Mr. Papandreou, Mr. Ward.
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.
Mr. Hymans, Mr. Folk, ———
I: Mr. Hymans, Mr. Folk; II: Mr. Hymans, ———.
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. Pierce, Mr. Hymans, Mr. Folk, Mr. Wiseman, Mr. Cameron, Mr. Barten, Mr. Archibald, Mr. Bain, Mr. Fishlow, ———

100A. I: Mr. Pierce, Mr. Hymans, Mr. Folk, Mr. Wiseman, Mr. Archibald; II: Mr. Archibald, Mr. Fishlow; 100B. I: Mr. Cameron, Mr. Barten, Mr. Pierce; II: Mr. Pierce, Mr. Hymans, Mr. Bain, ———

Not open to students who have completed Business Administration 100 or 101.

100A. The problem of economic stability; the problem of economic progress; and problems in the foreign economic relations of the United States.

100B. The problems of competition, monopoly and economic power, economic opportunity, motivation, efficiency, and freedom.

**101A–101B. History of Economic Doctrine.** (3–3) Yr. ———

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. Mr. Archibald

Prerequisite: course 100A–100B. Analysis of the determinants of the aggregate level of output and employment, and of the allocation of resources. Includes advanced value and distribution theory, and a brief review of modern monetary theory.

**103A–103B. Introduction to Economic Principles, Institutions, and Policies.** (3–3) Yr. Mr. 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.

**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, 1962–1963.
112A–112B. Economic History of Europe. (3–3) Yr. Mr. Rosovsky
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. 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. Ward
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 Eastern European economies; the Communist bloc as a whole. Prerequisite: course 118A or consent of the instructor.

121A–121B. Industrial Organization. (3–3) Yr. Mr. Preston
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. Holton
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.

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. Wiseman
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.

* Not to be given, 1962–1963.
133. Dynamic Economics and Business Fluctuations. (3) II. Mr. Pierce
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. Minsky
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. ————
(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. Bers
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.
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.

185. Social Insurance. (3) II. Mr. Folk
An analysis of the theories underlying social insurance and social insurance legislation throughout the world.

*188. Population and Migration. (3) I.
(Formerly numbered 188A–188B.)
Social and economic consequences of population change, with special reference to economic opportunities, employment, investment, and problems of international trade; population trends, theories, and problems, methods of population measurement and population forecasting. Population and migration problems in economic development.

190A–190B. International Economic Relations. (3–3) Yr.
190A. Theory. Mr. Letiche, ————

H195. Junior Honors Course. (1–3) I and II.
The Staff (Mr. Minsky in charge)

H196. Senior Honors Course. (3) I and II. The Staff (Mr. Minsky in charge)

* Not to be given, 1962–1963.
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. Minsky 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.

Mr. Scitovsky, Mr. Artle, Mr. Saffran, Mr. Papandreu
Two lectures and one discussion section per week.

200A. Micro-economics: The behavior of firms and households, and the determination of
prices and resource allocation patterns in a decentralized economy. Mr. Scitovsky, Mr.
Artle, Mr. Saffran.

200B. Macro-economics: Determination of national income, employment, price level,
growth, distribution. Mr. Scitovsky, Mr. Saffran, Mr. Papandreu.

201A–201B. History of Economic Thought. (3–3) Yr.
Mr. Letiche
Analysis of the relationships between historical conditions, economic theory, and eco-
nomic policy from the Greeks to modern times.

202. Advanced Economic Theory. (3) I and II.
Prerequisite: course 200A or equivalent. Mr. Papandreu, Mr. Scitovsky
Further treatment of micro-economics beyond what is covered in course 200A.

203. Advanced Topics in Economic Theory. (3) I and II.
Mr. Bain, Mr. Archibald, Mr. Hoos, Mr. Debreu, Mr. Radner
Prerequisite: course 200A–200B.
For students desiring further training in theoretical analysis. Topics to be covered in
the different sections will be announced annually.

I. Sec. 1: price theory, with emphasis on the behavior and performance, in price and
nonprice dimensions, of industries having various market structures, Mr. Bain; Sec. 2:
topic to be announced, Mr. Archibald; Sec. 3: linear models in economic theory: an
elementary presentation of linear programming, and input-output and activity analysis,
Mr. Debreu.
II. Sec. 1: contemporary contributions to the theory of the firm, Mr. Hoos; Sec. 2:
mathematical theories of economic planning, Mr. Radner.

(3–3) Yr.
Mr. Leibenstein,
Theory of economic change; applications to the development of underdeveloped econ-
omies; relation of such theories to general economic theory. Institutional patterns of
development; population problems, changes in resource and product composition.

* Not to be given, 1962–1963.
207A–207B. Mathematical Economics. (3–3) Yr. Mr. Debreu
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. Mr. Fishlow
Prerequisite: consent of instructor.
The purpose of this course is to enable graduate students with special interest in economic history to carry out advanced study in some phase of the field. Topics will be announced annually.
210B. Sec. 1: Seminar in American economic history. Mr. Fishlow.

211. Economic History of Japan. (3) I. Mr. Rosovsky
Emphasis on the post-Restoration (1868) period.

212A–212B. Topics in Economic History. (3–3) Yr. Mr. Landes, Mr. Rosovsky
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.

216. Seminar in Comparative Economic Systems and Planning. (3) I and II. Mr. Cameron, Mr. Grossman, Mr. Li
Advanced topics in comparative economic systems, planning, the Soviet economy, the economy of Communist China, social reform movements, and related subjects. The topics will be announced annually.
I. Sec. 1: national applications of input-output analysis, Mr. Cameron; Sec. 2: advanced topics in the Soviet economy, Mr. Grossman.
II. Sec. 1: Advanced topics in the Communist Chinese economy, Mr. Li; Sec. 2: comparative economic systems, Mr. Grossman.

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.

222. Economic Analysis of Public Services. (3) II. Mr. Margolis
Economic behavior of government agencies and criteria for selection and operation of public services. Special attention to transportation, water and other natural resources, and metropolitan government.

230A–230B. Public Finance. (3–3) Yr. Mr. Break, Mr. Wiseman
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. Minsky
Analysis of banking institutions and money, monetary theory, and monetary policy.

* Not to be given, 1962–1963.
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.

Mr. Mattessich

Prerequisite: courses 2 and 100A–100B. Recommended: some knowledge of accounting.
Survey of the theory underlying alternative methods of measurement and review of the methods used in the United States and other countries.


Mr. Barten

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. Barten

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. Ross, Mr. Kerr, Mr. Ulman

*254A–254B. Seminar in Agricultural Labor in Advanced and in Underdeveloped Countries. (3–3) Yr.

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.

290A–290B. International Economics. (3–3) Yr. Mr. Scitovsky, 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. Mr. Leibenstein

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)

* Not to be given, 1962–1963.

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. Radner, Mr. Kuznets

Laboratory Course in Statistical Inference for Social Scientists. (Statistics 131L.) (1) I and II. Mr. Radner, Mr. Kuznets

Survey of Algebra and Analysis. (Mathematics 190A–190B.) (3–3) Yr.

EDUCATION

(Department Office, 1501 Tolman Hall)

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.
J. Cecil Parker, Ed.D., Professor of Education.
Theodore L. Reller, Ph.D., Professor of Education.
David H. Russell, Ph.D., Professor of Education.
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.
William A. Brownell, Ph.D., LL.D., Professor of Education, Emeritus.
Guy T. Buswell, Ph.D., LL.D., Professor of Education, 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.
Edgar L. Morphet, Ph.D., Professor of Education, Emeritus.
George A. Rice, Ed.D., Professor of Education, 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.
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.
Martin A. Trow, Ph.D., Associate Professor of Education and Sociology.
Val E. Arnsdorff, Ph.D., Assistant Professor of Education.
John G. Hurst, Ph.D., Assistant Professor of Education.
Arthur R. Jensen, Ph.D., Assistant Professor of Education.
Robert W. Moulton, Ph.D., Assistant Professor of Education.
John L. Rinn, Ed.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.
Alan B. Wilson, Ph.D., Assistant Professor of Education.

Aubrey L. Berry, Ed.D., Lecturer in Education.
Joe L. Byers, Ph.D., Acting Assistant Professor of Education.
Hubert S. Coffey, Ph.D., Associate Clinical Professor of Psychology.
Enoch Dumas, Ed.D., Lecturer in Education, Associate Director of Teacher Education, and Supervisor of Elementary Education.
Joseph L. Fischer, M.A., Acting Assistant Professor of Education.
M. Ray Hitch, M.A., Lecturer in Education.
Barbara Kirk, M.A., Lecturer in Education.
George H. Kyme, Ph.D., Lecturer in Music and Supervisor of the Teaching of Music.
Jack D. Mezirow, Ed.D., Lecturer in Education.
Karl E. Schevill, Ph.D., Lecturer in Education, Associate Director of Teacher Education and Supervisor of the Teaching of Foreign Languages.
Hasseltine Byrd Taylor, J.D., Ph.D., Lecturer in Social Welfare.

Meidel Applegate, M.A., Supervisor of Secondary Education.
J. Oswaldo Asturias, B.A., Supervisor of Secondary Education.
Neva Aubin, M.A., Supervisor of Elementary Education.

1 In residence fall semester only, 1962–1963.
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.  
Purpose, content, organization, instructional materials, and evaluation of subjects in the curriculum.

130A. Arithmetic. (2) I and II.  
(Formerly numbered 131.)  
Mr. Dumas, Mr. Scott

130B. Art and Music. (2) I and II.  
(Formerly numbered 132.)  
Mrs. Aubin, Mr. Kyme, Mr. Luca

Prerequisite: Decorative Art 6A, Music 10.

130C. Reading and the Other Language Arts. (3) I and II.  
(Formerly numbered 134.)  
Mr. Russell

130D. Social Studies and Science. (3) I and II.  
(Formerly numbered 138.)  
Mr. Arnsdorf

151. Administration of the School Health Program. (2) I and II.  
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.  
Mr. Rinn

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.

167. Personality Theory in Counseling. (2) II.  
Mr. Moulton

Prerequisite: consent of instructor.

Critical analysis of personality theories and their relationships to counseling theories.

172. Junior High School Education. (2) I.  
Mr. Loban

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.

* Not to be given, 1962–1963.
182. Problems of Adulthood. (3) II. 
Problems of work, leisure, and aging. 
Mr. London

186. Laws Relating to Schools and to Children. (2) II. 
School laws and those aspects of labor and welfare laws applicable to school children. 
Mr. Berry, Mrs. Taylor

199. Special Study for Advanced Undergraduates. (1–5) I and II. 
The Staff (——— 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 completion of at least 12 units of upper division work basic to the subject of the graduate course.

The admission of undergraduates to graduate courses is limited to seniors who have an average grade of at least B in the basic courses; the study-list limits in such cases are the limits imposed by the rules of the Graduate Division.

200A. Social Foundations of Education. (3) I and II. 
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. 
Mr. Mezirow

200B. Psychological Foundations of Education. (3) I and II. 
(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 psychology at an advanced level.

200C. Foundations of Curriculum Development. (3) I and II. 
General concepts, principles, and practices of public school curriculum planning. 
Mr. Parker

200D. Public School Organization and Administration. (3) I and II. 
Enrollment restricted to nonmajors in administration. 
The principles and practices of educational administration with respect to the teacher and the administrative personnel, state and local administrative organization, finance and business procedures, public relations. 
Mr. Reller, Mr. Swanson

201A–201B. History of Education. Seminar. (2–2) Yr. 
Admission on consultation with the instructor. 
The theory and practice of historical inquiry as applied to research in the history of education. 
Mr. Mosier

203. Problems in the History of Education. (2) I and II. 
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. 
Mr. Mosier

* Not to be given, 1962–1963.
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) II. Mr. Lilge
205B. Western Europe. (2) I and II.
205C. Asian Countries. (2) I and II. Mr. Fischer
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. Mezirow, Mr. Coffey

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. Ronning
Prerequisite: consent of instructor. Doctoral candidates in educational psychology may not register for this course.

211B. Children’s Thinking. (2) II.
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. Mr. Hurst
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.

214. Topics in Statistics with Application to Methods of Investigational Education. (2) I and II. Mr. Stellwagen
Prerequisite: a course in elementary statistics and consent of the instructor.
Topics in statistics. Content will vary from year to year. Topics covered in the past have included correlation analysis; small sample statistics; factor analysis; multivariate analysis and nonparametric techniques.

214B. Factor Analysis. (2) II. Mr. Stellwagen
Prerequisite: course 114 and 214A.

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. Hurst
215D. Human Development: Personal and Social. (4) II. Mr. Roden

* Not to be given, 1962–1963.
217A. Experimental Education. (2) I. Mr. Holmes
Laboratory experiments applied to the various school subjects. Voice recording, photographing eye movements in reading and spelling, analysis of rhythm in reading, arithmetic, and writing, and studies of the motor responses accompanying appreciation.

217B. Experimental Education. (2) II. Mr. Holmes
Prerequisite: course 217A.
Students expected to complete an advanced laboratory project.

218. Investigations in the Elementary School Curriculum. Research in the curriculum; students will have an opportunity to specialize in a selected area.

218A. Psychological Bases. (2) I. (Formerly numbered 118.)

218B–218C. Language Arts. (2–2) Yr. (Formerly numbered 218A–218B.)
218B: II; 218C: I.

218D. Arithmetic. (2) II. (Formerly numbered 219.)

218E. Social Studies. (2) II.

218F. Science. (2) I and II. Mr. Michaelis

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.
Prerequisite: consent of instructor. Mr. Arnsdorf

235. The Elementary School Curriculum. (2) I.
Prerequisite: consent of instructor.

236A–236B. Evaluation of Elementary Education. (2–2) Yr. Mr. Michaelis
Theories and principles of evaluation applied to various aspects of elementary education.

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. Ross, 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.

* Not to be given, 1962–1963.
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) I and II. Mr. Reller
242B. Administration of Educational Programs and Services; Pupil Personnel Services. (2–4) I. Mr. Swanson
242C. Administrative Behavior and Organization; Personnel Administration. (2–4) II. Mr. Reller
242D. Finance and Business Administration. (2–4) I. Mr. Ross
242E. School-Community Relations and Schoolhousing. (2–4) II. Mr. Reller

243. Administration of the Individual School. (2) II. ———, Mr. Edwards
(243: Sec. 1 formerly numbered 231.)
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. Mr. Rinn
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) I and II. Mr. Rinn
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. Mr. Moulton
Prerequisite: course 261 and consent of instructor.
Counseling theory, schools of counseling, intensive investigation of counseling techniques, diagnostic procedures and treatment, evaluation of counseling.

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) I.
Prerequisite: course 100B or former course 130 or 170, teaching experience, and consent of instructor.
Mr. Edwards

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, Mr. Roming

The nature and role of the junior college in American education, including a consideration of purposes, curriculum, principles of learning, development and utilization of instructional materials, and student personnel services. Credential candidates without teaching experience will register for 4 units of credit. Students not seeking the junior college credential may enroll for either 2 or 4 units.

281A°–281B. Adult Education Seminar. (2-2) Yr.
Formerly numbered 281.
Mr. London

(281B-I)
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.
Mr. Carter

288B. The Curriculum of Higher Education. (2) I and II.
Mr. Trow

288C. The Administration of Higher Education. (2) I.
Mr. Stone

292. Research Techniques. Seminar. (2) I and II
The Staff (——- in charge)

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

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. II.
B. Educational Administration. I and II.
Mr. London

C. Educational Curriculum. I and II.
Mr. Reller, Mr. Ross, Mr. Swanson, Mr. Wilson

D. Educational Psychology. I and II.
Mr. Parker

E. Educational Sociology. II.
Mr. Carter

F. Elementary Education. I and II.
Mr. Trow

G. Higher Education. I and II.
Mr. McConnell, Mr. Medsker, Mr. Stone

H. History of Education. II.
Mr. Mosier

I. Philosophy of Education. II.
Mr. Lilge

J. Secondary Education. I and II.
Mr. Loban

K. Student Personnel and Counseling Psychology. I and II.
Mr. Moulton, Mr. Rinn

* Not to be given, 1962-1963.
298. Directed Research Seminar. (2–4) I and II. The Staff (——— 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. Mrs. Kirk, Mr. Moulton

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. Mr. Swanson

Prerequisite: course 241A–241B and 293, and consent of instructor.

**Supervised Teaching**

320. Supervised Teaching in Secondary Schools. Professional Methods. 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 275) 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. Hatfield, Mr. Brown

Prerequisite: course 100A. Ordinarily course 320B should be taken concurrently with course 100B.

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. Mr. Polson, Mr. Brown, Miss Prochaska  
Mr. J. Lund, Mr. Stehr
Sec. 3. Mathematics.  
Mr. Farrell, Mr. Gray, Mrs. Maertins, Mr. Ruth
Sec. 4. English.  
Mr. Asturias, Mrs. Jackson
Sec. 5. Foreign Languages.  
Mr. Berg, Mrs. L'Aventure, Mr. McCreary, Mr. Nelson,  
Mrs. Pederson, Mr. Stehr, Mr. Thompson, Mr. Webster  
Miss Prochaska, Mr. Thompson  
Miss Prochaska  
Miss Hole  
Miss Stiles  
Mr. Kyne  
Mr. Thompson  
Mr. Berg, Mr. Schevill
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 280.)

324. Junior College Supervised Teaching. (4) I and II. 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 280). 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 280).

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.

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 280).

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.

* Not to be given, 1962-1963.
Special Education

*149. Administration, Organization, and Procedures in Special Education. (2) I.

*326. Supervised Teaching in Special Education. (4) II.
Prerequisite: course 149, which may be taken concurrently if circumstances require. Course 320E, Sec. 17, must be taken concurrently with 326. Open only to candidates for a credential in special education and only after consultation with the instructor in charge.

*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–328B. Vocal Technique and Methods of Teaching Voice. (2–2) Yr.


329A. Stringed Instruments. (1) I and II.

329B. Brass Instruments. (1) I.

329C. Woodwind Instruments. (1) II.

329D. Percussion Instruments. (1) I.

329E. Ensemble: Literature for School Orchestra and Band. (1) II.

Music 330. Choral Repertory. (1) II.

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.

* Not to be given, 1962–1963.
ENGLISH

(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 and Radiological Engineering.
Percy H. McGauhey, M.S., Professor of Sanitary Engineering (Chairman of the Division), Professor of Public Health Engineering 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, and Associate Professor of Public Health.
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.
Robert E. Selleck, Ph.D., Assistant Professor of Sanitary Engineering.

Edwin R. Bennett, M.S., Associate in Civil 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).
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.
Joe W. Kelly, B.S., Professor of Civil Engineering, Emeritus.
Vitelmo Bertero, Sc.D., Associate Professor of Civil Engineering.
Jack G. Bouwkamp, C.I., Associate Professor of Civil Engineering.
Hugh D. McNiven, Ph.D., Associate Professor of Civil Engineering.
Joseph Penzien, Sc.D., Associate Professor of Civil Engineering.
David Pirtz, M.S., Associate Professor of Civil Engineering.
†Karl S. Pister, Ph.D., Associate Professor of Civil Engineering.
Milos Polivka, M.S., Associate Professor of Civil Engineering.
Charles F. Schaeffey, M.S., Associate Professor of Civil Engineering.
Alexander C. Scordelis, M.S., Associate Professor of Civil Engineering.
Jerome L. Sackman, Eng.Sc.D., Assistant Professor of Civil Engineering.

Roger J. Evans, M.S., Associate in Civil Engineering.
Alexander Klein, M.S., Lecturer in Civil Engineering.
Harold I. Laursen, M.S., Associate in Civil Engineering.
Richard A. Parmelee, M.S., Associate in Civil Engineering.
Robert W. Shubinski, M.S., Associate in Civil Engineering.
Edward L. Wilson, M.S., Associate in Civil Engineering.

Transportation Engineering

(Division Office, 107 Engineering)

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.

* In residence fall semester only, 1962–1963.
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.

Walter E. Gillfillan, M.Eng., Lecturer in Transportation Engineering.
Wolfgang S. Homburger, M.S., Associate in Transportation Engineering.
James H. Kell, M.S.C.E., Associate in Transportation Engineering.
Wayne H. Snowden, B.S., Lecturer in Transportation Engineering.
Richard M. Zettel, M.A., Lecturer in Transportation Engineering.

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.
Charles A. Desoer, Sc.D., 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.

* In residence spring semester only, 1962–1963.
Albert C. English, Ph.D., Associate Professor of Electrical Engineering.
Elihu 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 Süsskind, Ph.D., Associate Professor of Electrical Engineering.
*Aram J. Thomasian, Ph.D., Associate Professor of Electrical Engineering and
Statistics.
George L. Turin, Sc.D., Associate Professor of Electrical Engineering.
Shyh Wang, Ph.D., Associate Professor of Electrical Engineering.
John R. Woodyard, Ph.D., Associate Professor of Electrical Engineering.
Thomas E. Everhart, Ph.D., Assistant Professor of Electrical Engineering.
Arthur Gill, Ph.D., Assistant Professor of Electrical Engineering.
Allan J. Lichtenberg, M.S., Assistant Professor of Electrical Engineering.
Alvin W. Trivelpiece, Ph.D., Assistant Professor of Electrical Engineering.
Theodore Van Duzer, 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.

Robert M. Bevensie, Ph.D., Acting Assistant Professor of Electrical Engineering.
Stirling A. Colgate, Ph.D., Lecturer in Electrical Engineering.
Lawrence Hasdorff, M.S., Associate in Electrical Engineering.
Richard E. Mortensen, M.S., Associate in Electrical Engineering.
Syed Nasar, M.S., Associate in Electrical Engineering.
Puttaveeriah Paramasivaiah, M.S., Associate in Electrical Engineering.
Elijah Polak, M.S., Acting Assistant Professor of Electrical Engineering.
Norman P. Schein, M.S., Associate in Electrical Engineering.
Kashi R. Swaminathan, B.Sc., Diploma, Madras Institute of Technology,
Associate in Electrical Engineering.
Paul S. Wan, M.S., Associate in Electrical Engineering.
Niklaus E. Wirth, Ph.D., Associate in Electrical Engineering.

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.
William S. Jewell, Sc.D., Assistant Professor of Industrial Engineering.
Shiro Kobayashi, Ph.D., Assistant Professor of Industrial Engineering.

Robert M. Oliver, Ph.D., Lecturer in 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 and Acting Chairman of the Division of Mechanics and Design)
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.
Stanley A. Berger, Ph.D., Assistant Professor of Aeronautical Sciences.

Maurice Holt, Ph.D., Lecturer in 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.

* In residence fall semester only, 1962–1963.
Francis W. Hutchinson, M.S., M.E., Professor of Mechanical Engineering.
Harold W. Iversen, M.S., Professor of Mechanical Engineering.
Harold A. Johnson, M.S., Professor of Mechanical Engineering.
Ralph A. Seban, Ph.D., Professor of Mechanical Engineering (Chairman of the Division).
Yasundo Takahashi, Ph.D., Professor of Mechanical Engineering.
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. Naghdí, Ph.D., Professor of Engineering Science.
Reinhardt M. Rosenberg, M.S., Professor of Engineering Mechanics.
Walter W. Soroka, Sc.D., Professor of Acoustical Sciences (Vice-Chairman of Applied Mechanics).

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, Sc.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.
Chich 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 (Vice-Chairman of Design).

Leo Dabaghian, M.S., Associate in Mechanical Engineering.
Peter T. Lyman, M.S., Associate in Mechanical Engineering.

1 In residence fall semester only, 1962–1963.
2 In residence spring semester only, 1962–1963.
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. Shaffer, E.M., Professor of Mining.
† Jack Washburn, Ph.D., Professor of Metallurgy.
Paul A. Witherspoon, Ph.D., Professor of Petroleum Engineering (Acting Chairman of the Department).
Anders J. Carlson, Ph.D., Professor of Petroleum Engineering, Emeritus.
Edward H. Wisser, B.S., Professor of Mineral Exploration, Emeritus.
Douglas W. Fuerstenau, Sc.D., Associate Professor of Metallurgy (Vice-Chairman of the Department).
* 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.
Gareth Thomas, Ph.D., Assistant Professor of Metallurgy.

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 Metallurgy.
Kenneth K. Kelley, Ph.D., Lecturer in Metallurgy.
Robert B. Langston, M.S., Lecturer in Materials Science.

NAVAL ARCHITECTURE

(Department Office, 224 T-3)

Henry A. Schade, Dr.Ing., Professor of Naval Architecture (Chairman of the Department).

† In residence full semester only, 1962–1963.
John V. Wehausen, Ph.D., Professor of Engineering Science.  
J. Randolph Paulling, Jr., D.Eng., Nav.Arch., Assistant Professor of Naval Architecture.

Osvald J. Sibul, M.S., Lecturer in Naval Architecture.

NUCLEAR ENGINEERING
(Department Office, 219 T-4)

Thomas H. Pigford, Sc.D., Professor of Nuclear Engineering (Chairman of the Department).
Lawrence M. Grossman, Ph.D., Professor of Nuclear Engineering.
Harvey J. Amster, Ph.D., Associate Professor of Nuclear Engineering.
Paul L. Chambré, Ph.D., Associate Professor of Engineering Science and of Mathematics.
Hans Mark, Ph.D., Associate Professor of Nuclear Engineering.
Lawrence Ruby, Ph.D., Associate Professor of Nuclear Engineering.
Virgil E. Schrock, M.S., M.E., Associate Professor of Nuclear Engineering.
Rubin Goldstein, Ph.D., Assistant Professor of Nuclear Engineering.
Donald R. Olander, Sc.D., Assistant Professor of Nuclear Engineering.
Harold P. Smith, Jr., Sc.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.
Robert V. Pyle, Ph.D., Lecturer in Nuclear Engineering.
Richard N. Stuart, Ph.D., Lecturer in Nuclear Engineering.
Wilson K. Talley, M.S., Associate in Nuclear Engineering.
Roger W. Wallace, 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.

The Staff (Mr. Moffitt in charge)

1 In residence fall semester only, 1962–1963.
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.

1. 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.

Mr. McNiven, Mr. Polivka

Two lectures and three laboratory hours per week.

Prerequisite 18A: Physics 2A and 3A or 4A; Mathematics 3B and Engineering 21 both of which may be taken concurrently. For students in architecture, 18B: Engineering 21 and Mathematics 3B.

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.

18B. Deformation of structural members and frames. Introduction to analysis of indeterminate structures using moment distribution. Study of sidesway using moment distribution and approximate methods.

21. Plane Surveying. (3) I and II.

The Staff (Mr. Moffitt in charge)

Prerequisite: trigonometry. Not open to students in engineering.

Principles and practice of surveying, including use of tape, transit, level, alidade; calculation of traverse, areas, volumes, curves; stadia and plane table mapping.

22. Engineering Drawing. (2) I and II. The Staff (Mr. Levens in charge)

One lecture and five laboratory hours per week. Prerequisite: course 23.

Freehand pictorials; theory of orthogonal projection; single and multiple auxiliaries; dimensioning; freehand and mechanical working drawings; graphic computations; plotting experimental data and determination of elementary empirical equations.

23. Descriptive Geometry. (2) I and II. The Staff (Mr. Levens in charge)

One lecture and five laboratory hours per week. Prerequisite: Mathematics 3A (may be taken concurrently); plane geometry, trigonometry, and mechanical drawing.

The fundamental principles of descriptive geometry and their application to the solution of three-dimensional problems arising in the various branches of engineering.


Mr. Levens

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; functional scales; elements of nomography; empirical equations; graphical calculus; freehand pictorials and orthographic sketches; and conceptual design.

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. DeCarno (in charge), Mr. Grassi, Mr. Hazlett, Mr. Keachie, Mr. Lapsley
Prerequisite: Mechanical Engineering 105A, or Physics 112, or Chemistry 110B; Electrical Engineering 100A, 101A or 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.
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 distributions 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. Schaff (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.
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.
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.
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.
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 169.
‡ 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.

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.  

Prerequisite: senior standing in civil engineering.  

Mr. Monismith  

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.

120. Soil Mechanics. (3) I.  

Prerequisite: consent of the instructor. Not open to undergraduate students in civil engineering.  

Mr. Seed  

Selected topics in soil mechanics and experiments on physical and mechanical properties of soils including their application in design problems.

121. Soil and Foundation Engineering. (3) I and II.  

Mr. H. E. Davis (in charge), Mr. Seed, Mr. Mitchell  

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.  

Prerequisite: course 121.  

Mr. Seed  

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.  

Prerequisite: Engineering 18B. For students in architecture.  

Mr. Scordelis  

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. Popov 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. Popov 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. Mr. Schefcey 
Prerequisite: course 131, 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) 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. Flight Structures. (3) II. Mr. Penzien 
Prerequisite: course 130. 
Stress, deformation, and stability analyses of flight structures; torsion and bending of typical sections; buckling and post-buckling strengths of thin sheet elements; stress and stability considerations of sandwich components; thermal stresses and thermal buckling; high temperature creep effects.

139. Introduction to Mechanics of Solids. (3) I. Mr. Popov 
Prerequisite: course 130 or Physics 105A or consent of the instructor. 
Stress-strain relations for elastic and inelastic materials; plastic flow, creep, relaxation, thermal effects; solution of problems in elasticity and inelasticity.

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. Selleck, Mr. Oswald, Mr. Pearson 
Prerequisite: Engineering 103. 
Hydraulic and sanitary analysis and design of municipal and industrial waste collection 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 water 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 pollu-
   tion and waste disposal.

149. Municipal Engineering Services. (2) II.  Mr. Homburger, 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 develop-
   ment and conservation.

160. Hydrology. (2) I.  Mr. Todd
   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
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. Monismith
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. Polivka
Lectures and seminars. Consideration of broad aspects of concrete construction; tech-
nical 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 impor-
tance; fundamental principles that underlie construction practices, methods and equip-
ment, their application and limitations; economic factors involved in planning, organizing,
and operating a construction force.

190. Engineering Reports. (2) II.  Mr. Polivka
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. Horonjef 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 inde-
pendent 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 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 analyses.

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. Orlob, Mr. Wiegel
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) I. 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.

† See double dagger (†) footnote, page 293.
16. Industrial Wastes. (2) II.  
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.  
Mr. Pearson

18. Atmospheric Pollution. (3) I.  
Prerequisite: course 146.  
Nature of air pollutants and methods of monitoring and controlling air pollution.  
Mr. Tebbens

290K. Air Pollution Control. (2) II.  
Mr. Tebbens

290L. Water Resources Development. (2–3) II.  
The Staff (Mr. Todd in charge)

290M. Coastal Engineering. (3) II.  
Mr. J. W. Johnson, Mr. Wiegel

290N. Applications of Digital Computers to Hydraulic and Sanitary Engineering Problems. (2) I.  
Mr. Harder

290V. Hydro-electric Power Development. (3) II.  
Mr. Orlob

Courses in Structural Engineering and Structural Mechanics

220. Statically Indeterminate Structures. (3) I.  
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.  
Mr. Scordelis

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, instrumentation for dynamic strain measurements, stress coat analysis, analogy methods, photoelasticity, photostress and Moire.

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. McNiven

Prerequisite: course 230B 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.  
Mr. McNiven  
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

290G. Applications of Digital Computers to Structural Problems. (2) I.  
Mr. Scheffey

290H. Plastic Analysis of Structures. (2) II.  
Mr. Bertero

290J. Vibrations of Ship Structures. (2) I.  
Prerequisite: graduate standing and consent of the instructor.
Courses in Transportation Engineering

250. Analysis of Transportation Systems. (6) I.  
Prerequisite: course 170, Engineering 120, Statistics 130E.  
The Staff (Mr. Kennedy in charge)  
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, Mr. Kell  
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.

(2 or 3) II.  
Mr. Monismith

290Q. Advanced Topics in Soil Mechanics. (1) II.  
Mr. Seed

290S. Statistical Theories of Traffic Flow. (1–3) II.  
Mr. Oliver

290T. Administration of Transportation Functions. (1) II.  
Mr. Davis

General Courses

270A–270B. Advanced Soil Mechanics. (3–3) I and II.  
Mr. Seed  
Prerequisite: course 121 and 114, or equivalent.  
Advanced theories of soil mechanics, including: theories of consolidation; stress distribution; bearing capacity analyses; lateral pressures; design of anchored bulkheads; pile foundations; shear strength of cohesive soils; slope stability analyses; foundation vibrations; effects of earthquakes and dynamic loads.
270L. Advanced Soil Mechanics Laboratory. (1) II.  
Mr. Seed  
Prerequisite: course 270A–270B, 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.

272. Soil Stabilization. (2) II.  
Mr. Mitchell, Mr. Monismith  
Prerequisite: graduate standing.  
Purposes of soil stabilization; principles of stabilization using compaction, aggregate addition, cement, asphalt and chemicals; the nature, mechanism, advantages, disadvantages, design, construction and economics of the stabilization of soils for use in highways and airfields; special stabilization techniques; principles of pavement design.

(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. I and II.  
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: engine-ring 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.  
The Staff  
Meetings of the staff and graduate students for discussion of current developments and research in various fields of civil engineering and irrigation. Seminars scheduled in each of the following groups: hydraulics, irrigation, and sanitary engineering, and structures (including materials and soil mechanics).
ELECTRICAL ENGINEERING

Upper Division Courses†

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; vacuum tubes and semiconductor electronics 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.

Single-phase 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 electronuclear 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.

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.

Analytical and experimental studies in basic Electrical Engineering: Vacuum and solid state electronic devices; passive and active linear circuits in transient and steady state; ferromagnetics, solid state magnetics, and magnetic circuits.

† See dagger (†) footnote, page 292.
111A–111B. Electrical Machinery. (3–3) Yr. Mr. Robertson, Mr. Bergen

111A: I and II.
111B: II.
Prerequisite: course 109B, Mechanical Engineering 100.

111A. The fundamental theory of the exploitation of nonlinear and linear ferromagnetic materials to produce power modulation, amplification, and energy conversion in static and rotating devices.

111B. The dynamic and steady-state characteristics of rotating electromechanical devices including the direct-current machine, the induction machine, the synchronous machine, the Ampèry meter, 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.

116A–116B. Electronic Communication Systems. (3–3) Yr. Beginning each semester. 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; amplifiers 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.
Prerequisite: course 106 or 109B.

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 microwave 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. Elements of feedback and stability theory. Analysis of communication and control systems in time and frequency domains.

123. Principles of Circuit Synthesis. (3) I and II. Mr. Kuh, Mr. Gill

Prerequisite: course 119.

The properties of linear lumped element circuits and their network functions; development of synthesis methods for one-port and two-port circuits; techniques for the design of filters, filter amplifiers, and equalizers.


Mr. Desoer, Mr. Turin

Prerequisite: course 109B, not open to those taking course 116A.

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. Pepper  
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. Hopkin  
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. (3) I.  
Mr. English, Mr. Wang  
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  
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. Saunders 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)  
Prerequisite: course 133A, 111B (may be taken concurrently). 
Experiments on a-c and d-c machinery.
151A–151B. Switching and Computing Circuits. (3–3) Yr.  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
Prerequisite: course 151A.
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. Birdsay
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.

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.

† See footnote, page 293.
216. Microwave Antennas. (3) II.  
Mr. Angelakos
Prerequisite: course 117A–117B.
Application of Maxwell’s equations to transmission, propagation, and reception of radio waves.

217. Microwave Networks. (3) 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
Prerequisite: recommended, course 117A–117B or 123.
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.
Analysis and synthesis, Z-transform applied to sampled-data problems. Digital computers in feedback control problems.

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.

231. Solid State Devices. (3) I.  
Mr. Wang
Prerequisites: course 150 or Physics 140 or the equivalent.
Semiconductor and microwave magnetic devices. Typical subjects include: diodes,
transistors, tunnel diodes, avalanche transistors, parametric devices, thermoelectric effects, nonreciprocal microwave magnetic devices, and nonlinear magnetic effects.

240. Nonlinear Active Circuits. (3) I. Mr. Pederson
Prerequisite: course 119 and 125.
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 and 125.
Fundamental properties of linear active circuits; gain-bandwidth limitations and optimum performance of amplifiers; theory and design of feedback amplifiers; noise study; application to vacuum tube, transistor, negative-resistance and parametric 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. Turin
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) I. 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. Mr. Trivelpiece

290C. Active Circuit Theory. (1) I and II. Mr. Kuh
Prerequisite: course 223 and 224.

290D. Quantum Electronics. (3) I. Mr. Singer
Prerequisite: course 117A or equivalent field theory course and one solid state physics course.

290E. Theory and Applications of the Z-Transform Method. (1) I. Mr. Jury
Prerequisite: course 222 or 228 or 229 or 227.

290F. Boundary Value Problems in Electromagnetic Theory. (3) I. Mr. Welsh
Prerequisite: recommended: Mathematics 220D; Electrical Engineering 210A–210B or Physics 210A–210B.
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 1962–1963 are: Direct synthesis of feedback systems, control systems, electromagnetic theory, crossed-field electron tubes, microwave tube research, optimal control, problems in space flight experiments, problem-oriented languages for computers, interactions between matter and radiation, plasma diagnostics.

299. Individual Study or Research. (1–6) 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.

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.

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.

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.

132. Principles and Metallurgy of Welding. (3) I.

(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.

(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.

† See footnote, page 292.
141. Introduction to Industrial Engineering and Organization. (2) I.
Prerequisite: junior standing in Engineering.
The Staff
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. Robinson
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. Robinson
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) I. Mr. Keachie
Prerequisite: course 142 or 143.
Design and administration of wage and incentive systems; job analysis and evaluations; 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.  
Prerequisite: course 151 or consent of instructor.  
Mr. Grassi, Mr. Lapsley  

198. Directed Group Studies for Undergraduates. (1–5) I and II.  
The Staff (Mr. Shephard in charge)  
Prerequisite: upper division standing in engineering.  
Group studies of selected topics which vary from year to year.

199. Individual Study and Research for Advanced Undergraduates.  
(1–5) I and II.  
The Staff (Mr. 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‡

220. Advanced Metal Cutting. (3) I.  
(Formerly numbered 245.)  
Prerequisite: Materials Science 124, Industrial Engineering 130, or consent of instructor.  
Mr. Kobayashi  
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.  
(Formerly numbered 290.)  
Prerequisite: Materials Science 124, Industrial Engineering 131, or consent of instructor.  
Mr. Thomsen  
Solution of forming problems using slip-line theory and other approximate methods.

240. Policy-level Problems in Industrial Engineering. (3) II.  
Mr. DeGarmo  
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.  
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.

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.

‡ See footnote, page 293.
Courses in Operations Research

Upper Division Courses†

160. Linear Programming. (3) I.  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. 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. Eisenberg
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
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
Prerequisite: course 162; Statistics 134, or consent of instructor.

263. Advanced Problems in Applied Stochastic Processes. (3) I. Mr. Oliver
Prerequisite: course 163; Mathematics 111, or consent of instructor.

264. Process Analysis. (3) II.  Mr. Konigsberg
Prerequisite: course 160.
Programming the basic components of a process for optimum design and efficient allocation of facilities.

290. Advanced Graduate Study in Industrial Engineering.  The Staff (Mr. Shephard in charge)
Prerequisite: consent of instructor.
Topics in operations research, manufacturing processes and industrial administration.
290A. Nonlinear Programming. (3) II.  Mr. Dantzig
Prerequisite: course 162, 262 or consent of instructor.
290B. Inventory Theory. (3) II.  Mr. Shephard

† See footnote, page 292.
‡ See footnote, page 293.
MECHANICAL ENGINEERING

Upper Division Courses†

100. Introduction to Dynamics. (2) I and II. The Staff (Mr. Hsu in charge)

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.

(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.

Prerequisite: course 105A.

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.

Prerequisite: course 105A.

The Staff (Mr. H. A. Johnson in charge)

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. Maslach (in charge), Mr. Hutchinson, Mr. Tichvinsky

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.

110. Mechanism and Dynamics of Machinery. (3) 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.

Mr. Levens

Prerequisite: Mathematics 14A–14B.

Theory and design of concurrent 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. Hauser 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.

† See footnote, page 292.
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 undersea 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, thermoelectric 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.  
The Staff (Mr. Howe in charge)  
Prerequisite: course 112 and 131A.  
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. Maslach 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.  
Mr. Stewart  
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.

154. Thermodynamics. (3) I and II.  
Mr. Tien, Mr. H. A. Johnson  
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.

161. Turbomachinery. (3) II.  
Mr. Iversen  
Prerequisite: course 105A and Engineering 103.  
Pumps, turbo-compressors, hydraulic and gas turbines. Analysis of fluid machinery performance with emphasis on the applications to fluid systems.

163. Fluid Mechanics. (3) I.  
Mr. Laird  
Prerequisite: course 105A; Engineering 103; Mathematics 14B.  
Fundamental mechanics of ideal and viscous, incompressible and compressible, laminar and turbulent flows.
164. Automatic Control. (3) I and II.  Mr. Takahashi, Mr. Thal-Larsen
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.

165. Automatic Controls Laboratory. (1) I and II.  Mr. Thal-Larsen
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.

170. Mechanical Vibrations. (3) I and II.  Mr. Carland, Mr. Soroka
Prerequisite: course 102 and Mathematics 14A-14B or equivalent.
Introduction to the theory of mechancial vibrations with application to vibration isolation, critical speeds, and machinery.

171. Design of Mechanical Equipment. (3) I and II.  Mr. Frisch
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.

172. Elasticity and Stress Analysis in Design. (3) I.  Mr. Meriam
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.

173. Noise Control. (3) II.  Mr. Soroka
(Formerly Engineering 173.)
Prerequisite: course 102 and Engineering 103 or Mechanical Engineering 109.

175. Advanced Mechanics. (3) I and II.  Mr. Goldsmith, 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.  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. Naghdii
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.
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.

210. Advanced Kinematics and Mechanisms. (3) II. Mr. Radcliffe
Prerequisite: course 110 or 175 recommended.
Analysis and synthesis of plane and space mechanisms. Constraint criteria. Complex variable methods in motion analysis. Advanced analytical and graphical techniques for the design of mechanisms to guide a plane or point through multiple positions.

211. Graphical Analysis. (3) I. Mr. Levens
Prerequisite: course 111 or consent of the instructor.
Graphical and numerical methods showing the application of calculus and ordinary differential equations to problems in mechanical engineering systems. Advanced methods of nomography applied to the interrelationships among three or more variables. Transformations and validity tests on experimental data.

212. Optimal Design of Mechanical Elements. (3) II. Mr. Frisch
Prerequisite: course 245 recommended.
Statistical considerations of failure theories and factors of safety. Probability evaluation of manufacturing errors and reliable usage of materials. Optimization of designs for normal, redundant and incompatible specifications showing the application of primary and subsidiary design equations. Use of reliability evaluation in analysis and synthesis of mechanical designs.

214. Lubrication and Friction. (3) II. Mr. Tichvinsky
Prerequisite: course 163 recommended.
Hydrodynamic theory of lubrication for advanced analysis and design of various types of bearings operating with liquids and air. Discussion of materials, lubricants, corrosion and wear of modern bearings. Dry and boundary friction; effects of materials, surface, pressure, velocity, temperature and atmosphere.

232. Experimental Mechanics. (3) I. Mr. Brown, Mr. Finnie
Prerequisite: course 170 or 164.
Development of the methods of experimental mechanics. Measurement systems for static, steady state vibratory and transient situations. Studies of the basic types of transducers and circuitry for measuring displacement, strain, velocity, acceleration, force, temperature, and time.

1 See footnote, page 293.
245. Mechanical Behavior of Engineering Materials. (3) I.

Prerequisite: consent of the instructor.
Basic principles governing structure of materials. Relationship of structural features to the mechanical properties of ceramics, metals and polymers. Methods of determining mechanical properties for different conditions of load and environment. Application of both theoretically and experimentally determined materials properties to quantitative prediction of service performance.

Mr. Finnie and Mr. Hauser

264. Advanced Automatic Control. (3) I.

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.

Mr. Takahashi

265. Heat Conduction. (2) I.

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.

Mr. Seban

266. Heat Convection. (3) II.

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.

Mr. Seban

267. Thermal Radiation. (2) I.

Prerequisite: course 151 (may be taken concurrently).
The transfer of radiant energy, gaseous radiation, geometrical and spectral characteristics of systems involving thermal radiation.

Mr. H. A. Johnson

268. Advanced Problems of Thermodynamics. (3) II.

Prerequisite: course 154.
An introduction to the statistical thermodynamics of the pure component and of mixtures. The thermodynamics of irreversible phenomena.

Mr. Tien

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.

Prerequisite: course 154 or Physics 112.

Mr. Brown

290S. Information Theory and Thermodynamics. (3) I.

Prerequisite: course 154 or Physics 112.

Mr. Tien

290T. Photoelasticity. (3) II.

Prerequisite: course 232 or Civil Engineering 221.

Mr. Brown

290U. Corrosion. (3) I.

Prerequisite: graduate standing.

Mr. Cornet

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.

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.

283A–283B. Oscillations in Nonlinear Systems. (3–3) Yr.
283A: II. Mr. Rosenberg, Mr. Hsu
Prerequisite: Mechanical Engineering 170 or Electrical Engineering 109B.

284A–284B. Mechanical Vibrations. (3–3) Yr. Mr. Rosenberg
Recommended: Mechanical Engineering 170.

285A. Theory of Elasticity. (3) I. Mr. Hsu
(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. Naghdii
(Formerly Mechanical Engineering 285C.)
Prerequisite: Mechanical Engineering 185.

286A. Theory of Plasticity 1. (3) II. Mr. Naghdii
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. Naghdii
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. Advanced Mechanics
Prerequisite: Mechanical Engineering 102, 102A, or 105B

289A. Fluid Dynamics
Prerequisite: Mechanical Engineering 170, 175, or 185
The flow of liquids and gases. Hydrodynamics of deformable bodies and coordinate transformations.

289B. Continuum Mechanics
Prerequisite: Mechanical Engineering 170, 175, or 185
Continuum mechanics for a continuous theoretical and applied approach.

290A.

290B. Thermodynamics

290C. Thermodynamics

290D.

290E.

290F.

290G.

290H.

290I.

290J.

121. E

* Not to be given, 1962–1963.
287B. Impact. (3) I.
Prerequisite: course 287A. Course 284A–284B recommended.

Mr. Goldsmith

289A. Foundations of the Theory of Continuous Media 1. (3) I.
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.

Mr. Naghdi

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.

Mr. Naghdi

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. Leitmann

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

290H. Analytical and General Dynamics. (3) I.
Prerequisite: course 287A or equivalent.

Mr. Lieber

290J. Relativistic Mechanics. (3) I.
Prerequisite: consent of the Instructor.

Mr. Lieber

(3) II.

Mr. Lieber

Prerequisite: course 290F or consent of the instructor.

Aeronautical Sciences

Upper Division Courses†

121. Engineering Aerodynamics. (3) II.
Prerequisite: Engineering 103.
Wing characteristics, performance determination, loading conditions, static and dynamic stability and control of airplanes.

† See footnote, page 292.
122. Propulsion. (3) I and II. Mr. Oppenheim, Mr. Starkman
Prerequisite: Mechanical Engineering 105A–105B, Engineering 103, and senior standing.
Analysis of propulsion systems and machinery with emphasis on the aerodynamics, thermodynamics and mechanics of systems applicable to jet propulsion of aircraft and missiles.

162. Elementary Hydrodynamics. (3) I and II. Mr. Sherman, Mr. Schaaf
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) I. Mr. Starkman
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.

276. Mechanics of Real Fluids. (3) I and II. Mr. Berger, Mr. Sherman
Prerequisite: Engineering 230. Recommended: Mechanical Engineering 161 and Aeronautical Sciences 162.

277. Compressible Fluids. (3) I and II. Mr. Talbot, Mr. Holt
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. Hurlbut
290B. Advanced Propulsion Systems. (3) II. Mr. Starkman
290C. Rarefied Gas Dynamics. (3) II. Mr. Schaaf
290D. Magneto-hydrodynamics. (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. Maslach 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. Maslach in charge)
Investigation of advanced problems in aeronautical sciences.

* Not to be given, 1962–1963.
† See footnote, page 293.
MINERAL TECHNOLOGY

Ceramic Engineering†

Geological Engineering

Upper Division Courses‡

*120. Fundamentals of Geologic Engineering. (2) I.
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.
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.

*122. North American Mining Districts. (3) I.
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.

123A–123B. Exploration for Mineral Deposits. (3–3) Yr. Mr. Hawkes
Prerequisite: Geology 150 or equivalent.
Application of principles of geology, geophysics, geochemistry, aerial photography, and statistics in the exploration for deposits of metals and industrial minerals.

198. Directed Group Studies for Advanced Undergraduates. (1–5) I and II.
The Staff (Mr. Hawkes 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. Hawkes 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‡

Prerequisite: Geology 5 and 150 or equivalent.
A study of geological aspects of engineering construction problems by means of studies of case histories and review of current literature.

* Not to be given, 1962–1963.
† For courses in ceramic engineering, see Materials Science, page 322.
‡ See also courses listed under Petroleum Engineering, Mining, Geology. For basic prerequisite, see footnote, page 293.
203. Advanced Mineral Exploration. (2) I. Mr. Hawkes, Mr. Ward
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.
Prerequisite: consent of the instructor.
Current and advanced topics in Geological Engineering.
290A. Advanced Geological Engineering. (2) I. Mr. Hawkes
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. Ward 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. Hawkes in charge)

Materials Science

Upper Division Courses†

100. Industrial Ceramics and Metallurgy. (1) I. Mr. Thomas
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 metallur-
gical 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. Ravitz
Prerequisite: Chemistry 110B and senior standing.
The principles of thermodynamics with emphasis on their application to metallurgical
and ceramic problems.

* Not to be given, 1962–1963.
† See footnote, page 292.
11. 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.

11L. 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.

12. 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.

13. Principles of Ceramic Engineering. (4) II. 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.

14. 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.

121. Physical Metallurgy. (2) I and II. Mr. Washburn, Mr. Thomas
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, Mr. Thomas
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. Parker
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.
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. Ravitz
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) Yr.  
Mr. Fulrath  
Majors in metallurgy or ceramic engineering will be allowed only 1 unit of credit.  
Prerequisite: graduate standing.  
The principles of solid state physics and chemistry applied to materials of current and  
potential use in nuclear engineering. Specific emphasis is placed on the irradiation effects  
and on processing variables that influence the irradiation behavior of materials.

‡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. LaForce  
A theoretical study of the metallic state, emphasizing those properties of technologic  
importance; chemical bonding forces, crystal structures and metals and alloys, comp-  
ressibility, specific heat, magnetism, electrical and thermal conductivity, thermodynamics.

256. Reaction Kinetics. (3) II.  
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.  
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  
Prerequisite: course 111.  
Relationships between structures, compositions and physical and chemical properties in  
high temperature materials.

‡ To be offered in even-numbered years.
† See footnote, page 293.
§ To be given if a sufficient number of students enroll.
273. Structure and Reactions in Inorganic Materials. (2) II.  Mr. Searcy
Prerequisite: Chemistry 110B; Physics 121.
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.
Consent of the instructor.
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 the instructor.

290B. Surface Properties of Engineering Materials. (3) I.  Mr. Fuerstenaug

290C. The Electrical and Magnetic Properties of Materials. (3) II.  Mr. LaForce

290D. Electron Microscopy in Metallurgy. (2) II.  Mr. Thomas

298. Group Studies, Seminars, or Group Research. (1–5) I and II.
The Staff (Mr. Thomas 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. Fatt
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.

* Not to be given, 1962–1963.
† For courses in metallurgy, see Materials Science, page 322.
‡ See also Geological Engineering, pages 321–322.
§ See footnote, page 292.
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.

107. Computer Applications in Mineral Engineering. (3) II. Mr. Somerton
Prerequisite: senior standing in engineering.
Condensed coding systems, techniques of problem solution and applications to problems in student’s field of interest.

Mining

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.

143. Geological Factors in the Valuation and Operation of Mines. (3) II.
Prerequisite: course 140 and Mineral Engineering 101.
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.

† See footnote, page 292.
‡ See also courses in geology and geological engineering.
∗ Not to be given, 1962–1963.
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.  
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 de-  
formation with those of ore deposition. Application to search for new mining districts.

298. Group Studies, Seminars, or Group Research. (1–5) I and II.  
The Staff (Mr. Shaffer in charge)

299. Individual Study or Research. (1–5) I and II.  
The Staff (Mr. Shaffer in charge)

Petroleum Engineering

Upper Division Courses†

161. Petroleum Engineering—Development. (3) I.  
Mr. Putnam

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 me-  
chanics, zonal evaluation, well completion and completion evaluation.

161L. Petroleum Engineering—Development Laboratory. (2) I.  
Mr. Putnam

Prerequisite: course 161, which should be taken concurrently.

Laboratory experiments in petroleum engineering development including drilling me-  
chanics, zonal evaluation and well completion evaluation.

162. Petroleum Reservoir Mechanics. (3) II.  
Mr. Fatt

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.

† See footnote, page 293.

‡ See footnote, page 292.
162L. Petroleum Reservoir Mechanics Laboratory. (2) II.  Mr. Fatt
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. 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. Putnam 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. Putnam 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.  Mr. Fatt
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.

208. Advanced Reservoir Engineering. (3) II.  Mr. Fatt
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) I.
Prerequisite: graduate standing or consent of the instructor.
A study of the physical and economic factors underlying the appraisal of oil-producing properties. Estimation and evaluation of oil and gas reserves.

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) II.  Mr. Witherspoon
Prerequisite: Chemistry 110A–110B, or Mechanical Engineering 105A or Mineral Engineering 105 and Engineering 103.

† See footnote, page 293.
298. Group Studies, Seminars, or Group Research. (1–5) I and II.

The Staff (Mr. Fatt in charge)

Advanced study in various fields of petroleum engineering on topics which may vary from year to year depending upon student interest. Topics suggested for 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)

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**NAVAL ARCHITECTURE**

**Upper Division Courses†**

151. Statics of Naval Architecture. (3) I.

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.

Mr. Schade

152. Dynamics of Naval Architecture. (3) I.

Prerequisite: Engineering 103 and Naval Architecture 151 which may be taken concurrently.


Mr. Wehausen

153. Marine Engineering. (3) II.

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.

Mr. Tichvinsky

154. Applied Naval Architecture. (3) II.

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.

Mr. Schade

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.

† See footnote, page 292.
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 forces 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
290B. Ship Dynamics. (3) II. Mr. Wehausen
Prerequisite: graduate standing and consent of the instructor.

298. Group Studies, Seminars, or Group Research. (1–5) I and II.
The Staff (Mr. Schade in charge)
Advanced study in various fields of naval architecture on topics which may vary from year to year.

299. Individual Study or Research. (1–5) I and II.
The Staff (Mr. Schade in charge)
Investigation of selected advanced naval architecture subjects.

Related Course in Another Department
Mathematics 270. Technical Hydrodynamics. (3) I. Mr. Lewy

NUCLEAR ENGINEERING

Upper Division Courses†

101A–101B. Engineering Science Laboratory. (2–2) Yr. Mr. Mark
Prerequisite: Physics 121.
Laboratory for upper division students in engineering science program. Design of experiments, measurements and interpretation of physical phenomena of importance in many of the new areas of applied science.

† See footnote on page 293.
‡ See footnote, page 292.
* Not to be given, 1962–1963.
65. Introduction to Nuclear Reactor Theory. (3) I and II.  
Mr. Pigford
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.

66. Introduction to Nuclear Engineering Laboratory. (1) I and II.  
Mr. Wallace
Prerequisite: course 165 (may be taken concurrently).
Experimental work in nuclear measurements and nuclear reactor performance; Geiger-Müller, 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.

199. Individual Studies or Research for Advanced Undergraduates.  
(1–5) I and II.  
The Staff (Mr. Pigford 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.
Individual study and/or research on a problem chosen by the student and carried out under guidance of an instructor.

Graduate Courses†

250A–250B. Nuclear Reactor Theory. (3–3) Yr. Beginning each semester.  
Mr. Ruby, Mr. Grossman
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. Wallace
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 footnote, page 293.
260. Nuclear Reactor Systems. (3) I and II. Mr. Orlander
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.
Prerequisite: course 250A–250B. Mr. Amster, Mr. Grossman
The theory of the distribution in space, angle, and energy of neutrons in migrations 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) I. Mr. Smith
290G. Neutron Thermalization in Crystalline Solids. (3) I and II. Mr. Stuart
Prerequisite: consent of the instructor, based on knowledge of statistical mechanics and quantum mechanics at the upper division level.
290H. Nuclear Reactor Systems (B). (3) II. Mr. Orlander
Prerequisite: course 250A.
290I. Controlled Thermonuclear Reactions. (3) II. Mr. Pyle
Prerequisite: course 290A and either Electrical Engineering 117A or Physics 110A–110B.
290J. Applied Scattering Theory. (3) II. Mr. Amster
Prerequisite: Physics 115 or equivalent.
290K. Neutron Thermalization in Crystalline Solids. (3) II. Mr. Stuart
Prerequisite: course 290G or consent of the instructor based on knowledge of statistical mechanics and quantum mechanics at the upper division level.

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.

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

Research in electrical sciences covers a very large range of activities, and the need for electrical knowledge and equipment is central to research in almost every other area of creative effort. The research in the Electronics Re-
search Laboratory reflects this breadth, with investigations in six separate areas: (1) circuit and system theory; (2) electromagnetic problems in antennas and propagation; (3) solid state and semiconductor materials, mechanisms and devices, including quantum electronics; (4) electron-stream interactions; (5) high and low temperature plasmas; (6) magnetic mechanisms and electromechanical energy conversion. The work is largely supported by contracts with the Federal Government, notably the Department of Defense and the National Science Foundation. The Electronics Research Laboratory coordinates the various research projects, aids in the establishment of new projects, and furnishes research facilities. The personnel of the laboratory include faculty members, principally from the Department of Electrical Engineering, research assistants and other graduate students together with a number of full-time research support persons. All of the work is intimately related to graduate study programs of the faculty and students.

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.

Inorganic Materials Laboratory

In recognition of the pressing need for improved understanding of materials of possible application in nuclear reactors, jet and rocket engines, space craft frames, and electronic devices, the Inorganic Materials Laboratory has been organized as a division of Lawrence Radiation Laboratory. Research is conducted by staff members and graduate students as well as by post doctoral students and some permanent research personnel in the departments of Chemistry, Mineral Technology, and Nuclear Engineering. A majority of graduate students majoring in materials science hold research assistantships with this laboratory and perform their thesis work in the Hearst Mining Building.

Studies of the laboratory encompass a spectrum of research in fundamental
properties of metals and inorganic, or ceramic, materials. A partial list includes: synthesis of inorganic materials; kinetic and thermodynamic studies of high temperature chemical reactions; evaluation of influences of microstructure, composition, temperature, pressure and other variables on electrical and mechanical properties; radiation-effects studies; solid state diffusion studies; spectroscopic and mass spectroscopic investigations of high temperature vapors.

**Mechanical Engineering Laboratories**

The Department of Mechanical Engineering has combined teaching and research laboratories in Hesse Hall and in the Mechanics Building, with additional facilities for instruction and research at the Richmond Field Station.

The campus laboratories have facilities and services for undergraduate laboratory study and for graduate research programs in all phases of mechanical engineering: acoustics, aerodynamics, air conditioning, analog computers, automatic controls, combustion, dynamic stress, fluid flow, fluid mechanics, fluid machinery, heat-power, heat transfer, impact, instrumentation, lubrication, refrigeration, stress analysis and experimental mechanics, thermal radiation, thermodynamics, and vibration. These laboratories are kept flexible to meet the progress of technology and science, and many of pioneer research equipments are incorporated into the undergraduate laboratory program upon completion of the initial original research.

Research efforts that are too large to be accommodated on campus are conducted at the Field Station. The major facilities are low pressure aerodynamic wind tunnels for the study of upper atmosphere flight phenomena of high speed aircraft, missiles, and space craft; transient boiling heat transfer equipments for studies in connection with nuclear power generation systems; combustion and detonation systems for rocket thrust research; wind tunnels for convective heat transfer programs related to space-craft reentry into the earth's atmosphere; and anechoic and reverberation chambers and related sound rooms for noise isolation, identification, and insulation.

**Minerals Research Laboratory**

The function of this laboratory is to coordinate research in the fields of mining, geological engineering, and petroleum engineering. 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 mainly by contributions from government agencies. All research is of a basic nature and is concerned with new methods of discovering hidden ore bodies and methods for extracting presently unrecoverable petroleum from underground reservoirs.
Berkeley Thermodynamics Laboratory

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 thermodynamic values (heat capacities at low and high temperatures, entropies, heats of reaction, and free energies of reaction) of pure metallurgical and ceramic substances.

The chief of the laboratory serves as a University lecturer in alternate years and offers a course (Materials Science 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 laboratory 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 underway 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 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

(1Department 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., D.Ès L.(hon.), 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).

Alfred Kazin, M.A., Mrs. William Beckman Professor for the spring semester.

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.
John H. Raleigh, Ph.D., Professor of English.
David W. Reed, Ph.D., Professor of English.
Mark Schorer, Ph.D., Litt.D., Professor of English (Chairman of the Department).

Wayne Shumaker, Ph.D., Professor of English.
Henry N. Smith, Ph.D., Professor of English.
Ernest Tuveson, Ph.D., Professor of English.
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.
George R. Stewart, Ph.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.
Lairz Ziff, Ph.D., Associate Professor of English.
Robert Bloom, Ph.D., Assistant Professor of English.
Richard Bridgman, Ph.D., Assistant Professor of English.
Jackson V. Burgess, M.F.A., Assistant Professor of English.
John Coolidge, Ph.D., Assistant Professor of English.
Frederick C. Crews, Ph.D., Assistant Professor of English.
Thomas B. Flanagan, Ph.D., Assistant Professor of English.
Donald Friedman, Ph.D., Assistant Professor of English.
Barbara Garlitz, Ph.D., Assistant Professor of English.
Thomson W. Cunn, M.A., Assistant Professor of English.
Robert Haller, Ph.D., Assistant Professor of English.
Martin Halpern, Ph.D., Assistant Professor of English.
Frank S. MacShane, D.Phil., Assistant Professor of English.
Robert L. McNulty, Ph.D., Assistant Professor of English.
Brendan P. O Hehir, Ph.D., Assistant Professor of English.
Stephen K. Orgel, Ph.D., Assistant Professor of English.
John Paterson, Ph.D., Assistant Professor of English.
Constantinos A. Patrides, D.Phil., Assistant Professor of English.
Paul Pichler, Ph.D., Assistant Professor of English.
†Norman Rabkin, Ph.D., Assistant Professor of English.
Ralph W. Rader, Ph.D., Assistant Professor of English.
Hugh M. Richmond, D.Phil., Assistant Professor of English.
Sheldon Sacks, Ph.D., Assistant Professor of English.
John D. Seelye, Ph.D., Assistant Professor of English.
Robert E. Tracy, Ph.D., Assistant Professor of English.
Alex Zwerdling, Ph.D., Assistant Professor of English.
Stanley Fish, Ph.D., Instructor in English.
Ulrich Knoepflmacher, Ph.D., Instructor in English.
George Starr, Ph.D., Instructor in English.

Warner Berthoff, Ph.D., Visiting Associate Professor of English.
Stanley G. Eskin, Ph.D., Acting Assistant Professor of English.
Dorothee Finkelstein, Ph.D., Lecturer in English.

† In residence fall semester only, 1962–1963.
‡ In residence spring semester only, 1962–1963.
Herbert Gold, M.A., Lecturer in English.
Joseph E. Kramer, M.A., Acting Instructor in English.
Gardner D. Stout, M.A., Acting Assistant Professor of English.

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 96.

*Departmental Major Advisers:* Mr. Patrides, Chairman; Mr. Knoepflmacher, Mr. Bridgman, Mr. Paterson, Mr. Renoir, Mr. Richmond, Mr. Haller, Mr. Friedman, Mr. Zwerdling, Mr. Orgel, Mr. Piehler, Mr. Bloom, Mr. Stout.

*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. The requirement in one of these areas may be met, however, by an appropriate 2-unit summer session 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.

*Honors Program.* Students with an over-all grade-point average of 3.0 may apply to the departmental honors committee for admission to the honors program. Application should be made through the student's major adviser not later than the end of the student's junior year. Candidates for Honors in English will be required to write a bachelor's thesis in their senior year, beginning the work in a section of English 151 and completing it in English H195 or H197.

*Teacher Training.* Consult Mr. Jordan, Mr. Coolidge, Mr. Parkinson, or Mr. Evans; see also the ANNOUNCEMENT OF THE SCHOOL OF EDUCATION.

*Higher Degrees.* Consult Mr. Smith; see also the ANNOUNCEMENT OF THE GRADUATE DIVISION, AT BERKELEY.
Lower Division Courses

Freshman Course

1A–1B. First-Year Reading and Composition. (3–3) Yr. Beginning each semester.
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. Crews

33A–33B. American Studies. (3–3) Yr. Mr. Ziff
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. McNulty
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. Seelye, Mr. Eskin
Prerequisite: course 1A–1B or Speech 1A–1B, or consent of instructor.

43. Introduction to the Study of Poetry. (3) I. Mr. Hugo
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. Coolidge, Mr. Hugo
44A is not prerequisite to 44B.
44A. I: Mr. Coolidge.
44B. II: Mr. Hugo.
Lectures on great works of the world's literature.
46A–46B. Survey of English Literature. (3–3) Yr. Beginning each semester.  
Prerequisite: course 1A–1B.  
The Staff (Mr. Barish 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. Chatman, Mr. Sacks

131. American English. (3) I.  
Mr. Reed

141. Modes of Writing (Exposition, Fiction, Verse, etc.). (3) I and II.  
Mr. Burgess, Mr. Bloom
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.

B. Courses in Literature

114A. The English Drama to 1642. (3) I.  
Mr. Barish
The history of English drama from the miracle plays to the closing of the theaters in 1642; special critical attention to Marlowe, Chapman, Jonson, and Webster.

114B. The English Drama from 1660 to 1850. (3) II.

114C. British and American Drama from 1850 to the Present. (3) II.  
Mr. Bogard
The history of dramatic literature in England, America, and Ireland, with emphasis on Shaw and O’Neill; continental influences and developments in the theater that have influenced the drama.

116. The English Bible as Literature. (3) II.  
Mr. Jordan

117A–117B. Shakespeare. (3–3) Yr.  
Mr. Evans, Mr. Richmond
117A is not prerequisite to 117B. Lectures on the entire works of Shakespeare, including nondramatic poems.

117J. Shakespeare. (3) I and II.  
Mr. Orgel, Mr. McNulty, Mr. Coolidge
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.

* Not to be given, 1962–1963.
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. Development of literary form and idiom throughout the Christian West from the
   first to the fifteenth centuries.
   120B. Close study of selected classics in translation, including the Nibelungenlied
   and Dante's Comedy.
121. The Romantic Period. (3) I. Mr. Caldwell
122. The Victorian Period. (3) I. Mr. McKenzie
123. Nineteenth-Century British Prose. (3) II. Mr. Knoepfmacher
125B. The Novel in Western Civilization. (3) I. Mr. Raleigh
125C–125D. The English Novel. (3–3) Yr. Mr. Rader, Mr. Brightfield
   125C: is not prerequisite to 125D.
   125C: Defoe to Scott.
   125D: Dickens to Conrad.
125E. The American Novel. (3) II. 
128. Regional Literature: California and the West. (3) I. Mr. Hart
130A. American Literature before 1840. (3) II. Mr. Hart
130B. American Literature, 1840–1885. (3) I and II. Mr. Bridgman
130C. American Literature: 1885 to the Present. (3) I. Mr. Berthoff
*132. The Transcendental Movement in American Literature. (3) II. Mr. Smith
149. The English Lyric. (3) I. Miss Miles
   The development of the English traditions of structure and style in lyric poetry.
152. Chaucer. (3) II. Mr. Piehler
155. The Age of Chaucer. (3) I. Mr. Haller
156. Backgrounds of English Literature in the Continental
   Renaissance. (3) II. Mr. Eskin
   A survey of the principal continental documents which are important to an understand-
   ing of the English Renaissance.
158A–158B. The English Renaissance. (3–3) Yr. Mr. Cline, Mr. O Hehir, Mr. Patridges
   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.
160. British Literature from 1900 to the Present. (3) II. Mr. Schorer
* Not to be given, 1962–1963.
161. Recent British and American Poetry. (3) I. Mr. Zwerdling
166. The Augustan Age. (3) II. Mr. O Hehir

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) II.
151C. Conrad. (3) I.
151Cl. Coleridge. (3) I.
151D. Dryden. (3) I. Mr. Orgel
151E. Henry James (3) I. Mr. Bloom
151F. Fielding. (3) II.
151H. Hawthorne. (3) I.
151J. Milton. (3) I and II. Mr. Richmond, Mr. Shumaker, Mr. Fish
151Jn. Ben Jonson. (3) II. Mr. Barish
151K. Contemporary Authors. (3) I and II.
   Mr. Schorer, Mr. Bogard, Mr. Zwerdling, Mr. Flanagan
151L. Chaucer. (3) I and II.
   Mr. Cline, Mr. Shumaker, Mr. Renoir, Mr. Caldwell
151M. Melville. (3) II. Mr. Raleigh

* Not to be given, 1962–1963.
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).

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. Gold
106B. Verse. (3) I and II.
106D. Literary Criticism. (3) I.
106E. Long Narrative. (3) II. Mr. Gold
The student will work throughout the semester on a single project, either fiction (novel) or nonfiction (biography, history).

* Not to be given, 1962–1963.
106H. Expository and Critical Writing. (3) II. Mr. D. Friedman

106L. Advanced Composition. (3) I and II. Mr. Stout, Mr. Evans, Mr. Coolidge

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. Flanagan, Mr. Stout

Specifically for candidates for the Certificate of Completion of the teacher-training curriculum whose teaching major is not English.

106N. Advanced Composition. (3) II. Mr. Parkinson

For candidates for the general elementary credential with any major. Review of elements of composition, writing in connection with discussion of books suitable for elementary and junior high school.

106P. Advanced Prose. (3) I and II. Mr. Rader, Mr. Crews

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, Miss Richardson

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 165.)

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.

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 graduate survey courses: 203A, 203E, 203F, 203M, 203N, 203R, 203RV.

200. Techniques of Literary Scholarship. (3) I and II. Mr. Brightfield, Mr. Stout, Mr. Jordan, Mr. Caldwell, Mr. Richmond, Miss Miles

I: Mr. Brightfield, Mr. Jordan, Mr. Richmond, Miss Miles; II: Mr. Caldwell, Mr. Stout.

202. The History of English Criticism. (3) I. Mr. Brightfield

203A. Readings in American Literature. (3) I and II. Mr. Berthoff, Mr. Hart

(Formerly numbered 203P.)
Prerequisite: open to graduate students and (with consent of the instructor) to advanced undergraduates.
203E. Readings in Elizabethan Drama. (3) II.  
Prerequisite: open to graduate students and (with consent of the instructor) to advanced undergraduates. 
Mr. Barish

203F. Readings in the British and American Novel. (3) II.  
Prerequisite: open to graduate students and (with consent of the instructor) to advanced undergraduates. 
Mr. Raleigh

203M. Readings in Modern British and American Literature. (3) I.  
Prerequisite: open to graduate students and (with consent of the instructor) to advanced undergraduates. 
Mr. Parkinson

203N. Readings in English Literature of the Neo-Classical Period. (3) I.  
Prerequisite: open to graduate students and (with consent of the instructor) to advanced undergraduates. 
Mr. Traugott

203R. Readings in Renaissance Literature. (3) I and II.  
Prerequisite: open to graduate students and (with consent of the instructor) to advanced undergraduates. 
Mr. Friedman, Mr. Orgel

203RV. Readings in British Literature of the Romantic and Victorian Periods. (3) II.  
Prerequisite: open to graduate students and (with consent of the instructor) to advanced undergraduates. 
Mr. Jordan

*204. Celtic Studies. (3) I and II.  
This course may be repeated for credit. 
Mr. Hutson

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.

208. Problems in the Study of Literature. (3) I and II.  
Mr. Coolidge, Mr. Flanagan, Mr. Tracy, Mr. Tuveson, Mr. Raleigh, Mr. Traugott, Mr. Bloom, Mr. Rabkin

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 1962–1963 will be as follows: Nineteenth Century Backgrounds (I, Mr. Flanagan; II, Mr. Raleigh), Shakespeare on the Stage (I, Mr. Tracy), American Literature (I, Mr. Tuveson), Seventeenth-Century Backgrounds (I, Mr. Coolidge); Sixteenth-Century Literature (II, Mr. Rabkin), Twentieth-Century Literature (II, Mr. Bloom), Forms of Comedy (II, Mr. Traugott).

210. Readings in Medieval Latin. (3) I.  
(Formerly numbered 220A.) 
Prerequisite: Latin 2 or equivalent.
An introduction to the central language and literature of the Middle Ages. 
Mr. Jones

211A. Introduction to Old English. (3) I and II.  
Mr. Hutson, ——

Open to seniors with consent of the instructor.
Rapid reading of Old English texts.

* Not to be given, 1962–1963.
211B. The Beowulf. (3) I and II.  Mr. Renoir, Mr. Hutson

213. Readings in Middle English. (3) I and II.  
Mr. Cline, Mrs. Finkelstein, Mr. Hutson, Mr. Piehler, ———  
I: Mr. Piehler, Mrs. Finkelstein, Mr. Hutson; II: Mr. Cline, Mrs. Finkelstein, Mr. Piehler.  
Rapid reading of selections in Middle English, and perhaps some entire poems, from the twelfth century to the fifteenth.

Seminars

220. The Medieval Mind. (3) II.  Mr. Jones  
(Formerly numbered 220B.)  
Prerequisite: course 210 or equivalent.  
Literary culture of Western Europe without accent on geographical or linguistic distinctions.

221A. The Old English Language. (3) I.  Mr. Renoir  
(Formerly numbered 211G.)  
Prerequisite: recommended: a reading knowledge of German. Designed for students whose special interest is linguistics.  
Old English and its Indo-European and Germanic backgrounds.

221B. The Middle English Language. (3) II.  Mr. Reed  
(Formerly numbered 211H.)  
Designed for students whose special interest is linguistics.  
The history of the English language from Late West Saxon to Chaucer.

221C. The Modern English Language. (3) I.  Mr. Sacks  
(Formerly numbered 211J.)  
Designed for students whose special interest is linguistics.  
The history of the English language from Chaucer to the present. Rapid survey of contemporary dialects and of the structure of standard English.

222. Old English Poetic Forms and Techniques. (3) II.  Mr. Haller  
(Formerly numbered 212.)  
Prerequisite: two semesters of Old English.

223. Studies in Middle English Literature. (3) I.  Mr. Renoir

225A–225B. The Popular Ballad. (3–3) Yr.  Mr. Bronson

227. Linguistics and Literary Analysis. (3) II.  Mr. Reed  
(Formerly numbered 207.)  
Prerequisite: course 205A–205B. Students whose interest is contemporary literature may take 227 concurrently with 205B.  
The application of linguistic knowledge and methods of analysis to literary works.

228. Regional Literature: California and the West. (3) II.  Mr. Hart

230A–230B. American Literature. (3–3) Yr.  Mr. Hart, Mr. Smith  
230A is not prerequisite to 230B.

231. Linguistic Geography. (3) I.  Mr. Reed  
Analysis of American dialect materials.

232. Anglo-American Literary Relations. (3) I.  Mr. Ziff  
Literary culture of the American colonies and of the United States (to 1840) considered as an integral part of the British tradition.

* Not to be given, 1962–1963.
234. American Drama. (3) II. Mr. Bogard
(Formerly numbered 214.)
Prerequisite: consent of the instructor.
Studies in American drama from the colonial period to the present.

235. Mark Twain. (3) II. Mr. Smith

245. Spenser. (3) I. Mr. McNulty

247. Theory of Poetry. (3) II. Miss Miles

251A–251B. Romantic Period. (3–3) Yr. Mr. Hugo, Mr. Caldwell
251A is not prerequisite to 251B

252. Chaucer. (3) I. Mr. Haller
(Formerly numbered 210.)
Prerequisite: basic knowledge of Chaucer and his language is presupposed.

253. Studies in Shakespeare. (3) II. Mr. Evans
(Formerly numbered 217.)

254A–254B. Elizabethan Drama. (3–3) Yr. Mr. Barish
254A is not prerequisite to 254B.

255. Restoration and Eighteenth-Century Drama. (3) II. Mr. Shumaker

256. Milton and His Contemporaries. (3) I. Mr. Shumaker
(Formerly numbered 218.)

257. Literary Criticism. (3) II. Mr. McKenzie
(Formerly numbered 257A.)

258. Johnson and His Contemporaries. (3) I. Mr. Bronson

260. Modern British Literature. (3) II. Mr. Parkinson
From 1900 to the present.

262. Victorian Period. (3) II. Mr. Brightfield

264. The Metaphysical Poets. (3) I. Mr. Patrides

266. Period from 1660 to 1744. (3) II. Mr. Traugott

269. Theory of Fiction. (3) II. Mr. Paterson

298. Special Studies. (3–6) I and II. The Staff (Mr. Smith in charge)
Normally reserved for students directly engaged upon the doctoral dissertation.

299. Special Study. (1–3) I and II. The Staff (Mr. Smith 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.

* Not to be given, 1962–1963.
Related Courses in Other Departments

See listings for departments of Comparative Literature, Romance Philology, and Linguistics.

Attention is directed also to courses in foreign literature in translation. See pages 353–355.

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.
Woodrow W. Middlekauff, Ph.D., Professor of Entomology.
Ray F. Smith, Ph.D., Professor of Entomology (Chairman of the Department).
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. Michellbacher, Ph.D., Professor of Entomology, Emeritus.
John W. MacSwain, Ph.D., Associate Professor of Entomology.
Harold F. Madsen, Ph.D., Associate Professor of Entomology.
Ronald W. Stark, Ph.D., Associate Professor of Entomology.
John R. Anderson, Ph.D., Assistant Professor of Parasitology.
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. Doultt, Ph.D., LL.B., Professor of Biological Control.
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.
Carlton S. Koehler, Ph.D., Lecturer in Entomology.
Mauro E. Martignoni, Ph.D., Lecturer in Insect Pathology.
Powers S. Messenger, Ph.D., Lecturer in Insect Ecology.
Edward S. Ross, Ph.D., Lecturer in Entomology.
Edward A. Steinhaus, Ph.D., Professor of Insect Pathology.
Yoshinori Tanada, Ph.D., Lecturer in Insect Pathology.
David L. Wood, Ph.D., Lecturer in Entomology.

Letters and Science List. Courses 10, 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 96.

Departmental Major Adviser: Mr. Daly.
The Major in Entomology and Parasitology. 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 65). 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. 
Lectures and laboratory. Prerequisite: course 106; Chemistry 8 or the equivalent.

Mr. Craig

112. Systematic Entomology. (4) II. 
Lectures and laboratory. Prerequisite: course 100.
Classification of insects, taxonomic categories and procedure; bibliographical methods; nomenclature; museum practices.

Mr. Usinger

114. Introductory Forest Entomology. (3) I. 
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.

Mr. Stark, Mr. Wood

115. Principles of Forest Entomology. (3) I. 
Lectures and laboratory. Prerequisite: course 100 or 114.

Mr. Stark, Mr. Wood

117. Helminthology. (4) I. 
Lectures and laboratory.
Helminthic infections of man and domestic animals. Biology, host-parasite interrelationships, identification, prophylaxis, and therapeutics.

Mr. Furman

118. Plant Nematology. (4) II. 
Lectures and laboratory.
Identification, morphology, biology, and distribution of plant parasitic and associated nematodes. Symptomatology, pathology, and control of nematode infections in cultivated crops.

Mr. M. W. Allen

119. Acarology. (3) I. 
Lectures and laboratory. Prerequisite: course 112.
Taxonomy, biology, and ecology of mites and ticks.

Mr. Furman

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.

Mr. Middlekauff

125. Insect Vectors of Plant Pathogens. (4) I. 
Mr. Freitag, 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. 
Lectures and laboratory.
Role of insects and other arthropods in transmission and causation of diseases of humans and domestic animals.

Mr. Furman, Mr. Anderson

127. Insect Ecology. (3) II. 
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.

Mr. Smith, Mr. Huffaker, Mr. Messenger

127L. Laboratory in Insect Ecology. (2) II. 
Prerequisite: courses 100, 127 (may be taken concurrently). Enrollment limited to ten students.
Laboratory and field studies demonstrating principles. Emphasis on population dynamics and analysis of the insect environment.

Mr. Smith, Mr. Huffaker, Mr. Messenger
128. Chemistry of Insecticides and Fungicides. (4) I. Mr. Hoskins
   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. Doutt
   Lectures and laboratory. Prerequisite: course 100.
   Population phenomena; biology of entomophagic 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. Martignoni
   Lectures and laboratory. Prerequisite: course 100, and at least one course in a microbiological science.
   Principles of insect pathology and insect microbiology, and their applications; infectious and noninfectious diseases of insects.

133. Biology of Aquatic Insects. (4) II. Mr. Usinger
   Lectures and laboratory. Field trips for the study of stream and lake survey methods.
   General and applied limnology, with special reference to insects. Laboratory exercises on the life histories and identification of aquatic insects.

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 165.)

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, Mr. Hoskins
   Lectures and laboratory. Prerequisite: courses 110, 128. Recommended: courses 106, 112, 127; Biochemistry 102. May be taken twice for credit.
   Selected topics.

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, Mr. Anderson
   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.
231. Advanced Insect Pathology. (3) II.
Mr. Martignoni, Mr. Steinhaus, Mr. Tanada
Prerequisite: course 106 and 131, or consent of instructor.
Advanced consideration of infectious and noninfectious diseases of insects, diagnosis, symptomatology, morphopathology, physiopathology, and epizootiology.

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 1962–1963 will probably include seminars in: (a) Agricultural Entomology (Middlekauff, W. W. Allen, Koehler); (b) Parasitology (Furman, Anderson); (c) Insect Physiology and Toxicology (Craig, Gordon, Hoskins); (d) Insect Pathology (Steinhaus, Martignoni, Tanada); (e) Systematic Entomology (I. MacSwain, Ussinger; II. Daly, Hurld); (f) Insect Ecology (Smith, Doutt, Huffaker, Messenger); (g) Forest Entomology (I. Stark, Wood).

Staff Seminar in Entomology. (No credit) Yr.
The Staff (Mr. Smith in charge)
Biweekly meetings for presentation of special topics.

FOOD TECHNOLOGY

For courses in Food Technology, see Nutritional Sciences, page 451.

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.
100A–100B. Greek and Latin Literature in Translation.
178. Mythology.

Comparative Literature
151A–151B. The Literature of the Renaissance in Western Europe.
English
120A–120B. Medieval Literature.

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.
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 Literatures
39. Great Writers of Russian Literature.
130A–130B. Survey of Russian Literature and Intellectual Trends.
132. Russian Literature since 1917.
133A. The Russian Novel to 1850 and Its Relations to West European Literatures.
133C. Dostoevsky.
133D. Tolstoy.
133F. Chekhov.
134. Russian Folklore.
FOREIGN LITERATURE IN TRANSLATION; FORESTRY

135. The Russian Drama from the Seventeenth Century to the Twentieth.
140. Survey of Western and Southern Slavic Literatures.
151. The Reformation and Counter-Reformation in Polish Literature.
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.
182A–182B. Survey of Polish Culture.

Spanish

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.
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.
Woodbridge Metcalf, M.S.F., Associate 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.
William J. Libby, Ph.D., Assistant Professor of Forestry.
Paul J. Zinke, Ph.D., Assistant Professor of Forestry.

Arthur B. Anderson, Ph.D., Lecturer in Wood Chemistry.
David L. Brink, Ph.D., Lecturer in Wood Chemistry.
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 96.

Lower Division Courses

1. Elements of Forestry. (3) II. Mr. Grah
   Forests in relation to national life; principles of forestry.

   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.

47. Measurement and Utilization of Forests and Associated Wildland Resources. (4) Mr. Palley
   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, field trips. Prerequisite: Botany 1.
   Artificial establishment of forest stands from collection of seed to planting of trees.

108. Dendrology. (3) I. Mr. Libby
   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.
14. Wood Technology. (3) I. 
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.

Mr. Cockrell

15. Physical Properties of Wood. (3) I. 
Lectures and laboratory. Prerequisite: Physics 2A–2B or the equivalent. Density, moisture relations, shrinking and swelling, strength, thermal, electrical, and acoustic properties of wood.

Mr. Cockrell

18. Forest Engineering. (3) II. 
Lectures and laboratory. Prerequisite: Engineering 21 and Physics 2A–2B. Engineering methods involved in logging and forest management.

Mr. Sampert

20. Management of Forest Properties. (4) II. 
Lectures and laboratory. Prerequisite: courses 104 and 110. Economic and regulatory principles involved in managing forest lands for continuous production.

Mr. Grah

121. Forest Economics. (3) I. 
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.

Mr. Zivnuska

122. Forest Policy. (3) II. 
Prerequisite: 6 units of economics and senior standing. The evolution of forest policy in the United States. State and national forest policies. Policy objectives, programs, and groups. Analysis of current policy problems.

Mr. Vaux

125. Forest Influences. (3) I. 
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.

Mr. Zinke

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.

Mr. Sampert

128. Forest Protection. (3) I. 
Lectures and one field trip. Junior and senior students from other departments may be admitted with consent of the instructor. Forest fire behavior; ignition and spread of forest fires and factors by which they are influenced; forest fire control organization and equipment; methods of fire prevention and suppression.

130. Industrial Forestry. (3) II. 
Prerequisite: senior standing. Senior and graduate students from other departments may be admitted with consent of the instructor. The application of forest management to large properties under private ownership; nature and development of the industrial forest enterprise; costs and returns; integration of forest industries; status and trends of American industrial forestry.

132. Forest Photogrammetry. (3) II. 
Lectures and laboratory. The construction of planimetric and topographic maps from vertical and oblique aerial photographs. The use of aerial photographs in mapping vegetation types and estimating timber volumes. Construction of aerial photo mosaics.

Mr. Colwell

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 165.)

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 140.

204. Seminar in Silviculture. (2) I.  
   Mr. Muelder  
   Prerequisite: course 104.

205. Seminar in Wood Technology. (2) I.  
   Mr. Cockrell  
   Prerequisite: course 114.

206. Seminar in Forest Management. (2) II.  
   Mr. Grah  
   Prerequisite: course 120 and 6 units of economics.

207A–207B. Seminar in Forest Economics. (2–2) Yr.  
   Mr. Zivnuska, Mr. Vaux  
   Prerequisite: 12 units of economics, agricultural economics, or forest economics. 207A 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.  
   Mr. Zinke  
   Prerequisite: course 125 and consent of the instructor.

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)

For a description of special facilities for graduate study at the Forest Products Laboratory and in the Wildland Research Center, see page 115.

**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*.

Lionel R. Duuisit, Ph.D., *Assistant Professor of French*.

1 In residence fall semester only, 1962–1963.
Basil Guy, Ph.D., Assistant Professor of French.
Walter E. Rex, Ph.D., Assistant Professor of French.
John H. Atherton, M.A., Instructor in French.

Marie-Louise Dufrenoy, Ph.D., Lecturer in French.
Leonard W. Johnson, M.A., Acting Instructor in French.
Roger C. Kempf, Diplômé d’études Supérieures de Philosophie, Lecturer in French.
Robert A. Taylor, M.A., Acting Instructor in 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 96.

Departmental Major Advisers: Mr. Augst, Mr. Eustis (Teaching Majors), Mr. Guy, Mr. Rex.

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.

Note. A student enrolled in French 1, 2, or 3 which duplicates courses completed in high school or at another institution of collegiate grade will not be allowed unit credit. The first two years of work in a foreign language in high school is considered to be equivalent to one semester in college (4 units); each successive year in a foreign language in high school is equal to one additional semester in college (4 units).

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. Johnson in charge

French for Graduate Students. (No credit) I and II. Mr. Guy 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. Duisit, Mr. Taylor
Some sections emphasize reading, others conversation. Reading sections are not designed
for prospective French majors.
Reading sections: Mr. Taylor in charge; conversation sections: Mr. Duisit in charge.
Prerequisite: course 2 or equivalent.

Prerequisite: course 3 (conversation) or equivalent. Mr. Duisit in charge

4R. Intermediate French. Reading. (4) I and II. Mr. Taylor in charge
Prerequisite: course 3 or equivalent.
Reading of short, representative works with classroom analysis in English. Not for pros-
spective majors in French.

20. Intermediate French Pronunciation. (1) I and II. Mr. Duisit in charge
Prerequisite: course 2 or equivalent.

25. Advanced French. (3) I and II. Mr. Duisit 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.

semester. Mr. Putter (in charge), Mr. Atherton, Mr. Eustis, Mr. Guy,
Mr. Kempf, Mr. Rex

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
121A–121B. The Eighteenth Century. (2–2) Yr. Mr. Guy
125. Advanced French Pronunciation. (1) I and II.
   Mr. Duisit (in charge), Miss Dufreney

130A–130B. Advanced Grammar and Composition. (3–3) Yr.
   Mr. Carmody (in charge), Mr. Kempf, Mr. Meylan,
   Mr. Rex, Mr. Sandmann
   Prerequisite: course 101A–101B.

131A–131B. Advanced Literary Composition. (3–3) Yr.
   Mr. Calame, Mr. Duisit
   Prerequisite: course 101A–101B. Required of all candidates for the M.A. degree.

134A–134B. French Culture and Institutions. (3–3) Yr. Mr. Johnson
   Prerequisite: course 101A–101B.

*160. Contemporary Literature. (2) II.

H197A–H197B. Honors Course. (2–2) I and II.
   Mr. Calame, Mr. Eustis, Mr. Guy
   Prerequisite: H197B open only to students who complete H197A with a grade of B or better.
   Writing of papers, followed at the end of the senior year by a comprehensive examination. To be undertaken not later than the beginning of the senior year. May not be substituted for any part of Plan A or Plan B major program.

199. Special Study for Advanced Undergraduates. (1–3) I and II.
   The Staff (Mr. Meylan in charge)

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,
   39B. The Nineteenth Century. (2) II. Mr. Putter (in charge), Mr. Atherton,
   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.

* Not to be given, 1962–1963.
146A–146B. Readings in Contemporary French Literature. (2–2) Yr.  
Mr. Carmody

Graduate Courses

(Congering conditions for admission to graduate courses, see page 165.)

Course 201A or 206A is required for all candidates for the M.A. degree.

201A–201B. Historical Grammar. (3–3) Yr.  
Mr. Walpole

*202A–202B. Studies in Medieval French Literature. (2–2) Yr.  
Mr. Walpole

203A–203B. Studies in French Language. (2–2) Yr.  
Mr. Sandmann
  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.  
Mr. Carmody
  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. 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.

*217A–217B. Humanism in the French Renaissance. (2–2) Yr.  
Mr. Meylan

218A–218B. French Classicism. (2–2) Yr.  
Mr. Calame


220A–220B. Explication de Textes. (2–2) Yr.  
Mr. Calame

230A–230B. French Literary Criticism. (2–2) Yr.  
Mr. Eustis

* Not to be given, 1962–1963.
235. Methods of Literary Research with Special Reference to Bibliography. (1) II.
Mr. Eustis
For prospective doctoral candidates.

298. Special Study for Graduate Students. (1-4) I and II.
The Staff (Mr. Eustis in charge)

Related Courses in Other Departments
See courses listed under Comparative Literature and Romance Philology.

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 96.

Departmental Major Adviser: I. Mr. Brown; II. 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 94).

The Major in Animal Genetics. To obtain the B.S. degree in this major, the following five items must be satisfied: 1. General University requirements. 2. College of Agriculture requirements (see page 65). 3. Animal science curriculum requirements: (a) General—chemistry and/or biochemistry, 16 units. Economics, 3 units. English and/or speech, 6 units. Physics, 6 units. Zoology, 8 units. Bacteriology or botany, 4 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.
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), 54 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 B.S. degree in this major, the following five items must be satisfied: 1. General University requirements. 2. College of Agriculture requirements (see page 65). 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, 3 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 Course

100. 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.

† Not including Mathematics C or D.
†† In addition to University requirements.
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-num-
bered years; 103B given in the spring semester of even-numbered years.

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.
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 (I. Mr. Brown in charge; II. Mr. Dempster in charge)

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 165.)

*205. Advanced Population Genetics. (2) II.  Mr. Dempster
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. ——— in charge)

299. Research in Genetics. (1–9) I and II.
The Staff (I. Mr. Brown in charge; II. Mr. Dempster in charge)

Staff Seminar in Genetics. (No credit) I and II.
The Staff (Mr. Jenkins in charge)
Weekly meeting for the presentation of special topics.

Related Courses in Other Departments

Human Evolution and Fossil Man (Anthropology 152 and 152L)
Bacterial Genetics (Bacteriology 107)
Seminar in Microbial Genetics (Bacteriology 213)

* Not to be given, 1962–1963.
Plants in Relation to Man (Botany 115 and 115L)
Plant Cytology (Botany 130)
Seminar in Plant Cytology (Botany 284)
Biological Effects of Radiation (Medical Physics 131)
Cytology (Zoology 107 and 107C)
Genetics (Zoology 114)
Human Genetics (Zoology 115)
Animal Evolution (Zoology 126)
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 E. Kesseli, Ph.D., Emeritus Professor of Geography.
Carl O. Sauer, Ph.D., D.Phil. (h.c.), LL.D., Emeritus Professor of Geography.
John B. Leighly, Ph.D., LL.D., Professor of Geography, Emeritus.
Clarence J. Glacken, 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.
Robert N. Colwell, Ph.D., Professor of Forestry.
Daniel B. Luten, Ph.D., Lecturer in Geography.
Nicholas T. Mirov, Ph.D., Lecturer in Geography.
David E. Sopher, Ph.D., Lecturer in Geography.

Letters and Science List. All undergraduate courses in geography are included in the Letters and Science List of Courses. For regulations governing this list, see page 96.

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.

1 In residence fall semester only, 1962–1963.
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. Mr. Blumenstock
   Two lectures and two section meetings per week.

2. Introduction to Cultural and Historical Geography. (3) I and II.
   Two lectures and two section meetings per week. Mr. Glacken, _____, _____

4. Map Reading and Map Interpretation. (3) II. 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

100A–100B. Principles of Cultural Geography. (3–3) Yr.
   Mr. Glacken, Mr. Wheatley

   Either half of the course may be taken independently.
   The theory of geographical inquiry; major themes in the relationships among culture,
   society, and environment; attitudes to nature illustrated from contemporary and historical
   sources.

*101. Field Geography. (3) I.
   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.
   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.
   Origin of land forms. Review of varied interpretation of processes involved, with empha-
   sis on recent views.

109. Topographical Photo Interpretation. (3) I. Mr. Colwell
   Lecture and laboratory. Prerequisite: consent of the instructor.
   The identification and classification of data on air photographs; the solution of selected
   problems in photogrammetry.

* Not to be given, 1962–1963.
111. Elementary Meteorology. (3) I. Mr. Blumenstock

113. Climatology. (3) II.

119. The Arid Lands. (2) I. 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. Mr. Vance

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.

123B. Geography of Northwest Europe. (3) II.

124. Geography of the Soviet Union. (3) I. Mr. Mirov

125A. Geography of Southeast Asia. (3) I. Mr. Wheatley

125B. Geography of East Asia. (3) II. Mr. Wheatley

125C. Geography of South Asia (India, Pakistan, Nepal, and Ceylon). (2) I. Mr. Sopher

*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) I. 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) I and II. Mr. Kesseli

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. Parsons

Factors and trends in the geographic distribution of manufacturing industries.

* Not to be given, 1962–1963.
145. Economic Geography: Sources and Utilization of Energy. (3) I. Mr. Luten
World distribution, production trends, use patterns, and potentials of fossil fuels, nuclear, and other sources of energy.

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.

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)

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 165.)

For facilities for research, see the ANNOUNCEMENT OF THE GRADUATE DIVISION, AT BERKELEY.

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.
205. Seminar in Physical Geography. (2) I and II.
207. Seminar in History of Geography. (2) II. Mr. Glacken
208. Seminar in Economic Geography. (2) I. Mr. Vance
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.

* Not to be given, 1962–1963.
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.
Frederick A. F. Berry, Ph.D., Associate Professor of Geology.
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 96.

MAJOR IN GEOLOGY

Departmental Major Adviser: Mr. Evernden.

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, 105, 107, 118; and at least 8 units selected from either one of the following two groups of courses.

Group 1: Geology 104A–104B, 116, 117, 131, 133, and Chemistry 110A.

Group 2: Geology 116, 117; Paleontology 111, 112, 116 and 117.

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 102, 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

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1 In residence fall semester only, 1962–1963
2 In residence spring semester only, 1962–1963.
courses: Chemistry 104, 110B, 120, 122, 123; Geology 101, 103, 104A–104B, 105, 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 or 2A, and Geology H196.

MAJOR IN GEOPHYSICS

Departmental Major Adviser: Mr. Evernden.

The Major Program. Required courses: Chemistry 1A; Geology 5, 6, 101, 103, 121 or 122A–122B; Mathematics 1A–1B, 2A–2B; 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.

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.

One three-hour laboratory per week. Prerequisite: a lecture course in geology; Chemistry 1A.

6. Introduction to Mineralogy. (4) I and II. Mr. Fyfe, Mr. Weiss

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.

* Not to be given, 1962–1963.
† Contact departmental office for substitute course.
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.
   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. (3) I and II.
   The Staff (Mr. Curtis, Mr. Gilbert in charge)
   Two four-hour meetings per week. Prerequisite: course 5 and 6, or 150; 105 or 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.

102. Field Geology. (1) I and II.  Mr. Gilbert, Mr. Curtis
   One week-long field trip. Prerequisite: course 101 and 103.
   Additional training in geologic mapping and report writing; the geology of areas be-
   yond the environs of San Francisco Bay. Can be repeated without duplication of credit.

103. Igneous and Metamorphic Rocks. (3) I.  Mr. Weiss
   Two lectures and one three-hour laboratory period per week. Prerequisite: course 5
   and 6, or 150.
   Origin, description, and classification of igneous and metamorphic 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. Sedimentary Rocks. (3) II.  Mr. Gilbert
   Two lectures and one three-hour laboratory period per week. Several all-day field
   trips in lieu of laboratories will be scheduled on week ends. Prerequisite: course 5 and 6;
   Paleontology I or a course in historical geology.
   Origin, classification, and relationships of stratified rocks; principles of stratigraphic
   measurements 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.

* Not to be given, 1962–1963.
107. Geology of North America. (2) II. 
Prerequisite: course 11 and 103. 
The sedimentary, igneous, and structural evolution of the continent.

111A–111B. Geology of Fluids. (3–3) Yr. 
Prerequisite: course 101 or 150; and a course in college physics. 
Petroleum and water; structure, stratigraphy, and hydrodynamics of structural basins.

116. Structural Geology. (2) I. 
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.

118. Advanced Summer Field Course. (4) 
Prerequisite: course 101 with a grade of C or better.

120. Elementary Seismology. (2) I. 
Mr. Byerly 
Prerequisite: course 5, 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. Paragenesis of Minerals. (3) I. 
Mr. Fyfe 
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 
Three lectures per week. Prerequisite: course 103 (may be taken concurrently); Chemistry 5 recommended.

150. Geology for Engineers. (3) II. 
Mr. Wahrhaftig 
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. Evernden 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 165.)

*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.

*202. Advanced Field Study. (3) I and II.*  
Mr. Meyer, Mr. Wahrhaftig

Prerequisite: course 101 or equivalent and consent of the instructor.

Supervised field study for graduate students with prior experience.

*204A–204B. Elastic Waves. (2–2) Yr.*  
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 metaliferous 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.*  
Mr. Berry, Mr. Christensen

Prerequisite: consent of the instructor.

I. Regional sedimentary studies: preparation and interpretation of paleogeologic, isopach and lithofacies maps.

II. Tectonics.

*210. Advanced Optical Mineralogy. (3) II.*  
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. Advanced Geology of Fluids. (2) II.*  
Mr. Berry

Prerequisite: consent of the instructor. Course 111A–111B and 209A are recommended. Critical study of original literature, discussion, and occasional lectures. Topics will vary from year to year.

* Not to be given, 1962–1963.
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.

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.

216A. Structural Analysis of Deformed Rocks. (2) I.  
Mr. Weiss  
Prerequisite: course 101 and consent of the instructor.  
Analysis of structures and fabrics in hand specimens, in the field and on geologic maps.

216B. Petrofabric Analysis. (2) II.  
Mr. Turner  
Prerequisite: course 212, 216A and consent of the instructor.  
Analysis of structures and fabrics on the microscopic scale.

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. Curtis 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.  
Mr. Pabst  
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. Mr. Pabst
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. Evernden 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 earth-
quake 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 seismo-
graphs are in Haviland Hall; and an underground vault to house the seismo-
graphic 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 (Chairman of
the Department).

C. Grant Loomis, Ph.D., Professor of German.
Philip Motley Palmer, Ph.D., Professor of German.
Heinz Politzer, Ph.D., Professor of German.
Clair Hayden Bell, Ph.D., Professor of German, Emeritus.
Edward V. Brewer, M.A., Professor of German, Emeritus.
Arthur G. Brodeur, Ph.D., Professor of Germanic Philology and English,
Emeritus.

* Not to be given, 1962–1963.
* In residence spring semester only, 1962–1963.
Lawrence M. Price, Ph.D., Professor of German, Emeritus.
Archer Taylor, Ph.D., Professor of German, Emeritus.
Erwin G. Gudde, Ph.D., Associate Professor of German, Emeritus.
Franz Schneider, Ph.D., Associate Professor of German, Emeritus.
Marianne Bonwit, Ph.D., Associate Professor of German.
Andrew O. Jászi, Ph.D., Associate Professor of German.
†Karl S. Guthke, Dr. phil., Associate Professor of German.
Joseph Mileck, Ph.D., Associate Professor of German.
Blake L. Spahr, Ph.D., Associate Professor of German.
‡Eugene K. Grotegut, Ph.D., Assistant Professor of German.
‡Hunter C. Hannum, Ph.D., Assistant Professor of German.
Frederic C. Tubach, Ph.D., Assistant Professor of German.
Philip F. Glander, Ph.D., Instructor in German.
Kathleen Harris, Dr. phil., Instructor in German.
Michael Mann, Ph.D., Instructor in German.

Richard Packham, M.A., Acting Instructor in German.
Richard M. Sheirich, M.A., Acting Instructor in German.
Edith Lewy Hecht, M.A., Associate in German.

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 96.

Departmental Major Adviser: ————.

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 353–355.

Note. A student enrolled in German 1, 2, 3, or 3S which duplicates courses completed in high school or at another institution of collegiate grade will not be allowed unit credit. The first two years of work in a foreign language in high school is considered to be equivalent to one semester in college (4 units); each successive year in a foreign language in high school is equal to one additional semester in college (4 units).

Higher Degrees. See the Announcement of the Graduate Division, at Berkeley.

‡ In residence spring semester only, 1962–1963.
GERMAN

A. German for Graduate Students, Beginning. (No credit) I and II.  
(Formerly numbered 1G.)  Mr. Packham in charge  
Preparation for graduate reading examinations.

B. German for Graduate Students, Advanced. (No credit) I and II.  
(Formerly numbered 2G.)  Mr. Packham in charge  
Preparation for graduate reading examinations.

Lower Division Courses

1. Elementary German. Beginners' Course. (4) I and II.  
Mr. Tubach, Miss Harris 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.  
Mrs. Hecht  
Two hours daily, five times per week.  
This course is equivalent to course 1 and 2.

2. Elementary German (continuation of 1). (4) I and II.  
Miss Harris, Mr. Tubach 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. Packham 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. Glander 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. Glander in charge  
Prerequisite: course 3 or four years of high school German.  
Conversational sections available. See course 3 above.

*4S. Scientific German. (3) II.  
Mr. Hannum  
Prerequisite: course 3S or 3 or equivalent.

39. Great Writers in German Literature.  
Any one of these courses is open to students in all departments of the University. No 
knowledge of German required.  
39A. Medieval Period. (2) I. Mr. Tubach.  
39B. Eighteenth Century. (2) I. Mr. Glander.  
39C. Nineteenth Century. (2) II. Mr. Loomis.  
39D. Twentieth Century. (2) II. Mr. Hannum.

* Not to be given, 1962–1963.
Upper Division Courses
Prerequisite: 16 units of lower division German courses.

101. Introduction to German Literature. (3) I and II. Mr. Jászi, 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.

102. Twentieth-Century German Drama. (3) I and II. Mr. Miley
(Formerly numbered 100A.)

103. Twentieth-Century German Prose. (3) I and II. Mr. Miley, Mr. Politzer
(Formerly numbered 100B.)

104. Nineteenth-Century German Drama. (3) II. Mr. Scheirich
(Formerly numbered 104A.)

105. Nineteenth-Century German Prose. (3) I. Mr. Jászi
(Formerly numbered 104B.)

107. The Works of Friedrich Schiller. (3) I. Mr. Mann

108. Goethe to the Italian Journey. (3) I. Miss Harris

109. Goethe after the Italian Journey. (3) II. Miss Harris

110. German Lyric Poetry. (3) I. Mr. Scheirich
Readings in German poetry from the Enlightenment to the present day.

*112A–112B. Survey of German Culture and Institutions. (2–2) Yr. Mr. Guthke
112A is not prerequisite to 112B.
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.
Prerequisite: same as for course 118A. 118A is not prerequisite to 118B.

119A. German Literature in the Eighteenth Century: Enlightenment, and Storm and Stress. (3) I. Mr. Grotegut
An analysis of the important German literary documents from 1700 to 1775.

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.

* Not to be given, 1962–1963.
*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. Jászí
Prerequisite: same as for course 118A.

130A–130B. Advanced Grammar and Composition. (3–3) Yr. Mr. Tubach, Mr. Packham, Mr. Palmer
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, or consent of the instructor.
131A is not prerequisite to 131B.

135A. Middle High German. (3) I. Mr. Palmer
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.

140. Introduction to Descriptive and Historical German Grammar. (3) II. Mr. Beeler
Prerequisite: same as for course 118A.
For prospective teachers and those planning to take courses in linguistics.

199. Special Study for Advanced Undergraduates. (1–3) I and II. in charge

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 165.)

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. Mr. Spahr
Prerequisite: course 135A.

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. Jáaszí

* Not to be given, 1962–1963.
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. Mr. Jászi
    Studies in Rilke.

*240. Twentieth-Century German Prose. (2) II. Mr. Mileck
    Thomas Mann, Hermann Hesse, and Franz Kafka.

249. Seminar in German Literature. (2 or 3) I and II. The Staff (Mr. Jászi in charge)
    I. Topic: Naturalism (2). Mr. Guthke
    II. Topic: Sec. 1. ——— (2). ———; Sec. 2. Hofmannsthal. (2). Mr. Politzer

298. Special Study for Graduate Students. (1–4) I and II. Mr. Jászi in charge

**German Linguistics**

For the courses in English philology, see the Department of English, page 337.

*260. Germanic Linguistics. (3) II. Mr. Beeler
    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.

262. History of the German Language. (3) I. Mr. Palmer
    Prerequisite: grade B or higher in course 135A.

265. Gothic. (3) II. Mr. Beeler

*275. Old High German. (3) I. Mr. Palmer

290. Seminar in Germanic Linguistics. (2 or 3) II. Mr. Palmer
    Topic: Old Saxon (2).

**Related Courses in Another Department**

The Symbolist Movement in European Literature (Comparative Literature 201A–201B).

Arthurian Literature. Theme: *The Grail* (Comparative Literature 205).

* Not to be given, 1962–1963.
GREEK

For courses in the Greek language and literature, see under Department of Classics, page 241.

HISTORY

(Department Office, 3229 Dwinelle Hall)

Walton E. Bean, Ph.D., Professor of History.
Woodbridge Bingham, Ph.D., Professor of History.
Woodrow Borah, Ph.D., Professor of History.
Delmer M. Brown, Ph.D., Professor of History.
†A. Hunter Dupree, Ph.D., Professor of History.
George H. Cuttridge, 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.
†Bryce Lyon, Ph.D., Professor of History.
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 (Chairman of the Department).
Charles G. Sellers, Ph.D., Professor of History.
†Engel Sluiter, 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.
Adrienne Koch, Ph.D., Associate Professor of History.

Albert Fishlow, B.A., Acting Assistant Professor of Economics.
Henry Rosovsky, Ph.D., Associate Professor of Economics.
Robert O. Paxton, Ph.D., Acting Instructor in History.
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 96.

Departmental Major Advisers: Consult Departmental Office.

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 and 17C–17D; 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

* In residence spring semester only, 1962–1963.
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 and 17C–17D, 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, at Berkeley, 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. Brucker, Mr. Schorske, ———

H4B. Western Civilization from 1648. (3) II.
Prerequisite: consent of instructor. Limited to ten students per section.
An honors course including reading, discussion, and reports, focusing on selected movements and epochs.

8A–8B. The Americas since 1492. (3–3) Yr.

17A–17B. The United States. (2–2) Yr. Mr. Sellers, Mr. Rappaport

Lower division students and history majors should take course 17C–17D in conjunction with this course.
17C–17D. The United States. (1–1) Yr.  Mr. Sellers, Mr. Rappaport
An extra hour of discussion to be taken concurrently with 17A–17B. Intended especially for lower division students and history majors.

H17A–H17B. The United States (3–3) Yr.  Mr. Abrams, ———
Prerequisite: sophomore standing and consent of instructor. Limited to ten students per section.
An honors course including reading, discussion, and reports, focusing on selected movements and epochs.

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.  Miss Koch
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.  ———

112A–112B. Economic History of Europe. (3–3) Yr.  Mr. Landes

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.

*115A–115B. Byzantium. (3–3) Yr.

121A–121B. Medieval Europe. (3–3) Yr.  Mr. Brentano

*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.
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

* Not to be given, 1962–1963.
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. Mr. Riasanovsky

135B. Russia, 1689–1890: Peter the Great through the Great Reforms. (3) II. Mr. Riasanovsky

136. Russia since 1890: The Russian Revolutions and the Soviet Regime. (3) II. Mr. Malia

*139A–139B. Southeastern Europe and the Near East. (3–3) Yr. The Ottoman Empire, Turkey, Albania, Bulgaria, Greece, Yugoslavia, and Rumania since the eighteenth century.

*140A–140B. The Habsburg Monarchy and the Succession States. (3–3) Yr.

141A–141B. Modern France. (3–3) Yr. Mr. Paxton

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.

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. Gutteridge
Prerequisite: an elementary knowledge of the history of Western Europe.

*152A–152B. Constitutional History of England. (3–3) Yr. Mr. Barnes

* Not to be given, 1962–1963.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>155A–155B</td>
<td>The British Commonwealth and Empire.</td>
<td>(3–3)</td>
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<td></td>
<td>Prequisite: course 151B or equivalent.</td>
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<tr>
<td>159</td>
<td>Great Britain since 1900.</td>
<td>(3) I</td>
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<td>160A–160B</td>
<td>Spain and Portugal.</td>
<td>(3–3) Yr</td>
<td>Mr. Herr</td>
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<tr>
<td>161A–161B</td>
<td>Hispanic-American History.</td>
<td>(3–3) Yr</td>
<td>Mr. King</td>
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<td></td>
<td>161A. The Colonial Empire.</td>
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<td>161B. Since Independence.</td>
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<td>162</td>
<td>The Caribbean Area since 1700.</td>
<td>(3) I</td>
<td>Mr. King</td>
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<tr>
<td>163</td>
<td>Brazil.</td>
<td>(3) II</td>
<td>Mr. Sluiter</td>
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<tr>
<td>164</td>
<td>Argentina since 1800.</td>
<td>(3) I</td>
<td>Mr. Scobie</td>
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<tr>
<td></td>
<td>Emphasis on post-1800 developments. Designed for majors in the social sciences.</td>
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<tr>
<td>165A–165B</td>
<td>Modern Social History of Latin America.</td>
<td>(3–3) Yr</td>
<td>Mr. Scobie</td>
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<tr>
<td>166A–166B</td>
<td>Mexico.</td>
<td>(3–3) Yr</td>
<td>Mr. Padden</td>
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<tr>
<td>167A–167B</td>
<td>The Diplomatic History of the United States.</td>
<td>(3–3) Yr</td>
<td>Mr. Rappaport</td>
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<td>168</td>
<td>Inter-American Relations.</td>
<td>(3) II</td>
<td>Mr. King</td>
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<td></td>
<td>Emphasis will be placed on the Pan-American movement and the development of the Organization of American States.</td>
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<tr>
<td>169A–169B</td>
<td>Intellectual History of Spanish America.</td>
<td>(3–3) Yr</td>
<td>Mr. Padden</td>
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<tr>
<td>170A–170B</td>
<td>American History to 1789.</td>
<td>(3–3) Yr</td>
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<td>170A, or written consent of instructor, prerequisite to 170B.</td>
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<td>172A–172B</td>
<td>Constitutional History of the United States.</td>
<td>(2–2) Yr</td>
<td>Mr. Harper</td>
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<td></td>
<td>Prerequisite: course 17A–17B or 171A–171B or consent of instructor.</td>
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<tr>
<td>172C–172D</td>
<td>Constitutional History of the United States.</td>
<td>(1–1) Yr</td>
<td>Mr. Harper</td>
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<td>An extra hour of class discussion to be taken only with course 172A–172B.</td>
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<tr>
<td>173A</td>
<td>The Era of Sectional Conflict, 1820–1865.</td>
<td>(3) I</td>
<td>Mr. Stampp</td>
</tr>
<tr>
<td>173B</td>
<td>Reconstruction and the New Nation, 1865 to 1900.</td>
<td>(3) II</td>
<td>Mr. Stampp</td>
</tr>
<tr>
<td>174A–174B</td>
<td>Recent History of the United States.</td>
<td>(3–3) Yr</td>
<td>Mr. Abrams</td>
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<td></td>
<td>174A. 1900 to 1928.</td>
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<td></td>
<td>174B. 1928 to the present.</td>
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<tr>
<td>175A–175B</td>
<td>Intellectual History of the United States.</td>
<td>(3–3) Yr</td>
<td>Mr. May</td>
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</tbody>
</table>

* Not to be given, 1962–1963.
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.  
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.  
Mr. Barth

*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.

194A–194B. China. (3–3) Yr.  
Mr. Brown

195A–195B. Japan. (3–3) Yr.  
Mr. Metcalf

197A–197B. India. (3–3) Yr.  
Mr. Metcalf

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. 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) II.  
Mr. Charlson

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.

A. Ancient Greece and Rome. I. Mr. Sinnigen.
B. Europe. I. ————, Mr. Paxton, ————. II. Mr. Andress, Mr. Riasanovsky, ————.
C. England. I. ————, II. Mr. Brentano, ————.
D. United States. I. Mr. Abrams, ————, Mr. Rappaport, ————. II. Mr. Abrams, Mr. Barth, Mr. Bean, Mr. Harper, ————.
E. Latin America. I. ————, II. Mr. Padden.
F. Asia. I. Mr. Metcalf, II. Mr. Bingham.
(See also History of Science, p. 90.)

* Not to be given, 1962–1963.
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) II. Mr. Malia
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.

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 165.)

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. Ancient Greece and Rome. I. Mr. Sinnigen.
B. Europe. I. Mr. Angress, Mr. Bouwsma, Mr. Paxton, ———. II. Mr. Angress, Mr. Landes, Mr. Paxton, ———.
C. England. I. Mr. Guttridge, ———. II. Mr. Brentano, ———.
D. United States. I. Mr. Barth, Mr. Harper, Miss Koch, Mr. May, Mr. Sellers. II. Mr. Abrams, Mr. Rappaport, ———.
E. Latin America. I. Mr. King, II. Mr. Hammond, Mr. Sluiter, ———.
F. Asia. I. Mr. Bingham. II. Mr. Brown, Mr. Wheatley.
(See also History of Science, page 392.)

202. Historical Method and Bibliography. (3) I and II. Mr. Brentano, Mr. Sontag, Mr. Borah, Mr. Rosenberg
I: Mr. Brentano, Mr. Sontag; II: Mr. Borah, Mr. Rosenberg.
Designed especially for candidates for higher degrees in history. Stress is laid on practical exercises.

Group II—Research Seminars

211A. Ancient Greece and Rome. (3) II. A reading knowledge of French or German, and Latin or Greek is required.

* Not to be given, 1962–1963.
<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>220</td>
<td>Historical Auxiliaries to Medieval Studies. (3) I.</td>
<td>Mr. Galbraith</td>
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<td></td>
<td>(Formerly numbered 205.) Emphasis upon diplomatic and practical paleography.</td>
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<td>221</td>
<td>Medieval Europe. (3) II.</td>
<td>Mr. Galbraith</td>
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<td>231</td>
<td>The Renaissance. (3) II.</td>
<td>Mr. Brucker</td>
</tr>
<tr>
<td>232</td>
<td>Europe in the Seventeenth and Eighteenth Centuries. (3) II.</td>
<td>Mr. Bouwsma</td>
</tr>
<tr>
<td>233</td>
<td>Western Europe. (3) I.</td>
<td>Mr. Herr</td>
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<tr>
<td>234</td>
<td>European Intellectual History. (3) I.</td>
<td>Mr. Schorske</td>
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<td>235</td>
<td>Russian Thought and Politics in the Nineteenth Century. (3) I.</td>
<td>Mr. Riasanovsky</td>
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<td>236</td>
<td>Modern Russia. (3) II.</td>
<td>Mr. Malia</td>
</tr>
<tr>
<td>239</td>
<td>Central and Southeastern Europe. (3) II.</td>
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<td>241</td>
<td>Modern France. (3)</td>
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<td>242</td>
<td>Germany and Central Europe before 1815. (3) II.</td>
<td>Mr. Rosenberg</td>
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<td>243</td>
<td>Modern Germany. (3) I.</td>
<td>Mr. Angress</td>
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<td>244</td>
<td>European Diplomatic History. (3) II.</td>
<td>Mr. Sontag</td>
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<tr>
<td>246</td>
<td>European Social and Institutional History of the Nineteenth Century. (3) I.</td>
<td>Mr. Rosenberg</td>
</tr>
<tr>
<td>248</td>
<td>Modern Italy. (3) II.</td>
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<td>250</td>
<td>Medieval England. (3) II.</td>
<td>Mr. Brentano</td>
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<tr>
<td>251</td>
<td>England, 1660 to 1837. (3) II.</td>
<td>Mr. Guttridge</td>
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<td>252</td>
<td>Tudor-Stuart England. (3) II.</td>
<td>Mr. Barnes</td>
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<td>255</td>
<td>The British Commonwealth and Empire. (3)</td>
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<td>260</td>
<td>Spain. (3)</td>
<td>Mr. Herr</td>
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<td></td>
<td>Prerequisite: course 160A–160B, a reading knowledge of Spanish, and German or French.</td>
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<td>261</td>
<td>Hispanic-America. (3) II.</td>
<td>Mr. King</td>
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<td>262</td>
<td>Hispanic America: Comparative Studies. (3) I.</td>
<td>Mr. Borah</td>
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<tr>
<td>263</td>
<td>Hispanic-America: Colonial Period and Brazil. (3) I.</td>
<td>Mr. Sluiter</td>
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<tr>
<td>265</td>
<td>Modern Social History of Latin America. (3) II.</td>
<td>Mr. Scobie</td>
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</tbody>
</table>

* Not to be given, 1962–1963.

§ Approved for one offering only, 1962–1963.
266. Mexico. (3) II. Mr. Padden

267. Diplomatic History of the United States. (3) I. Mr. Rappaport
   Prerequisite: course 167A–167B.

270. The American Colonies. (3) II.

°271. The American West. (3)

272. Economic and Legal History of the United States. (3) I. Mr. Harper

273. The Old South, the Civil War, the Reconstruction. (3) II. Mr. Stampp

°274. Recent History of the United States. (3) II.

275. Intellectual History of the United States. (3) II. Mr. May
   Recommended: course 175A–175B or equivalent.

°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) I. Mr. Hammond

°282. Spanish Borderlands. (3) Mr. Hammond

289. California and the West. (3) I. 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) I. Mr. Brown

297. India. (3) II. Mr. Metcalf

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. Brown, Mr. Herr, Mr. Riasanovsky,
   Mr. Sellers, Mr. Borah, Mr. Stampp

   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 de-

° Not to be given, 1962–1963.
tails see the cross-listings in the philosophy section of this bulletin.) Students interested in graduate programs in the history of science should consult Mr. Hahn.

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.

*127A–127B. Topics in the History of Physical Science. (3–3) Yr.
(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 episodes in the development of scientific thought.

128A–128B. Topics in the History of Biological Science. (3–3) Yr.

*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) II.

205. Seminar in the History of Science. (3) II. Mr. Hahn
(Formerly numbered 204.)

278. History of Science and Technology in America. (3) I. Mr. Greene

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.
Stanley G. Eskin, Ph.D., Assistant Professor of English.
Daniel Heartz, Ph.D., Assistant Professor of Music.

Committee in Charge:

William G. Bade, Ph.D., Associate Professor of Mathematics.
Marianne Bonwit, Ph.D., Associate Professor of German.

* Not to be given, 1962–1963.
William J. Bouwsma, Ph.D., Associate Professor of History.
Stanley L. Cavell, Ph.D., Assistant Professor of Philosophy.
Lawrence H. Moe, Ph.D., Associate Professor of Music.
Charles Muscatine, Ph.D., Professor of English (Chairman of the Committee).
Juergen Schulz, Ph.D., Assistant Professor of 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 96.

The Field Major. See the Announcement of the College of Letters and Science.

Upper Division Courses

§101. The Arts. (3) I. Mr. Heartz, Mr. Boyden, ———
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, Mr. Eskin
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, Mr. Bouwsma
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.

HUNGARIAN

(For courses in the Hungarian language and literature, see under Department of Slavic Languages and Literatures.)

INSECT PATHOLOGY

(See Entomology and Parasitology for courses offered by staff members of the Department of Insect Pathology.)

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.

Luigi Dallapiccola, Visiting Professor, Chair of Italian Culture, for the fall semester.

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 96.

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

11. Elementary Italian. (4) I and II. Mr. Ferruolo (in charge)
   Five meetings per week.

12. Elementary Italian. (4) I and II. Mr. Ferruolo (in charge)
   Five meetings per week. Prerequisite: course 1 or the equivalent.

13. Intermediate Italian. (4) I and II. Mr. Stefanini (in charge)
   Five meetings per week. Some sections emphasize reading, others conversation. Prerequisite: course 2 or the equivalent.

   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.
Ferruolo, Mr. Perella.
39B. From the End of the Renaissance to the Present. (3 I and II) Mr. Perella, Mr.
Scaglione.

Upper Division Courses

(3–3 Yr.) 
Mr. Stefanini

103A–103B. A Survey of Italian Literature. (3–3 Yr.) Mr. Costa
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. Scaglione

110A–110B. Italian Literature of the Thirteenth and Fourteenth Centuries.
(3–3 Yr.) Mr. De Negri
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.) Mr. Costa
Emphasis on the works of Vico, Goldoni, Parini, and Alfieri.

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

199. Special Study for Advanced Undergraduates. (1–3 I and II.)
Mr. Ferruolo (in charge)
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.

^ Not to be given, 1962–1963.
140. Dante, Petrarch, and Boccaccio. (3) II.
Mr. De Negri, Mr. Ferruolo, Mr. Perella
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 165.)

1201. Historical Grammar. (2) I.
Mr. Stefanini

1202. Early Italian Texts. (2) II.
Mr. Stefanini

1203. Methods of Literary Study and Stylistic Analysis. (2) II.
Mr. Scaglione

*1204. Italian Literary Criticism. (2) II.
Mr. Costa

1209. Studies in the Divina Commedia. (2) I.
Mr. De Negri

1211. Seminar on Petrarch. (2) I.
Mr. Ferruolo
The fundamental aspects of Petrarch's work in relation to the rise and development of humanism.

*1213. 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.

1215. Chivalric Poetry in Italy. (2) I.
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.

1217. Studies in the Renaissance. (2) II.
Mr. Ferruolo

*1218. Seminar on the Baroque. (2) I.
Especially: the pastoral drama, Marino, and the Marinisti.
Mr. Perella

1221. Romanticism in Italy. (2) II.
Mr. De Negri
The Romantic movement in Italy in its relationship to European Romanticism, with emphasis on Foscolo, Leopardi, and Manzoni.

1299. Special Study for Graduate Students. (1-4) I and II.
Mr. De Negri (in charge)
Specifically designed for students 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.

Italian for Graduate Students. (No credit) I.
Mr. Costa
(Formerly numbered 1G.)
First course.

Related Courses
The Literature of the Renaissance in Western Europe (Comparative Literature 151A–151B).
Italian Culture in Transition, 1450–1650 (History 130).

* Not to be given, 1962–1963.
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.
Kenneth Stewart, B.Litt., Professor of Journalism.
Phillip F. Griffin, M.A., Associate Professor of Journalism.

Pete Steffens, M.A., Lecturer in Journalism.
Allan Temko, A.B., Lecturer in Journalism.

Letters and Science List. All courses except 131A, 131B, 152, and 181 series. For regulations governing this list, see page 96.

Departmental Major Advisers: Mr. Desmond, Mr. Griffin, Mr. Steffens, Mr. Stewart.

The Major. (1) English 1A–1B or Speech 1A–1B; (2) one year course selected from Economics 1A–1B, History 4A–4B, 17A–17B, Political Science 1 and 2; (3) one semester course selected from Anthropology 2A, Psychology 1A, Sociology 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 the fall 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. Steffens
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.

131A–131B. The Editing Process. (3–3) Yr. Mr. Griffin, Mr. Steffens
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. Stewart
Development of journalism, particularly in the United States, with an introduction to the important media and personalities.

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.
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. Steffens
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.

165. The Press, the Law and the Constitution. (3) I. Mr. Pickerell
Introduction to historical development of freedom of press and speech; development of rights to publish news and comment, restrictions to rights affected by controls over defamation, licensing and taxation, access to information, and the doctrine of privacy.

181. Senior Course in Journalistic Problems. Mr. Pickerell, Mr. Stewart
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.
(Formerly numbered 180).
Two hours of lecture and one two-hour laboratory per week.
181J. Newspaper Advertising. (3) I. 
(Formerly numbered 171.)
Two hours of lecture and one two-hour laboratorv per week.

181K. Problems of Publishing. (3) II. Mr. Pickerell
(Formerly numbered 170.)
Two hours of lecture and one two-hour laboratorv per week.

181L. Reporting of Public Affairs. (3) II. Mr. Stewart
(Formerly numbered 184.)
Two hours of lecture and one two-hour laboratorv per week.

(3–3) Yr. 
190A is not prerequisite to 190B.

190A. Press and World Affairs.
Examination 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.

196. Theories and Problems in the Conduct of International Information
Programs. (3) I. 
Mr. Hulten
Prerequisite: senior or graduate standing and consent of the instructor. Governmental efforts at international persuasion.

H198. Senior Honors Program. (2–4) I and II.
The Staff
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.

199. Special Study for Advanced Students. (1–4) I and II. 
Mr. Griffin
Prerequisite: for students whose major is journalism, at least a B average in all journalism courses undertaken or consent of the instructor; for others, at least a B average in all courses undertaken and consent of the instructor.

Graduate Courses

Prerequisite: courses 21 or 131 and 140. Admission to all graduate courses is at the discretion of the instructor. See also page 165.

201. Research Methods in Journalism. (2) I. 
Required of all candidates for the Master of Journalism degree.

220. The Newspaper and Public Affairs. (2) I. 
Mr. Desmond

231. The Press and Its Audience. (2) II. 

240. Seminar in History of Journalism. (2) I. 
Mr. Griffin

251. Literature of the Press. (2) I. 
Mr. Griffin
Study of journalistic writings, principally contemporary.
263. Public Opinion, Propaganda, and the Mass Media. (2) II. Mr. Pickrell

265. The Law of Communications. (2) II. A seminar inquiring into legal controls affecting the press. Case studies.

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. Pickrell

290. Seminar in Comparative World Journalism. (2) I. Mr. Desmond

296. Seminar in International Persuasion. (2) II. Mr. Hulten

Prerequisite: course 196 or consent of instructor.
Use of communication in international relations; examination of propaganda campaigns and techniques.

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. Mr. Hulten

May be taken both semesters.
Individual investigation of a selected topic, conducted under guidance of a member of the faculty.

Related Courses in Other Departments

Field Work in Legislative Process (Political Science 400A–400B).
Introduction to Social Science (Social Science 1A–1B).

LANDSCAPE ARCHITECTURE

(Department Office, 101 Agriculture Hall)

H. Leland Vaughan, B.L.A., Professor of Landscape Architecture.
Francis J. Violich, B.S., Professor of City Planning and Landscape Architecture (Chairman of the Department).
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.
Robert T. Buchanan, M.L.A., Assistant Professor of Landscape Architecture.

May K. Arbogast, M.A.s., Lecturer in 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 84. 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.  Mr. Tetlow
   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.  
   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. Litton
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.

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. Vaughan
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 165.)

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. Mr. Royston
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.

Law

(Department Office, 225 Law Building)
Edward L. Barrett, Jr., B.S., LL.B., Professor of Law and of Criminology.
Rex A. Collings, Jr., M.A., LL.B., Professor of Law.
Albert A. Ehrenzweig, Dr. Jur., J.D., LL.M., J.S.D., Walter Perry Johnson
Professor of Law.
Geoffrey C. Hazard, Jr., A.B., LL.B., Professor of Law.
John R. Hetland, B.S.L., 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, B.S.L., LL.B., Professor of Law.
Calvert Magruder, M.A., LL.B., LL.D., Regents’ Professor for the fall semester.
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.
Jerome A. Cohen, A.B., LL.B., Associate Professor of Law.
Edward C. Halbach, Jr., A.B., J.D., LL.M., Associate Professor of Law.
Justin Sweet, A.B., LL.B., Associate Professor of Law.

1 In residence fall semester only, 1962–1963.
2 In residence, spring semester only, 1962–1963.
John P. Austin, A.B., LL.B., Lecturer in Law.
Spurgeon Avakian, A.B., LL.B., Lecturer in Law.
Babette B. Barton, B.S., LL.B., Lecturer in Law.
Newell C. Barnett, A.B., LL.B., Lecturer in Law.
Robert L. Bridges, A.B., LL.B., Lecturer in Law.
Valentine Brookes, A.B., LL.B., Lecturer in Law.
Richard M. Buxbaum, A.B., LL.B., LL.M., Acting Associate Professor of Law.
Robert H. Cole, A.B., LL.B., Acting Associate Professor of Law.
John W. Cowee, M.B.A., Ph.D., LL.B., Professor of Insurance.
Bernard L. Diamond, A.B., M.D., Lecturer in Law.
William I. Edlund, A.B., LL.B., Lecturer in Law.
Folger Emerson, A.B., LL.B., Lecturer in Law.
A. Barlow Ferguson, A.B., LL.B., Lecturer in Law.
Kathryn A. Gehrels, A.B., LL.B., Lecturer in Law.
James L. Hetland, Jr., B.S.L., LL.B., Visiting Professor of Law for the spring semester.
John H. Jackson, A.B., J.D., Acting Associate Professor of Law.
Tevis Jacobs, A.B., J.D., Lecturer in Law.
Nicholas Johnson, A.B., LL.B., Acting Associate Professor of Law.
Frank M. Keesling, A.B., LL.B., 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.
Calvert Magruder, M.A., LL.B., LL.D., Visiting Professor of Law for the spring semester.
Laura Nader, A.B., Ph.D., Assistant Professor of Anthropology.
John A. Pettis, Jr., A.B., LL.B., Lecturer in Law.
Richard R.B. Powell, M.A., LL.B., LL.D., Visiting Professor of Law.
Martin N. Pulich, A.B., LL.B., Lecturer in Law.
James E. Sabine, A.B., LL.B., Lecturer in Law.
Herma H. Schreter, A.B., J.D., Acting Assistant Professor of Law.
Walter G. Schwartz, A.B., LL.B., Lecturer in Law.
Preble Stolz, A.B., J.D., Acting Associate Professor of Law.
Marvin Tepperman, J.D., Lecturer in Law.
William Franklin Young, Jr., A.B., LL.B., Visiting Professor of Law.
Curriculum of the School of Law

For admission requirements and for the requirements for the degree of Master of Laws (LL.M.) and of Doctor of the Science of Law (J.S.D.), consult the ANNOUNCEMENT OF THE SCHOOL OF LAW.

Nonresidents of California enrolled as students in the School of Law pay a fee of $350 each semester, which includes the incidental fee charged all students.

Professional Curriculum

First Year

200A–200B. Contracts. (4–2) Yr. Mr. Jackson, Mr. Sweet, Mr. Young
202. Criminal Law and Procedure. (3) II. Mr. Barrett, Mr. Collings
206A–206B. Pleading and Procedure in Civil Cases. (2–4) Yr.
   Mr. Hazard, Mr. Louisell, Mr. Stolz, ———
207. Introduction to Legal History. (1) I. Mr. Hazard, Mr. Stolz
208A–208B. Property. (4–2) Yr. Mr. Hetland, Mr. Heyman, Mr. Powell
210. Equity. (2) II. Mr. Hazard, Mr. Jackson, Mr. Stolz
212A–212B. Torts. (4–2) Yr.
   Mr. Cole, Mr. Fleming, Mr. Magruder, 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. Cole
227. The Legal Profession. (1) II. Mr. Ehrenzweig
230. Marital Property. (2) I. Mr. Collings, Mrs. Schreter
232. Security Transactions. (2) I. Mr. Hetland, Mr. Riesenfeld
234A–234B. Estates and Trusts. (2–2) Yr. Mr. Heyman, Mr. Powell
237A–237B. Income Taxation. (2–2) Yr.
   Mrs. Barton, Mr. Kragen, Mr. Sato,


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<td>Administrative Law: Second Course. (2) II.</td>
<td>Mr. Johnson</td>
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<td>241</td>
<td>International Business Transactions. (2) II.</td>
<td>Mr. Buxbaum</td>
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<tr>
<td>242</td>
<td>International and Maritime Law. (2) I.</td>
<td>Mr. Riesenfeld</td>
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<td>243</td>
<td>Bills and Notes. (2) II.</td>
<td>Mr. Prosser</td>
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<td>246</td>
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<td>Mr. Ehrenzweig, Mrs. Schreter</td>
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<td>247</td>
<td>Securities Regulation. (2) II.</td>
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<td>248</td>
<td>Selected Problems in Business Planning. (2) I.</td>
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<td>252</td>
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<td>Family Law. (2) II.</td>
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<td>Federal Jurisdiction. (2) I.</td>
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<td>Political Institutions and Law in the Communist World. (2) II.</td>
<td>Mr. Cohen</td>
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<td>Land Development and Security. (2) II.</td>
<td>Mr. Hetland</td>
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<td>Insurance. (2) II.</td>
<td>Mr. Young, Mr. Cowee</td>
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<tr>
<td>258</td>
<td>Law of International Organization. (2) II.</td>
<td>Mr. Jackson</td>
</tr>
<tr>
<td>259</td>
<td>International Conflicts Law. (2) II.</td>
<td>Mr. Ehrenzweig</td>
</tr>
<tr>
<td>260</td>
<td>Land Use Planning. (2) II.</td>
<td>Mr. Heynweig</td>
</tr>
<tr>
<td>261</td>
<td>Selected Problems in Marital Property and Family Law. (2) II.</td>
<td>Mrs. Schreter</td>
</tr>
<tr>
<td>262</td>
<td>Labor Law. (3) I.</td>
<td>Mr. Kagel</td>
</tr>
<tr>
<td>263</td>
<td>Negotiation, Conciliation, Arbitration. (2) II.</td>
<td>Mr. Kagel</td>
</tr>
<tr>
<td>264</td>
<td>Modern Social Legislation. (2) II.</td>
<td>Mr. Cole</td>
</tr>
</tbody>
</table>

* Not to be given, 1962–1963.
265. Advanced Legal Writing. (1–2) I and II.  
266. Legislation. (2) I.  
267. Law and Anthropology. (2) II.  
268. State and Local Government Law. (2) I.  
269. State and Local Taxation. (2) II.  
270. Government Control of Business. (2) II.  
271. Trial Practice. (2) I.  
272. Antitrust Law. (2) I.  
274. Restitution. (2) I.  
275. Selected Problems in Contracts. (2) II.  
276. Copyright and Unfair Competition. (2) II.  
277. Advanced Study in Criminal Law. (2) I.  
278. Selected Problems in Criminal Law and Administration. (2) I.  
279. Natural Resources Law. (2) II.  
280. Oil and Gas Law. (2) I.  
281. Estate Planning and Taxation. (3) I.  
282. Estate and Gift Taxation. (2) I and II.  
283. Selected Problems in Estate Planning. (2) II.  
284. Selected Problems in the Taxation of Business Enterprise. (2) II.  

Graduate Curriculum  
286A–286B. Seminar in Business Associations. (2–2) Yr.  
287A–287B. Seminar in Commercial Transactions. (2–2) Yr.  
288A–288B. Seminar in Constitutional Law. (2–2) Yr.  

* Not to be given, 1962–1965
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. Buxbaum, Mr. Riesenfeld

291A–291B. Seminar in Labor Law and Procedure. (2–2) Yr. Mr. Kagel

292. Seminar in Legal Education. (1) I and II.
   The Staff (Mr. Newman in charge)

293A–293B. Seminar in Legal History and Jurisprudence. (2–2) Yr.
   Mr. Ehrenzweig, Mr. Hazard, Mr. Riesenfeld

294A–294B. Seminar in Legislation and Legislative Procedure. (2–2) Yr.
   Mr. Newman

295A–295B. Seminar in Practice and Procedure. (2–2) Yr.
   Mr. 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.
   Mrs. Barton, Mr. Kragen, Mr. Sato

298A–298B. Seminar in Roman and Comparative Law. (2–2) Yr.
   Mr. Cohen, 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.
Raynard C. Swank, Ph.D., Professor of Librarianship (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.
Frederic J. Mosher, Ph.D., Associate Professor of Librarianship.
Ray E. Held, Ph.D., Assistant Professor of Librarianship.
Mae J. Durham, B.L.S., Lecturer in Librarianship.
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, at Berkeley.)

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.

Courses in librarianship are 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 Master of Library Science degree (M.L.S.) is conferred upon students who complete a 28-unit program with an average grade of B. Twenty-two units must be taken in librarianship in required courses; 6 additional units may be elected in librarianship, or in upper division or graduate courses in other departments, provided they are approved by the Dean as being acceptable to the individual’s complete program of instruction.

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

Four hours of lecture and eight hours laboratory per week.
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. Mosher, Mr. Held

Basic reference materials including national and trade bibliography.
Lectures, discussions, and reports on assigned problems.

203. Introduction to Librarianship. (2) I. Mr. Swank

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) I and II. Mr. Merritt

Prerequisite: course 204.

Problems in selecting records, motion pictures, maps, and other library material in special format; special problems in selecting material in particular subject fields; methods of evaluating library collections and the effectiveness of the selection process.

206. School Library Administration. (2) II. Mrs. Durham

A general survey of elementary and secondary school libraries. Emphasis on the function, administration, organization, services, materials, and the planning and equipment of school libraries in relation to the modern school. Lectures, committee and individual reports, readings, class discussions, and field trips. Experiences gained in practice work are utilized.

207. Municipal and County Library Administration. (2) II. Mr. Wight

Government, organization, and administration of municipal, county, and regional public libraries. Library service programs in relation to varying community patterns. Lectures, readings, reports, field trips.

208. College, University, and Special Library Administration. (2) I and 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 child’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.

214. 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.

Reading interests, habits, and needs of different types and groups of readers. The nature of reading, problems of reading, selection of reading by children, young people, college students, and public library patrons. The role of the library in adult education.
217. Bibliography of Science and Technology. (2) II. Mr. Shank
Scientific and technical literature with emphasis on reference and bibliographical aids. Periodical and serial literature and its use and control through abstracts and indexes.

218. Advanced Cataloguing. (2) I or II. Miss Markley
Prerequisite: course 214.
Modern trends and problems in cataloguing with emphasis on cooperative cataloguing, special catalogues, and other special classes of library materials; study of areas of investigation and research in the field of cataloguing; discussion and reports.

219. Advanced Classification. (2) I or II. Miss Markley
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.

220A. Descriptive Bibliography. (2) I or II. Miss Markley
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 Me-Kerrow and Esdaile; methods of bibliographical description, based on Bowes; study of the bibliography of book rarities, with emphasis on American and western imprints.

220B. Subject Bibliography. (2) II. Miss Markley
Prerequisite: courses 201, 202, 212 (the last either previously or concurrently).
The history of bibliographical organization; methodology of enumerative bibliography, including form, style, and procedure; individual oral and written reports on the status of bibliographical control in selected subject fields, including location of special library collections and related research materials.

221. Book Collecting for University Libraries. (2) I. Mr. Danton
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.

225. History of Libraries. (2) Mr. Danton, Mr. Held
225A. History of Ancient and Medieval Libraries. I. Mr. Held.
225B. History of Scholarly Libraries. II. Mr. Danton.
225C. History of Popular Libraries. II. Mr. Held.

226. History of Printing. (2) Mr. Mosher
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.

228. Problems in Reading. (2) I. Mr. Merritt
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.

1 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.
1 Either 226A or 226B or 226C will be given during the spring semester.
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. Prerequisite 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 functions 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 educational levels, and community groups, as they affect library use. Methods of integrating the library with the community.

240. Content Analysis. (2) II. Mr. Merritt
Problems in methods of determining maturity level, social and moral attitudes, and other educational and propagandistic assumptions in materials of communication.

245. Introduction to Documentation. (2) II. Mr. Meyer
Prerequisite: courses 201, 202, 203.
Survey of activities performed by documentation centers in the production, acquisition, organization, servicing, and dissemination of technical reports. Introduction to various systems and devices for the storage and retrieval of information.

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 research. 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) II. Mr. Danton
Library development in the Western World—underlying social and political causes.

265. Seminar in Library Education. (2) I. Mr. Danton
Origins, development and effects of education for librarianship in Europe and the United States.

299. Special Study. (1–8) I and II. The Staff (Mr. Swank 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

(Departamental 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).
*John J. Cumperz, Ph.D., Associate Professor of Linguistics and South Asian Languages.
Dell H. Hymes, Ph.D., Associate Professor of Linguistics and of Anthropology.
Sydney M. Lamb, Ph.D., Associate Professor of Linguistics.
Jesse O. Sawyer, Ph.D., Assistant Professor of Linguistics and Director, Language Laboratory.
William F. Shipley, Ph.D., Assistant Professor of Linguistics.

<>

Harvey Pitkin, A.B., Acting Assistant Professor of Linguistics.

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 96.

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; 29 units of upper division courses in linguistics and allied fields. Twenty-three units of this last requirement are to consist of the following courses without substitution: Linguistics 100, 120, 130, 140, 145, 150; Sanskrit 190A–190B. The remaining 6 units (two courses) must be selected from among the following: Linguistics 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 or more 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 417.

**Lower Division Course**

35. Language and Linguistics. (3) I and II. Mr. Shipley, Mr. Pitkin
Prerequisite: sophomore standing.
How languages differ from one another in form and content; the structure of languages. How languages change; the reconstruction of former languages. The languages of the world and their relationships.

**Upper Division Courses**

100. Elementary Phonology and Grammar. (3) I and II. Mr. Pitkin, Mr. Shipley
Prerequisite: upper division status or with consent of the instructor.

120. Principles of Historical and Comparative Linguistics. (2) I. Mr. Chrétien
Prerequisite: upper division status or consent of the instructor.

130. Phonetics and Phonemics. (3) II. Mr. Shipley, Mr. Pitkin
Prerequisite: course 100 or equivalent. Lectures and section work.

140. Linguistic Analysis. (3) I and II. Mr. Pitkin, Mr. Emeneau
Prerequisite: course 100 and 130, or their equivalents.

145. Types of Linguistic Structure; a Survey of Selected Languages. (3) I and II. Miss Haas, Mr. Pitkin
Prerequisite: course 100 and 130, or their equivalents.

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 dialectology; function of speech variation in society.

Miss Haas

170. American Indian Languages. (3) II. 
Prerequisite: course 100 or equivalent.

The Staff

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

200. Proseminar. (2) I and II. ———, Mr. Chrétien

215. Mechanolinguistics. (2) I. 
The use of electronic computers in linguistic analysis and in such processes as the production and decoding of utterances.

Mr. Lamb

218. History of Linguistics. (2) II. 
(Formerly numbered 180.)
Prerequisite: consent of the instructor.

Mr. Hymes

220A–220B. Linguistics Laboratory. (3–3) Yr. 
Mr. Lamb, 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.

271. Acoustic Phonetics. (2) II. 
Prerequisite: course 130 or its equivalent.

Mr. Sawyer

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 duplication of credit with consent of instructor.
(a) Descriptive Linguistics, Mr. Lamb; (b) Historical Linguistics, Mr. Shipley; (c) Applications of Linguistics, Miss Haas; (d) Statistical Linguistics, Mr. Chrétien; (e) Mechanolinguistics, 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 (Miss Haas in charge)

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).

* Not to be given, 1962–1963.
Introduction to Descriptive and Historical German Grammar (German 140).
Germanic Linguistics (German 260).
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 (Romanic Philology 202).
Romance Dialect Geography (Romance Philology 205).
Comparative Slavic Linguistics (Slavic Languages and Literatures 220).
General Phonetics (Speech 103).

MA THEMATICS

(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.
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.
‡Derrick H. Lehmer, Ph.D., Professor of Mathematics.
Hans Lewy, Ph.D., Professor of Mathematics.
Michel Loève, Docteur ès Sciences, Professor of Mathematics and Statistics.
Charles B. Morrey, Jr., Ph.D., Professor of Mathematics (Vice-Chairman of the Department).
Anthony P. Morse, Ph.D., Professor of Mathematics.
Edmund Pinney, Ph.D., Professor of Mathematics.
Murray H. Protter, Ph.D., Professor of Mathematics (Chairman of the Department).
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.
Griffith C. Evans, Ph.D., Professor of Mathematics, Emeritus.
Sophia L. McDonald, 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.
William G. Bade, Ph.D., Associate Professor of Mathematics.
Errett A. Bishop, Ph.D., Associate Professor of Mathematics.
Hans J. Bremermann, Ph.D., Associate Professor of Mathematics.
Paul L. Chambré, Ph.D., Associate Professor of Mathematics and 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.
R. Sherman Lehman, Ph.D., Associate Professor of Mathematics.
Paul Emery Thomas, Ph.D., Associate Professor of Mathematics (Vice-Chairman of the Department).
Robert L. Vaught, Ph.D., Associate Professor of Mathematics.
Glen E. Bredon, Ph.D., Assistant Professor of Mathematics.
Peter N. Burgoyne, 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.
Shoshichi Kobayashi, Ph.D., Assistant Professor of Mathematics.
Adam Koranyi, Ph.D., Assistant Professor of Mathematics.
Antoni A. Kosinski, Ph.D., Assistant Professor of Mathematics.
Donald A. Ludwig, Ph.D., Assistant Professor of Mathematics.
Calvin C. Moore, Ph.D., Assistant Professor of Mathematics.
Andrew P. Ogg, Ph.D., Assistant Professor of Mathematics.
Dana Scott, Ph.D., Assistant Professor of Mathematics.
Gertrude I. Heller, Ph.D., Instructor in Mathematics for the fall semester.
David Shale, Ph.D., Instructor in Mathematics.

Manfred Breuer, Ph.D., Visiting Assistant Professor of Mathematics.
Claude C. Chevalley, Ph.D., Visiting Professor of Mathematics for the fall semester.

1 In residence fall semester only, 1962–1963.
2 In residence spring semester only, 1962–1963.
Hallard T. Croft, Ph.D., Lecturer in Mathematics.
Verena H. Dyson, Ph.D., Lecturer in Mathematics.
Walter Felscher, Dr. rer. nat., Visiting Assistant Professor of Mathematics.
Rubin Goldstein, Ph.D., Assistant Professor of Nuclear Engineering.
Reece T. Harris, Ph.D., Visiting Assistant Professor of Mathematics.
Bjarni Jonsson, Ph.D., Visiting Professor of Mathematics.
Shige Toshi Kuroda, D.Sc., Lecturer in Mathematics.
Hans Läuchli, Ph.D., Lecturer in Mathematics.
Stewart A. Robertson, Ph.D., Visiting Assistant Professor of Mathematics.
T. P. Srinivasan, M.A., Visiting Assistant Professor of Mathematics.
Volker Strassen, Dr. rer. nat., Acting Instructor in Mathematics.
John T. Tate, Ph.D., Visiting Professor of Mathematics for the spring semester.
John V. Wehausen, Ph.D., Professor of Engineering Science.
Donald Wehn, Ph.D., Lecturer in Mathematics.
Eugene M. Zaustinsky, Ph.D., Lecturer in Mathematics.

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 96.

Departmental Major Advisers: Mr. Bishop, Mr. Cordes, Mr. Feldman, Mr. Hirsch, Mr. Henkin, Mr. Robinson. Adviser for the major in mathematics for teachers: Mr. Seidenberg.

The Major in Mathematics. The major in mathematics consists of Mathematics 1A–1B, 2A–2B, 104, 115A, 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 Mathematics for teachers. 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 mathematics for teachers consists of Mathematics 1A–1B,

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 and 3A on the basis of the mathematics aptitude test of the College Board Examinations. 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. Bade, Mr. Helson, Mr. Robinson, Mr. Vaught

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.)

Prerequisite: two years of high school algebra, plane geometry, plane trigonometry. Honors course, corresponding to 1A–1B, for able students with strong mathematical

* Not to be given, 1962–1963.
† To be discontinued September 1963. This course will be offered for the last time in Summer Session 1963.
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. Hochschild, Mr. Morrey
Prerequisite: course 1A–1B.
Thorough technique of differential and integral calculus. Analysis of functions of several variables. Partial differentiation, multiple integrals. Differential equations. (Cover 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.
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–3B. Calculus with Analytic Geometry, First Course. (3–3) Yr.
Beginning each semester. Mr. Bredon, Mr. Scott, Mr. Seidenberg
Prerequisite: two years of high school algebra, plane geometry, plane trigonometry. Students may not receive credit for 3A–3B after having completed 3R or 16A–16B. 3A–3B covers the first 6 units of 1A–1B.
Elements of analytic geometry, introduction to differential and integral calculus, with applications.

4A–4B. Calculus with Analytic Geometry, Second Course. (3–3) Yr.
Beginning each semester.
Prerequisite: course 3B. 4A–4B covers two units of 1B and all of 2A.
Thorough technique of differential and integral calculus. Geometry and analysis of functions of several variables, partial derivatives, multiple integrals.

5. Mathematics for Liberal Arts Students. (3) I and II. Mr. Foster
Not open to students who have had 1A, 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.

6. Computers and Data Processing. (2) I. Mr. Huskey
An introductory course on automation of data processing structure of simple computers and its application to automatic control and pattern recognition. Algorithmic languages and translation to computers and their use in problem solving.

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. Mr. Bishop, Mr. Cordes, Mr. Thomas
Prerequisite: course 3B.
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.

* Not to be given, 1962–1963.
6A–16B. Analytic Geometry and Calculus. (3–3) Yr.
Mr. Lehman

16A. I and II.
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

01A–101B. Elementary Mathematics for Advanced Students. (3–3) Yr.
Mr. Diliberto

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. Introductory Analysis. (3) I and II.
Prerequisite: course 2B or 14B 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.

105. Integration. (3) I and II.
Prerequisite: course 104.
Functions of bounded variation, Riemann-Stieltjes integration, measure theory, Lebesgue-Stieltjes integration, Fubini and Radon-Nikodym theorems.

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.

112. Linear Geometry. (3) 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.

Discrete Probability (Statistics 112). (3) I and II.
Mr. Albert, Mr. Miles, Mr. Fabius, Mr. Buhlmann

Introduction to the Theory of Statistics (Statistics 113). (3) II.
Mr. Scott

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.

113B. Linear Algebra. (3) I and 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.
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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.

117. Analysis of Mathematical Problems. (3) I.
Prerequisite: upper division standing in mathematics and consent of instructor.
Intended primarily for students. Enrollment limited to fifteen students.
An undergraduate seminar in methods of attack on mathematical problems, without regard to particular field.

118. Analysis of Mathematical Problems. (3) II.
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.

119. Differential Equations. (3) I and II.
Prerequisite: course 2A or 4B. Only 1 unit credit will be allowed for students who have completed 2B or 14B or 110B. Will not count as part of the 24 units required for the mathematics major.

120A–120B. Advanced Calculus for the Applied Sciences. (3–3) Yr.
Beginning each semester.
Mr. Chambré
Prerequisite: course 14B or 2B. Primarily for students in the physical sciences.
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.
Prerequisite: course 2A or 4B. Only 1 unit credit will be allowed for students who have completed 2B or 14B or 110A. Will not count as part of the 24 units required for the mathematics major.

125A–125B. Mathematical Logic. (3–3) Yr.
Prerequisite: one year of calculus or Philosophy 12 or consent of instructor.

128A. Numerical Analysis. (3) I and II.
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.

* Not to be given, 1962–1963.
128B. Numerical Analysis. (3) II.
Prerequisite: courses 2A or 4A–4B, 111 or 113B, 119. 128A is not prerequisite for 128B.

128C. Laboratory for Numerical Analysis. (1) I. Mr. DeVogelaere in charge
Prerequisite: may be taken only in conjunction with course 128A.

128D. Laboratory for Numerical Analysis. (1) II. Mr. DeVogelaere in charge
Prerequisite: may be taken only in conjunction with course 128B.

130A–130B. Projective Geometry. (3–3) Yr.
130A. I and II.
(130A formerly numbered 9; 130B formerly numbered 112A.)
Prerequisite: course 1A–1B or 3A–3B.

135A. I and II.
Prerequisite: one year of calculus or consent of the instructor. Recommended: Philosophy 13.
135A. Arithmetic of natural numbers based on Peano's axioms. Inductive proofs and recursive definitions. Extension to the integers, rational numbers, and real numbers. Various characterizations of the field of real numbers.
135B. Axiomatic development of set theory. Finite and infinite sets, set-theoretical equivalence, cardinal numbers. Ordinal numbers, well-ordering; proof by transfinite induction, definition by transfinite recursion.

140. Metric Differential Geometry. (3) I and II.
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.
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.

160. History of Mathematics. (3) II.
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.
Prerequisite: course 2B or 14B or 122. Special sections will be arranged for students who have completed course 104.
190A–190B. Survey of Algebra and Analysis. (3–3) Yr.

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 165.)

202. Foundations of Analysis. (3) I and II. Mr. Bishop
Prerequisite: course 104 and 135A or consent of instructor.
Set theory, the real number system, topological spaces, metric spaces, compactness, completeness, function spaces.


203. Measure and Integration. (3) I and II. Mr. Kuroda
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. Mr. Robinson
Prerequisite: course 105, 185, or equivalent.
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. Mr. Ludwig
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.

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.

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. Mr. Bremermann
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.

215A. Algebraic Topology. (3) I and II. Mr. Bredon
Prerequisite: course 113B and 202.
Fundamental group, covering spaces; simplicial complexes, homology and cohomology groups; homotopy; applications to fixed point theorems and classification problems.
15B. Homotopy Theory. (3) II.  
Prerequisite: course 215A.  
Homotopy groups, fiber spaces, loop spaces; relations between homotopy and homology; obstruction theory; theorems of Hopf, Hurewicz and Whitehead.

17. Special Functions and Asymptotic Integration. (3) I.  
Mr. Pinney  
Prerequisite: course 185.  
Properties of the Bessel, Legendre, and hypergeometric functions and the asymptotic valuation of integrals by the methods of stationary phase and steepest descents.

19A–219B. Ordinary Differential Equations. (3–3) Yr.  
Mr. Lehman  
Prerequisite: course 111 or 113B, and 185 (which may be taken concurrently).  

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. Burgoyne  
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.  
Mr. Protter  
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.  
Mr. Protter  
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.  

226. Mathematical Logic and Computers. (3) I.  
Mr. Scott  
Prerequisite: course 125A.  
Boolean functions and switching circuits, deterministic computing elements, finite automata, Turing machines, introduction to recursive functions and unsolvable combinatorial problems, selected topics on general algorithmic languages.

228A–228B. Advanced Numerical Analysis. (3–3) Yr.  
Mr. DeVogelaere  
Prerequisite: course 128A–128B or consent of instructor. 228A is not prerequisite to 228B.

* Not to be given, 1962–1963.

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. Mr. Greenberg
Theory of algebraic functions. Algebraic varieties; in particular, algebraic curves, Bezout’s theorem. Branches of a curve. Linear series. Theorem of Riemann-Roch. Emphasis will be on algebraic methods.

235A–235B. Set Theory. (3–3) Yr. Mr. Ehrenfeucht
Prerequisite: courses 125A and 135A–135B.

240A. Differential Geometry. (3) I and II. ———, Mr. Chevalley
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. Mr. Kobayashi
Prerequisite: course 215A and 240A.
Affine connections, curvature tensor, manifolds of constant curvature, completeness. Additional topics selected by the instructor.

241. Complex Manifolds. (3) I.
Prerequisite: course 185 and 240A.
Compact Riemann surfaces, Kahler manifolds; sheaves; theorems of Dolbeaul and Hodge.

245A–245B. General Algebraic Systems. (3–3) Yr. Mr. Tarski, Mr. Jonsson
Prerequisite: course 113A, 113B, 125A–125B, and 135A.

250A. Groups, Rings and Fields. (3) I and II. Mr. Evens, Mr. Fong
Prerequisite: course 113B.
Group theory through the Jordan-Hölder-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. Mr. Fong
Prerequisite: course 250A.
Topics chosen from Noetherian rings, rings with descending chain condition, theory of the radical, homological methods.

* Not to be given, 1962–1963.
252. Representation Theory. (3) I.
Prerequisite: course 250A.
Structure of finite dimensional algebras, applications to representations of finite groups, the classical linear groups.
Mr. Koranyi

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) I.
Prerequisite: course 250A.
Valuation theory in number fields and relation to ideal theory, local fields, unit theorem and finiteness of class number, ramification theory.
Mr. Ogg

Prerequisite: course 125A, 130A and 135A.


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.
Mr. Hochschild

260. Topological Groups. (3) I.
Prerequisite: course 250A and 202.
Haar measure, locally compact Abelian groups, compact groups.
Mr. Hochschild

261A–261B. Lie Groups. (3–3) Yr.
Prerequisite: course 240A.
Lie groups and Lie algebras, general structure theory; compact, solvable, complex, and semisimple groups; classification of simple groups, representation theory.
Mr. Bredon

265. Differential Topology. (3) I.
Prerequisite: course 215A and 240A.
The imbedding theorem; characteristic classes; Morse theory; additional topics from cobordism, immersion theory, singularities of maps, and the structure of manifolds.
Mr. Fáry


270. Technical Hydrodynamics. (3) I.
Theoretical analyses of motion of frictionless and viscous fluids, flow of compressible fluids at sub- and supersonic velocities.
Mr. Lewy

275. Special Topics in Applied Mathematics. (3) II.
Prerequisite: course 215A.
Operator theory, boundary-value problems, and integral equations applied to problems arising from electromagnetic theory, quantum theory, and statistical mechanics.
Mr. Wehausen

276. Special Topics in Topology. (3) II.
Prerequisite: course 215A.
Topics of current interest in topology such as: homotopy theory, fiber bundles, sheaves, cohomology operations, theory of manifolds.

* Not to be given, 1962–1963.
277. Selected Topics in Differential Geometry. (3) I. Mr. Chern
   Prerequisite: course 240A.
   Study of deformation problem in differential geometry; deformation of Riemannian
   complex, and other structures, including extrinsic problems.

278. Selected Topics in Analysis. (3) I. Mr. Helson
   Prerequisite: Real and Complex Variables.
   Elements of harmonic analysis; conjugate function; boundary values of analytic func-
   tions; prediction theory.

290. Seminars. (2–6) I and II. The Staff
   Topics in foundations of mathematics, theory of numbers, numerical calculations,
   analysis, geometry, topology, algebra, and their applications, by means of lectures and
   informal conferences; work based largely on original memoirs. During 1962–1963, there
   will be, in particular, lecture seminars on the following subjects, in charge of the persons
   indicated:
   (1) Theory of categories, I, Mr. Chevalley; (2) Singular integral equations, I, II, Mr.
   Cordes; (3) Boundary problems, I, II, Mr. Cordes; (4) Spectral sequences, I, II, Mr. Fáry;
   (5) On C* algebras, I, II, Mr. Feldman; (6) Metamathematics of the theory of fields and
   geometry, I, II, Mr. Henkin and Mr. Tarski; (7) Current literature in topology, I, II, Mr.
   Hirsch; (8) Representations of locally compact groups, I, II, Mr. Moore; (9) Topics in
   partial differential equations, I, II, Mr. Morrey; (10) Topics in commutative algebra, I, II,
   Mr. Seidenberg; (11) Algebraic Geometry, II, Mr. Tate; (12) Topics in metamathematics,
   I, II, Mr. Vaught.

295. Individual Research Leading to Higher Degrees. (2–6) I and II.
   The Staff
   Mathematical Colloquium. (No credit) I and II.
   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)
Milton H. Price, Lieutenant Colonel, Artillery; Professor of Military Science
(Chairman of the Department).
Oscar A. Bailey, Major, Ordnance Corps; Associate Professor of Military
Science.
Andrew Blase, Lieutenant Colonel, Artillery; Associate Professor of Military
Science.
Harold N. Elliott, Major, Military Police Corps; Associate Professor of Military
Science.
Donald G. Gray, Major, Armored; Associate Professor of Military Science.
Keith H. Houison, Lieutenant Colonel, Transportation Corps; Associate Pro-
fessor of Military Science.
Satoru Amaki, Captain, Corps of Engineers; Assistant Professor of Military Science.
Fred J. Davis, Captain, Infantry; Assistant Professor of Military Science.
James E. Dunn, Captain, Signal Corps; Assistant Professor of Military Science.
Clayton V. Fitzgerald, Captain, Infantry; Assistant Professor of Military Science.
Frank J. Riley, Captain, Quartermaster Corps; Assistant Professor of Military Science.
Herald F. Stout, Jr., Captain, Infantry; Assistant Professor of Military Science.

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 II. (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. Gray 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 and acceptance of a commission in the United States Army Reserve or the Regular Army. 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 out-
Standing 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. Elliott 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. Elliott 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.
José Joaquín Nin-Culmell, Diplôme de fin d'Études, Schola Cantorum; Premier Accessit de Composition Musicale, Conservatoire National, Paris, Professor of Music.

Edgar H. Sparks, Ph.D., Professor of Music.
Lawrence H. Moe, Ph.D., Associate Professor of Music and University Organist.

Seymour J. Shifrin, M.A., Associate Professor of Music.
Alan Curtis, M.M., Assistant Professor of Music.

1 In residence fall semester only, 1962–1963.
Daniel Heartz, Ph.D., Assistant Professor of Music.
David Lewin, M.F.A., Assistant Professor of Music.
Michael Senturia, A.B., Instructor in Music.

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.
Luigi Dallapiccola, Visiting Professor, Chair of Italian Culture.
Elizabeth Davidson, M.A., Lecturer in Music.
Erich Hertzmann, Ph.D., Visiting Professor of 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.
Nathan Rubin, Diploma, Juilliard School of Music, Lecturer in Music.
Mary C. Sanks, M.A., 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 96.

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:

a. Theoretical.
   1. Core.
   2. Electives.
   3. Cognate.

b. Performance.
   1. Core.
   2. Electives.
   3. Cognate.

The cognate course is a required course in the area of student's interest. However, the minimum unit requirement in the area of interest may be increased and to be determined by the student and his or her advisor.

Adviser for Music Minors: Mr. Denny.

Minor in Music. The minor is designed to serve the general education by providing background in music, music history, and music literature. The minor consists of 18 units, 12 units of which must be taken at the University of California, Berkeley. The required courses are:

A. 12 units in designated courses.
   1. 303A–303B.
   2. 304A.
   3. 305A–305B.
   4. 306A–306B.
   5. 307A–307B.
   6. 308A–308B.
   7. 309A–309B.
   8. 310A–310B.
   9. 311A–311B.
   10. 312A–312B.
   11. 313A–313B.
   12. 314A–314B.

B. 6 units of courses selected from the following:
   1. 315A–315B.
   2. 316A–316B.
   3. 317A–317B.
   4. 318A–318B.
   5. 319A–319B.

The student may apply for the minor, and the student's program of study is designed by the student and his or her advisor.
a. **Theory.** Course 101A–101B.

**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 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.

**Adviser for Music Education Majors:** Mr. Elston, I; Mr. Lawton, II.

**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–D. 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, AT BERKELEY, 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. Swackhamer 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
Lectures and demonstrations dealing with the rudiments of music and the evolution of musical style from early times to the present.

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.
Two two-hour rehearsals per week. Mr. Senturia

42. University Chamber Band. (1) I.
One two-hour rehearsal per week. Mr. Berdahl

43. University Concert Band. (2) II.
Two hour-and-a-half rehearsals and one section hour per week. Mr. Berdahl

44. University Chorus. (2) I and II.
Two hour-and-a-half rehearsals and one section hour per week. Mr. Lawton
46. Chamber Music Ensemble. (1 or 2) I and II. Mr. Senturia
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. Lewin
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) II. Mr. Swackhamer
Prerequisite: course 27A or consent of instructor.

127D. Bach and Handel. (3) II. Mr. Curtis
Prerequisite: course 27A or consent of instructor.

127E. Mozart and Haydn. (3) II. Mr. Moe
Prerequisite: course 27A or consent of the instructor.

127F. Symphonic Literature of the Nineteenth Century. (3) I. Mr. Elston
Prerequisite: course 27A or consent of the instructor.

*127G. Masterworks of Choral Literature. (3) II. Mr. Lawton
Prerequisite: course 27A or consent of the instructor.

Performance
For particulars, see lower division performance courses.
All courses in this group may be repeated once without duplication of credit.

141. Advanced University Symphony Orchestra. (2) I and II. Mr. Senturia
Prerequisite: consent of instructor.

142. University Chamber Band. (1) I. Mr. Berdahl
Prerequisite: consent of instructor.

143. Advanced University Concert Band. (2) II. Mr. Berdahl
Prerequisite: consent of instructor.

144. Advanced University Chorus. (2) I and II. Mr. Lawton
Prerequisite: 4 units in course 44.
Primarily concerned with major works for chorus and orchestra.

* Not to be given, 1962–1963.
145. Repertory Chorus. (2) I and II.  Mr. Moe
Prerequisite: consent of instructor
Primarily concerned with lesser-known significant choral literature.

146. Advanced Chamber Music Ensemble. (1 or 2) I and II.  Mr. Senturia
Prerequisite: consent of instructor.

148. Advanced Piano Ensemble. (1) I and II.  Mrs. Petray

149. Collegium Musicum. (1 or 2) I and II.  Mr. Curtis
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. Beginning each semester.
The Staff (Mr. Swackhamer in charge)
Elements of music, with ear training, sight singing, and dictation.

C–D. Musicianship. (1–1) Yr.  Mrs. Petray, Mr. Sherman
Prerequisite: course A–B or consent of instructor.
A continuation of course A–B, which is prerequisite.

2A–2B. The Masterworks of Music. (1–1) Yr.  Mr. Curtis
Prerequisite: the ability to read music or consent of instructor.
Guided listening and discussion.

2C–2D. The Masterworks of Music. (2–2) Yr.  Mr. Imbrie
Prerequisite: courses 2A–2B and 3A–3B, or consent of instructor.
A continuation of course 2A–2B.

3A–3B. Harmony. (3–3) Yr. Beginning each semester.
Mr. Lawton (in charge), Mr. Curtis, Miss Davidson, Mr. Senturia
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. Imbrie (in charge), Mr. Lewin, Mr. Shifrin
A continuation of course 3A–3B, which is prerequisite.

**Upper Division Courses**

**Theory**

101A–101B. Counterpoint. (3–3) Yr.  Mr. Cushing (in charge), Mr. Elston, Mr. Lewin, Mrs. Sanks
Prerequisite: course 3D.

101A. Modal Counterpoint.
101B. Tonal Counterpoint.
102A. Keyboard Harmony. (2) I.
Prerequisite: course 3D, and 405A, 405B, 405C, 405D or equivalent.
Mr. Boyden

102B. Score Reading. (2) II.
Prerequisite: course 3D.
Mr. Heartz

105A–105B. Principles of Composition. (3–3) Yr.
Prerequisite: course 101B.
Mr. Cushing

106A–106B. Canon and Fugue. (3–3) Yr.
Prerequisite: course 101B.
Mr. Denny

107A–107B. Studies in Musical Analysis. (3–3) Yr.
Prerequisite: course 3D.
Structure in relation to harmonic, polyphonic, rhythmic, and thematic treatment.
Mr. Shifrin

108. Instrumentation. (3) I.
Prerequisite: course 3D. Teacher-training students are advised to take this course in their junior year.
A study of the instruments of the orchestra, leading to practice in scoring for instrumental combinations.
Mr. Denny

109. Orchestration. (3) II.
Prerequisite: course 108.
Mr. Denny

111. Band Instrumentation. (2) II.
Prerequisite: course 108.
A study of the instruments of the band; practice in scoring for selected wind instruments and for concert band.
Mr. Berdahl

112A–112B. Conducting. (2–2) Yr.
Prerequisite: course 108 (may be taken concurrently).
Mr. Lawton, Mr. Berdahl
112A. Choral Conducting.
112B. Instrumental Conducting.

History and Literature

Survey of Western Music

121A–121B. History and Literature of Music. (3–3) Yr.
Mr. Curtis, Mr. Duckles
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.

Composers, Forms, Mediums
Courses in this group will be given in rotation. Prerequisite: course 2D and 3D, or consent of instructor.

116B. Keyboard Music of the Baroque Period. (3) I.
Mr. Moe

* Not to be given, 1962–1963.
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

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

118B. Piano Music of the Romantic Period. (3) II.

118C. The Songs of Schubert. (3) I. Mr. Kerman

118D. Wagner's Ring of the Nibelung. (3) I. Mr. Shifrin

118E. Verdi. (3) I. Mr. Kerman
Prerequisite: course 2D and 3D, or consent of the instructor.

119B. Selected Modern Works. (3) II. Mr. Cushing

119C. Modern French Music. (3) II. Mr. Cushing
Critical and analytical studies of selected works of French composers from 1870 to the present, with special reference to Fauré, Debussy, and Ravel.

119D. Chamber Music of the Twentieth Century. (3) I. Mr. Imbrie
A critical and analytical study of works by Milhaud, Strawinsky, Bartók, Sessions, and Schönberg.

120A. Choral Literature: Josquin des Prez to Handel. (3) I. Mr. Lawton

120B. Choral Literature: Bach to the Present Day. (3) I. Mr. Lawton

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. Lewin

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 165.

* Not to be given, 1962–1963.
200A–200B. Introduction to Musical Scholarship. (3–3) Yr. Mr. Duckles
Bibliography; individual research projects and a class problem.

202. Seminar: Contemporary Music. (2) I. Mr. Elston

203. Seminar in Composition. Mr. Dallapiccola, Mr. Imbrie, Mr. Shifrin
203A. Technical Projects. (2) I and II. Mr. Imbrie
203B. Free Composition. (2) I and II. Mr. Dallapiccola, 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

208. Proseminar in Music History. (3) I and II. Mr. Boyden, Mr. Hertzmann, Mr. Sparks
208A. Origins to 1430. I. Mr. Sparks.
208B. 1430–1600. II. Mr. Sparks.
208C. 1600–1750. I. Mr. Boyden.
208D. 1730–1830. II. Mr. Hertzmann.
Comprehensive survey of music history. Study of music and sources; readings in the musicological literature (in English and in other languages); introduction to the main historical problems, methods of analysis, and lines of research.

210A–210B. Seminar in Mensural Notation. (3–3) Yr. Mr. Hertzmann

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

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 role 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. Prerequisite: course 200A and 210B. Mr. Hertzmann

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.

* Not to be given, 1962–1963.
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. Moe 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. Moe in charge
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.

429A–429B. Advanced Instruments and Voice. (1–1) Yr. Beginning each semester. Mr. Moe (in charge), Mrs. Jones, Mr. Berdahl
Section I: Advanced piano and organ; Section II: Advanced strings; Section III: Advanced voice; Section IV: Advanced woodwind and brass. Open to intending majors and majors in music education, with consent of instructor in charge.

429C–429D. Advanced Instruments and Voice. (1–1) Yr. Beginning each semester. Mr. Moe (in charge), Mrs. Jones, Mr. Berdahl
Prerequisite: course 429B.
Section I: Advanced piano and organ; Section II: Advanced strings; Section III: Advanced voice; Section IV: Advanced woodwind and brass. Open to intending majors and majors in music education, with consent of instructor in charge.

430A–430B. Minor Instrument. (1–1) Yr. Beginning each semester. Mr. Moe (in charge), Mr. Berdahl
Section I: Elementary organ; Section II: Elementary strings; Section III: Elementary

† See the Announcement of the School of Education.
woodwind and brass. Open to intending majors and majors in music education, with consent of instructor in charge.

Prerequisite: course 430B. Mr. Moe (in charge), Mr. Berdahl
Section I: Elementary organ; Section II: Elementary strings; Section III: Elementary woodwind and brass. Open to intending majors and majors in music education, with consent of instructor in charge.

* 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 175. Economics of Natural Resources.
270A–270B. Natural Resource Economics Research.
Economics *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.


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.
Hugh T. Kennedy, Major, U.S.M.C., Assistant Professor of Naval Science.

* Not to be given, 1962–1963.
Edward J. Murphy, Jr., Lieutenant, U.S.N., Assistant Professor of Naval Science.
Hugh Praetorius, Lieutenant, U.S.N., 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. Andersen
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. Praetorius
Weapons systems, capabilities and limitation, gun systems, antisubmarine warfare systems, guided missiles, nuclear weapons and space technology

Upper Division Courses

*101A. Naval Engineering. (3) I. Mr. Murphy
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. Murphy
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.
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.

* Not to be given, 1962–1963.
104M. Basic Strategy and Tactics. (3) II.
Modern strategical and tactical principles, using contemporary historical events as illustrative material.

Mr. Kennedy

105M. Amphibious Warfare. (3) I.
Introduction to amphibious warfare by a limited treatment of the factors pertaining to its planning and execution.

Mr. Kennedy

106M. Amphibious Warfare and Naval Officer Orientation. (3) II.
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.

Mr. Kennedy

107S. Navy Supply System. (3) I.
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.

Mr. Soens

108S. Supply Management Afloat. (3) II.
Prerequisite: course 107S.
The organization, management and control of logistics afloat, management analysis and controls of accounting system afloat.

Mr. Soens

109S. Retail and Cost Management. (3) I.
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.

Mr. Soens

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.
Henry L. F. Lutz, Ph.D., D.D., LL.D., Professor of Egyptology and Assyriology, Emeritus.
William Popper, Ph.D., LL.D., Professor of Semitic Languages, Emeritus.
William M. Brinner, Ph.D., 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.
Gene M. Schramp, Ph.D., Assistant Professor of Semitic Languages.


1Mounah A. Khouri, M.A., Acting Assistant Professor of Arabic.

1 In residence fall semester only, 1962–1963.
Letters and Science List. All undergraduate courses in this department are included in the Letters and Science List of Courses.

Departmental Major Advisers: Undergraduate: 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.

Honors Program: In addition to completing the regular requirements for the major, a candidate for graduation with honors must (a) have a 3.0 grade-point average over-all and within the department and (b) complete the Honors Course H198A–H198B, in which he will prepare an honors thesis in his senior year.

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.

12. Great Books of Hebrew Literature. (2) II. Mr. Fischel
Hebrew literature in translation.

Upper Division Courses

150. Ancient Israel. (3) II.
The history of Israel from the Patriarchal Age to the end of the Second Commonwealth.

151. Jewish Civilization. (3) I. Mr. Fischel
The social, religious, and cultural aspects of Jewish life in the main centers of Asia, Africa, and Europe from the time of the coming of Islam to the nineteenth century.
162A–162B. Introduction to the Comparative Study of the Iranian Languages. (2–2) Yr. 
Mr. Henning
Prerequisite: familiarity with at least one classical Indo-European language or with the processes of comparative philology, and consent of the instructor.
Survey of the languages of the Iranian branch of the Indo-European family of languages.

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. (3) 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
A chronological survey of the Islamic conquests and domination in the Near East and adjacent areas to the height of the Ottoman Empire.

180. Rise and Spread of Islamic Society. (3) II. 
Mr. Fischel
A critical study of the growth and development of the political, legal, and social institutions of Islam. May be repeated for additional credit with consent of the instructor.

190. Modern South Asian Literatures. (2) II. 
Mr. Vatsayan
Modern literatures of India, Pakistan, and Ceylon in translation.

191A–191B. Literary and Cultural Traditions of India. (2–2) Yr. 
Mr. Vatsayan
191A is not prerequisite to 191B.
The development of certain basic concepts and ideas as illustrated by ancient, classical, and medieval Indian literature. Analogies will also be drawn from the other arts.

*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.

*193. Linguistic Structures of South Asian Languages. (2) II. 
Mr. Gumperz
Prerequisite: Linguistics 100.
Structure and typology of selected South Asian languages.

Languages, Literatures, and Linguistics
Lower Division Courses

10A–10B. Elementary Hebrew. (4–4) Yr. 

20A–20B. Elementary Arabic. (4–4) Yr. 
Mr. Brinner
* Not to be given, 1962–1963.
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. ——— in charge
45A–45B. Elementary Telugu. (4–4) Yr. Mr. Doraswamy
46A–46B. Elementary Tamil. (4–4) Yr. Mr. Doraswamy in charge
   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. (3–3) 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.
   Prerequisite: course 103A–103B. Mr. Finkelstein
   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. Schramm
   Prerequisite: course 10A–10B or equivalent.

†111A–111B. Biblical Hebrew Texts. (2–2) Yr. ———
   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.

116A–116B. Aramaic. (3–3) Yr.
   Prerequisite: course 110A–110B or consent of the instructor.

* Not to be given, 1962–1963.
† Offered in alternate years.
120A–120B. Intermediate Arabic. (4–4) Yr. Mr. Khouri, Mr. Salinger
Prerequisite: course 20A–20B or equivalent.

121A–121B. Readings in Classical Arabic. (2–2) Yr. Mr. Salinger
Prerequisite: course 120A–120B or equivalent.
May be repeated for additional credit.

122A–122B. Readings in Modern Arabic. (2–2) Yr. Mr. Khouri, Mr. Brinner
Prerequisite: course 120A–120B or equivalent.
May be repeated for additional credit.

130A–130B. Intermediate Modern Persian. (2–2) Yr. Mr. Henning
Prerequisite: course 30A–30B or equivalent.

131A–131B. Middle Persian. (2–2) Yr. Mr. Henning
Prerequisite: course 130A–130B or equivalent.
Manichaean Middle Persian texts, with an introduction to Pahlavi.

132A–132B. Avestan. (1–1) Yr. Mr. Henning
Prerequisite: consent of the instructor.
Texts from the Vendidad and the Yashts.

133A–133B. Old Persian. (1–1) Yr. Mr. Henning
Prerequisite: consent of the instructor.
Achaemenid inscriptions.

136A–136B. Intermediate Modern Armenian. (2–2) Yr. Mr. Essabal
Formerly numbered 132A–132B.
Prerequisite: course 36A–36B or consent of instructor.

140A–140B. Readings in Hindi. (4–4) Yr. Mr. Vatsyayan,——
Prerequisite: course 40A–40B or equivalent.
Graded readings in modern Hindi prose.

141A–141B. Advanced Readings and Composition in Hindi. (1–4; 1–4) Yr. Mr. Vatsyayan,——
Prerequisite: course 140A–140B.
Texts selected according to individual requirements. May be repeated for additional credit.

142A–142B. Readings in Urdu. (4–4) Yr. Mr. Vatsyayan in charge
Prerequisite: course 40A–40B or equivalent.
Graded readings in modern Urdu prose.

143A–143B. Advanced Readings and Composition in Urdu. (1–4; 1–4) Yr. Mr. Vatsyayan in charge
Prerequisite: course 30A–30B and 142A–142B or equivalent.
Texts selected according to individual requirements. May be repeated for additional credit.

144A–144B. Hindi Prose Styles. (2–2) Yr. Mr. Vatsyayan,——
Prerequisite: course 40A–40B.
Literary and conversational prose styles and their function in modern Indian society.

145A–145B. Intermediate Telugu. (4–4) Yr. Mr. Doraswamy
Prerequisite: course 45A–45B or equivalent.

149A–149B. Studies in South Asian Languages. (2–2) Yr. The Staff
Prerequisite: consent of instructor.
Directed study in South Asian languages other than Hindi-Urdu for nonmajors. Subject to availability of staff.

* Not to be given, 1962–1963.
H198A–H198B. Senior Honors. (2–2) Yr. The Staff
Prerequisite: limited to senior honors candidates.
Directed study centering upon preparation of an honors thesis.

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

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 165.)

1201A–1201B. Later Stages of Egyptian. (3–3) 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. ———
(Formerly numbered 224A–224B.)
Prerequisite: course 110A–110B.
Reading and grammatical analysis of prophetical or poetical books of the Bible, such as Amos, Isaiah, Jeremiah, or Psalms.

220A–220B. Advanced Arabic. (2–2) Yr. Mr. Khoury, Mr. Salinger
(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.

231A–231B. Sogdian. (1–1) Yr. Mr. Henning
Prerequisite: consent of the instructor.
Reading of Buddhist and Manichaean texts.

236A–236B. Classical Armenian. (2–2) Yr. Mr. Essabai
Prerequisite: working knowledge of modern Armenian or of one of the early Indo-European languages, e.g. Latin, Greek, or Sanskrit.

290A–290B. Special Study. Yr. The Staff
Credit according to work accomplished.

291A–291B. Seminar. (2–2) Yr. The Staff
Students may receive credit for more than one seminar in the same semester. May be repeated without duplication of credit with consent of the instructor.
(a) Akkadian, Mr. Finkelstein; (b) Arabic, Mr. Brinner, Mr. Khoury; (c) Armenian, Mr. Essabai; (d) Egyptian, Mr. Baer; (e) Hebrew, Mr. Fischel, Mr. Schramm; (f) Iranian, Mr. Henning; (g) Persian, ———; (h) Semitics, Mr. Schramm, ———; (i) South Asian Languages, Mr. Vatsyayan; (j) South Asian Literatures, Mr. Vatsyayan.

* Not to be given, 1962–1963.
† Offered in alternate years.
NUTRITIONAL SCIENCES

(Department Office, 119 Morgan Hall)

George M. Briggs, Ph.D., Professor of Nutrition (Chairman of the Department).

Maynard A. Joslyn, Ph.D., Professor of Food Technology.

Gordon Mackinney, Ph.D., Professor of Food Technology.

Jessie V. Coles, Ph.D., Professor of Home Economics, Emeritus.

William V. Cruess, Ph.D., Professor of Food Technology, 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.

Barbara M. Kennedy (Barbara Kennedy Johnson), Ph.D., Assistant Professor of Nutrition.

Mary Ann Williams, Ph.D., Assistant Professor of Nutrition.

Mildred J. Bennett, Ph.D., Lecturer in Nutrition.

Ellsworth C. Dougherty, Ph.D., M.D., Lecturer in Comparative Nutrition.

Arild E. Hansen, Ph.D., M.D., Lecturer in Human Nutrition.

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.

Judson T. Landis, Ph.D., Professor of Family Sociology.

Virginia R. McMasters, M.S., Lecturer in Institution Management.

Harold S. Olcott, Ph.D., Professor of Marine Food Science.

Rosemarie Ostwald, Ph.D., Associate in Nutrition.

Gaylord P. Whitlock, Ph.D., Lecturer in Nutrition Education.

Departmental Adviser: Mr. Briggs.

Majors in Nutritional Sciences: Dietetics, Food Science, Nutrition.

The B.S. degree in nutritional sciences is granted upon the completion of one of these majors. The following five items must be satisfied:

1. General University requirements.

2. College of Agriculture requirements (see page 64).

3. Nutritional Sciences Curriculum requirements: (a) General—bacteriology, 4 units; biochemistry, 3 units; chemistry, 13 units; economics, 3 units; English and/or speech, 6 units; physics, 3 units; physiology, 3 units. (b) Nutritional sciences and related fields—courses in nutritional sciences depending on major selected, 21–35 units. Related courses in other departments
depending on major selected, 8–32 units. (c) Electives (restricted)—anthropology, art, foreign language, geography, geology, history, music, philosophy, political science, psychology, sociology; or additional units in economics and English, 15 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), 18–41 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.

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

Lower Division Courses

1. Introduction to Nutritional Sciences. (3) II.
   The Staff (Mr. Briggs in charge)
   Prerequisite: Chemistry 1A; Chemistry 8 (may be taken concurrently). Intended primarily for majors.
   Introduction to the chemical, biochemical, and physiological aspects of compounds in foods and their nutritional significance.

10. Survey of Nutritional Sciences. (3) I.
   The Staff (Mr. Briggs in charge)
   (Formerly Nutrition 10.)
   Primarily for nonmajors.
   Broad aspects of nutritional sciences and food components and their importance to life and mankind. Not open to students who have had course 1.

11. Foods as Sources of Nutrients. (2) I.
   Miss Kennedy
   (Formerly Nutrition 1.)
   Prerequisite: course 1; Chemistry 1A, 8.
   Composition of foods; chemical and physical changes in preparation and preservation.

11L. Foods as Sources of Nutrients—Laboratory. (2) I.
   Miss Kennedy
   (Formerly Nutrition 1—laboratory.)
   Prerequisite: course 11 (to be taken concurrently).

12. Experimental Food Study. (3) II.
   Miss Kennedy
   (Formerly Nutrition 2.)
   Lecture and laboratory. Prerequisite: course 11 and 11L. (Primarily for majors in dietetics and food science, Plan A.)
   Chemical and physical changes involved in food preparation, preservation and storage as they affect acceptability.

Upper Division Courses

*100. Food Economics. (3) I.
   (Formerly Nutrition 100.)
   Lecture and laboratory. Prerequisite: course 11, 11L; Business Administration 160 or Agricultural Economics 130.
   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.

* Not to be given, 1962–1963.
01A. Food Analysis. (3) I.  
(Formerly Nutrition 101A.)  
Lecture and Laboratory. Prerequisite: course 11 (may be taken concurrently); Chemistry B, 8; or Chemistry 1B and 8 with grades of at least B.  
Principles of quantitative analysis applied to food materials; chemical analysis of typical carbohydrate, fat, and protein foods.  

Miss Kennedy

101B. Advanced Food Analysis. (3) II.  
(Formerly Nutrition 101B.)  
Lecture and laboratory. Prerequisite: course 101A or Chemistry 5 with a grade of at least B. Given in spring semester of even-numbered years.  
Official analytical methods and legal standards for foods. Examination for deterioration and adulteration.  

Miss Kennedy

02. Principles and Practices of Food Processing. (3) I.  
(Formerly Food Technology 112.)  
Prerequisite: Chemistry 1A–1B and 8; Bacteriology 1 and 4; and a course in botany, zoology or physiology.  
Preparation, preservation and utilization of foods and food products.  

Mr. Joslyn

03. Biochemical Aspects of Food Processing. (3) II.  
(Formerly Food Technology 113.)  
Prerequisite: Chemistry 1A–1B, and 8; Bacteriology 1 and 4.  
Effect of processing and storage on color, flavor, texture and nutritive value of foods.  

Mr. Olcott

04. Enzymes in Foods and Nutrition. (3) I.  
(Formerly Food Technology 118.)  
Prerequisite: Biochemistry 102.  
Control and utilization of enzymes in preparation and preservation of foods and food products and the enzymatic aspects of digestion.  

Mr. Joslyn

05. The Natural Coloring Matters. (2) II.  
(Formerly Food Technology 120.)  
Lecture and laboratory. Prerequisite: 3 units of biochemistry or upper division organic chemistry.  
Chemistry of natural pigments and related compounds; spectrophotometric and chromatographic techniques; special emphasis on pigments in relation to foods.  

Mr. Mackinney

108. Introduction to Food Research. (2) II.  
(Formerly Nutrition 108.)  
Prerequisite: course 101A or Chemistry 5.  
Proseminar on current research in the chemistry of food composition, preparation, and control.  

Miss Kennedy

108L. Introduction to Food Research Laboratory. (2) II.  
(Formerly Nutrition 108L.)  
Prerequisite: course 108, to be taken concurrently.  

Miss Kennedy

110. Nutrition. (3) I and II.  
(Formerly Nutrition 111.)  
Prerequisite: Chemistry 1A or high school chemistry; Physiology 1. Primarily for students not majoring in Nutritional Sciences. Not open for credit to students who have taken Nutritional Sciences 112.  
Essential nutrients and their functions in the body; how to determine and satisfy the food needs of the individual for optimum health.  

Mrs. Cook

* Not to be given, 1962–1963.
112. Human Nutrition. (3) II.  
  (Formerly Nutrition 112A–112B.)  
  Lectures and laboratory. Prerequisite: course 1 and 11; Biochemistry 100A or 102 (may be taken concurrently); Physiology 1.  
  Scientific principles of meeting the metabolic and nutritional needs of normal individuals during growth, pregnancy, lactation, and old age.

114. Laboratory Methods in Metabolism. (4) II.  
  (Formerly Nutrition 114.)  
  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 Nutrition. (3) II.  
  (Formerly Nutrition 115.)  
  Lectures and laboratory. Prerequisite: course 112.  
  Biochemical, physiological, and nutritional basis for therapeutic treatment of various conditions and diseases in man by dietary means.

118A–118B. Experimental Nutrition. (2–2) Yr.  
  (Formerly Nutrition 118A–118B.)  
  Prerequisite: course 112, 114, and Biochemistry 102; or Biochemistry 100A–100B and 101A–101B.  
  Principles and experimental aspects of biochemistry and physiology as applied to the nutritional sciences.

118C–118D. Experimental Nutrition Laboratory. (2–2) Yr.  
  (Formerly Nutrition 118C–118D.)  
  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  
  (Formerly Nutrition 121A–121B.)  
  Lectures and laboratory. Prerequisite: course 12. 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.

198. Directed Group Study. (1–5) I and II. The Staff (Mr. Briggs in charge)  
  (Formerly Nutrition 198.)  
  Prerequisite: consent of the instructor.

199. Special Study for Advanced Undergraduates. (1–5) I and II.  
  The Staff (Mr. Briggs in charge)  
  (Formerly Nutrition 199.)  
  Prerequisite: senior standing, 3.0 grade-point average, and approval of the adviser.

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 165.)

201A–201B. Seminar in Nutrition. (1–2; 1–2) Yr.  
  (Formerly Nutrition 201A–201B.)  
  One lecture for each unit. Prerequisite: limited to first-year graduate students. May not be repeated for credit.  
  Introduction to research in nutritional sciences; emphasis on reporting and critical evaluation of topics in the current nutritional science literature.
219. Vitamin Analysis. (3) II. Miss Williams
(Formerly Nutrition 219.)
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
(Formerly Nutrition 290.)
Open to qualified graduate students. May be repeated for credit.
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.
(Formerly Nutrition 299.) The Staff (Mr. Briggs in charge)

Professional Courses

426. Hospital Problems. (2–3) I and II. Miss Henderson
(Formerly Nutrition 426.)
Open only to selected graduate students.
Supervised practice in administrative problems of the hospital dietetic service carried on during residence in Berkeley.

427. Hospital Dietetics. (6) I and II.
(Formerly Nutrition 427.)
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.
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, Ph.D., Assistant Professor of Physiological Optics and Optometry.
Harvey Arnold, B.S., Clinical Instructor in 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.
Kenton Kerr, 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, M.S., Clinical Instructor in Optometry.
Ellen Takahashi, M.Opt., Clinical Instructor in Optometry.

Leon Lewis, M.D., Lecturer in Medicine and Pathology.

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 96.

Upper Division Courses

Prerequisite. Physics 2A–2B, 3A–3B, Chemistry 1A, 8, Mathematics 3A, Bacteriology 2 and 4 or 1 and 4, Physiology 1, 1L†, 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.

103A–103B. Advanced Theoretical Optometry. (3–3) Yr.
Prerequisite: course 102A–102B. Mr. Marg, Mr. Morgan
Extension of course 102A–102B to binocular vision: binocular accommodation, ocular movements, fusion, and the anomalies of binocular vision.

† Physiology 1, 1L, 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.
Professional Courses

401A–401B. Ophthalmic and Mechanical Optics. (2–2) Yr.
Lectures and laboratory. Mr. Peters, Mr. Kerr
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. Mr. Lewis, Mr. Morgan
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 165.)
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. Hill, 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

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 clinic 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 psychologic 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 165.)

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.
Cyril Birch, Ph.D., Associate Professor of Oriental Languages.
†Michael C. Rogers, Ph.D., Associate Professor of Oriental Languages.

Chaote Lin, M.A., Acting Instructor in 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 96.

Departmental Major Advisers: Mr. Birch (Chinese); Mr. Nakamura (Japanese).

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 (Peoples of Southeast Asia), 120 (Language and Culture), 186 (Ethnology of Japan); Architecture 128 (Architectural History—Oriental); 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 (Asia), 191A–191B (Social History of Asia), 194A–194B (China), 195A–195B (Japan); Linguistics 35 (Language and Linguistics), 130 (Phonetics and Phonemics), 140 (Linguistic Analysis), 145 (Types of Linguistic Structure), 180 (History of Linguistics); Sociology 166 (Agricultural Oriental Societies), 167 (Modern Social Structure in the Near East).

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.  
   Class meets five hours a week.  
   Mr. Chao, Mr. Chen

2. **Elementary Mandarin (continued).** (4) II.  
   Class meets five hours a week. Prerequisite: course 1.  
   Mr. Chao, Mr. Chen

3. **Elementary Classical Chinese.** (4) I.  
   Class meets five hours a week.  
   Mr. Boodberg

4. **Elementary Classical Chinese (continued).** (4) II.  
   Class meets five hours a week. Prerequisite: course 3.  
   Mr. Boodberg

5. **Mandarin Texts.** (4) I.  
   Class meets five hours a week. Prerequisite: course 2.  
   Readings in Modern Mandarin (National Language) at an intermediate level.  
   Mr. Birch

6. **Elementary Korean.** (3–3) Yr.  
   Mr. Rogers

7. **Indonesian.** (3) I.  
   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.  
   Mr. Carr

8. **Elementary Modern Japanese.** (4) I.  
   Class meets five hours a week.  
   Mr. Nakamura, Mr. Lin

9. **Readings in Indonesian.** (2) II.  
   Prerequisite: course 8, or the equivalent.  
   Mr. Carr

10. **Elementary Modern Japanese (continued).** (4) II.  
    Class meets five hours a week. Prerequisite: course 9 or the equivalent.  
    Mr. Nakamura, Mr. Lin

11. **Introduction to Chinese Philology.** (2) I.  
    Prerequisite: course 3.  
    Basic conceptions of philology and textual criticism.  
    Mr. Schafer

12. **Intermediate Modern Japanese.** (4) I.  
    Prerequisite: course 19, or the equivalent.  
    Mr. Nakamura

**Courses in Which No Knowledge of Oriental Languages Is Required**

13. **Indonesian Civilization.** (2) I.  
    A survey of Indonesian civilization and the effects of contacts with Indian, Islamic, and Western cultures. Emphasis on Hinduism, Buddhism, and Islam.  
    Mr. Carr

14. **Great Books of Eastern Asia.** (1–1) Yr.  
    Lectures and readings on the great classics of Eastern Asia, in English translation. Course 38A is not prerequisite to 38B.  
    Mr. Boodberg
Upper Division Courses

Sixteen units of lower division language courses are prerequisite to all upper division language courses. Lower division courses in Near Eastern Languages, Sanskrit, and Linguistics may be substituted as prerequisite to upper division Indonesian 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 143.

119. Advanced Japanese. (4) II. Mr. Nakamura
   Prerequisite: course 39 or the equivalent.

123. Chinese Grammar. (3) I. Mr. Chao
   Prerequisite: Linguistics 35.

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.

* Not to be given, 1962–1963.
129C–129D. Japanese Historical Texts and Kambun. (3–3) Yr. Mr. Lin
Prerequisite: course 119; 129A–129B is not prerequisite to 129C–129D. Course 129C
is not prerequisite to 129D.

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

138. Modern Indonesian and Malay Literature. (3) I. Mr. Carr
Prerequisite: course 18 or the equivalent.

*139. Japanese Grammar. (2) I. Mr. Carr
Prerequisite: course 119.

143. Readings in Medieval Chinese. (3) I. 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. Mr. Rogers
May be repeated for credit.

156. Readings in Chinese Vernacular Literature. (2) II. Mr. Birch
Prerequisite: course 106, or 124A, or 124B.

164. Tibetan. (2) I. Mr. Nakamura
May be repeated for credit.

187. Philological Laboratory. (2) II. Mr. Boodberg
Philological analysis of an Oriental Language, using textual material.

(2–2) Yr. Mr. Chen
Prerequisite: course 103, or 104, or 143, or 124B with consent of the instructor.
Course 191A is not prerequisite to 191B.

191B. Belles-lettres.

(2–2) Yr. Mr. Chen
Prerequisite: course 103, or 104, or 143, or 124B with consent of the instructor.
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. Mr. Boodberg
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.

* Not to be given, 1962–1963.
1195. 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. Schafer 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. Lin

From the beginning to modern times, emphasizing Chinese, Buddhist, and Western influences.

142C. Civilizations of Eastern Asia: China. (3) II. Mr. Schafer

Emphasis on material culture, technology, and science.

142K. Civilizations of Eastern Asia: Korea. (2) II. Mr. Rogers

The development of Korean civilization; emphasis on Chinese influence.

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.

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.

* Not to be given, 1962–1963.
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

216. Texts on the Civilization of Medieval China. (2) I and II. Mr. Schafer
(Formerly numbered 216A–216B.)

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.

229. Seminar in Japanese Literature. (2) I and II.

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.

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.

* Not to be given, 1962–1963.
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.

Samuel P. Welles, Ph.D., Lecturer in Paleontology and Principal Museum Paleontologist 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 96.

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 110, 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.

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. Mr. Savage
Two lectures and one three-hour laboratory period per week; field trips. Prerequisite: course 1 or Zoology 1A or Geology 3 or Anthropology 1.
Cranial, dental, and postcranial morphology; evolution, classification, and distribution in time and space of mammals, reptiles, and amphibians.

10. Principles of Paleontology. (2) II. Mr. Stiriton
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. Vertebrate 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 (to be given 1962–1963); (2) Paleobotany for students with comprehensive training in botany.

121. Floras 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. Stirton
Two lectures, proseminar, and two three-hour laboratory periods per week. Prerequisite: course 3 or Zoology 106.
127. History and Paleoeconomy of Higher Vertebrates. (4) II. Mr. Savage

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.

195. 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 165.)

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 1962–1963 the following seminars will probably be offered: (a) Biostratigraphy, I, Mr. Berry; (b) Micropaleontology, I and II, Mr. Kleinpell; (c) Geographic distribution, II, Mr. Stirton; (d) Mesozoic continental faunas, I, and Functional vertebrate anatomy, II, Mr. Gregory; (e) Invertebrate paleontology, I and II, Mr. Durham; (f) Paleobotany, I and II, Mr. Fry; (g) Paleobiology of microorganisms, I and II, Mr. Arnold; (h) History of the mammalian fauna of Europe, I, Mr. Savage.

299. Research in Paleontology. (1–6) I and II. The Staff (Mr. Gregory in charge)

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

An outstanding collection of books and pamphlets on paleontology and related fields is incorporated in the Earth Sciences Library, a branch of the General Library housed in the Earth Sciences Building.

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. Dennes, 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.

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

Paul K. Feyerabend, Ph.D., Associate Professor of Philosophy.

Wallace I. Matson, Ph.D., Associate Professor of Philosophy.

Celestine J. Sullivan, Ph.D., Associate Professor of Philosophy.


1 In residence fall semester only, 1962–1963.

2 In residence spring semester only, 1962–1963.
Ernest W. Adams, Ph.D., Assistant Professor of Philosophy.
*Stanley L. Cavell, Ph.D., Assistant Professor of Philosophy.
*Price Charison, Ph.D., Assistant Professor of Philosophy.
John R. Searle, D.Phil., Assistant Professor of Philosophy.
David S. Shwayder, D.Phil., Assistant Professor of Philosophy.
Barry G. Stroud, M.A., Instructor in Philosophy.

Thompson E. Clarke, M.A., Lecturer in Philosophy.
Kurt B. Fischer, M.A., Lecturer in Philosophy.
Martin P. Golding, Ph.D., Visiting Assistant Professor of Philosophy.
Hans G. Herzberger, Ph.D., Lecturer in Philosophy.
Jaakko Hintikka, Dr. Phil., Visiting Professor of Philosophy for the spring semester.
*Thomas S. Kuhn, Ph.D., Professor of the History of Science.
Lars Svante Svenonius, Ph.D., Visiting Associate Professor of Philosophy for the spring semester.

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 96.

Departmental Major Adviser: Mr. Shwayder.

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.

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. 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.

* In residence spring semester only, 1962–1963.
Higher Degrees. See the Announcement of the Graduate Division, at Berkeley. Attention is called to the requirement of a reading knowledge of French and German for the Ph.D. in philosophy. Students who contemplate advanced study in philosophy should prepare themselves for this requirement in their undergraduate years.

Lower Division Courses

6A–6B. Introduction to Philosophy. (3–3) Yr. Beginning each semester.
Mr. Aschenbrenner, Mr. Feyerabend, Mr. Fischer, Mr. Herzberger, Mr. Matson, Mr. Rynin, Mr. Searle, Mr. Shwayder, Mr. Stroud, Mr. Sullivan
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. Clark, Mr. Craig, Mr. Mates,
Two lectures and two section meetings per week.

20A–20B. History of Philosophy. (3–3) Yr. Beginning each semester.
Mr. Aschenbrenner, Mr. Dennes, Mr. Matson, Mr. Sullivan
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. Matson, 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, ________
Moral values; the concepts of good and right; the criteria of conduct.

108. Social Philosophy. (3) II.
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) Mr. Cavell
The nature and the validity of religious ideas.

125. Theory of Value. (3) II.  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. Carlson
Course 136A is not prerequisite to 136B.
Form, expression, representation, style, interpretation and evaluation.
136A. The visual arts.
136B. Literature and music.
At the discretion of the instructor, the general prerequisite for upper division courses in philosophy may be waived for major students of literature or the arts.

137. Aesthetic Theories. (3) I.  ________
A study of aesthetic theories based on historical and recent materials.

140. Philosophy of Law. (3) I.  ________
Philosophical problems arising in the legal context.

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) II.  Mr. Carlson  ________

Group B

Courses dealing with the methods of reflective thinking and the more general features of experience.

111. Metaphysics. (3) I.  ________

113A–113B. Logic. (3–3) Yr.  ________
Prerequisite: course 12 or equivalent.

114. Theory of Knowledge. (3) I and II.  Mr. Clarke, Mr. Searle

119. Modal Logic. (3) II.  Mr. Hintikka
Prerequisite: course 12 or equivalent.

120A–120B. Scientific Method. (3–3) Yr.  Mr. Feyerabend, ________
Methodology of the mathematical, the natural, and the social sciences.

* Not to be given, 1962–1963.
124. Philosophy of Science. (3) I.  Mr. Adams
   Prerequisite: course 12.
   Central topics: axiomatic analysis of concepts of geometry (theoretical and applied),
   physics, and unobservables in behavioral science.

133A–133B. Philosophy of Language. (3–3) Yr.  Mr. Searle, Mr. Clarke
   The logical structure of language: propositions, reference, truth, predication and re-
   lated concepts.

135A–135B. Contemporary Philosophy. (3–3) Yr.
   Mr. Shwayder, Mr. Herzberger

*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) I.  Mr. Sullivan

*121. Hobbes. (3) I.  Mrs. Hungerland

Development of Scientific Thought and Technique (History 105A–105B)
(3–3) Yr.

Mr. Kuhn

*129. Leibniz. (3) II.  Mr. Adams

130. Materialism and Naturalism. (3) II.  Mr. Matson
   Historical and critical studies of the chief philosophical materialists from Democritus
   to Dewey.

* Not to be given, 1962–1963.
132. Descartes. (3) II.

139. Philosophy of Kierkegaard. (3) II.
Prerequisite: course 6A–6B, or 20A–20B, or 101, or consent of the instructor.
The philosophical writings of Kierkegaard.

*145. American Philosophy. (3) II.

171. Greek Philosophy from Thales to Democritus. (3) I.
Prerequisite: course 20A.
The emergence, from a mythological background, of Greek philosophical thought in the
sixth century, B.C. The philosophies of the Milesians, Heraclitus, the Pythagoreans, Par-
menides, the Pluralists, and the Atomists.

183. Locke. (3) II.

*184. Berkeley. (3) I.

185. Hume. (3) I.

188. Post-Kantian Idealism. (3) I.
The philosophies of Fichte, Hegel, and Schelling.

189. Modern German Philosophy. (3) II.
German phenomenology from Brentano to Heidegger.

191. Marxism. (3) I.
The philosophical and sociological theories of Marx and Engels; historical materialism
and ideology; theory of the state; the later Marxists; contemporary Marxist thought.

H195. Philosophy Tutorial. (3) II.
The Staff (Mr. Searle 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. Herzberger
Restricted to senior honors students majoring in philosophy.
A seminar course for a group of honor students on a topic to be announced. The col-
loquium 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. Matson in charge)

Graduate Courses
(Concerning conditions for admission to graduate courses, see page 165.)

250. Special Studies. (1–6) I and II.
The Staff (Mr. Matson 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. Matson in charge)
Advanced study in various fields of philosophy. Topics will vary from year to year. The
program for 1962–1963 will probably include seminars in: (a) Philosophy of Science (I.
Adams); (b) Theory of Knowledge: Traditional Epistemology, Common Sense, and Daily
Life (I. Clarke); (c) Problems of Meaning (II. Clarke); (d) Logic (I. Craig); (e) Philosophy

* Not to be given, 1962–1963.
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.
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.
Koman Boyceff, 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.
Roberta J. Park, M.A., Assistant Supervisor of Physical Education.
William H. Phillips, Jr., M.A., Assistant Supervisor of Physical Education.

* In residence spring semester only, 1962–1963.
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.
D. Revay Anderson, M.A., Junior Supervisor of Physical Education.
Paul L. Dunham, M.A., Junior Supervisor of Physical Education.
Joel E. Grose, M.A., Junior Supervisor of Physical Education.
Shirley P. King, M.Ed., Junior Supervisor of Physical Education.
John Moncrieff, M.S., Junior Supervisor of Physical Education.
W. Robert Morford, M.A., Junior Supervisor of Physical Education.
Lois J. Rigden, M.A., Junior Supervisor of Physical Education.
George S. Uchida, A.B., 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 and 130 are included in the Letters and Science List of Courses. For regulations governing this list, see page 96.

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 IA, Nutritional Sciences 110, 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 or 111; 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, at Berkeley, 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; sailing, $12.
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. (2) 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, circuit training, diving, golf, gymnastics, handball, judo, officiating, squash, swimming, lifesaving, tumbling, trampoline, tennis, weight-lifting, 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, golf, gymnastics, football, rugby, swimming, soccer, tennis, track and field, waterpolo, and wrestling. A sport "in season" may be taken for 1 unit.

Lower Division Courses for Women

26. Physical Education Activities. (2) I and II.

The Staff (Miss Espenscheid 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. (2) I and II.

The Staff (Miss White, Mr. Keeney in charge)

Sports: archery, badminton, bowling, fencing, figure skating, golf, tennis, sailing, synchronized swimming, and trampoline.

Dance: modern, folk, and social.

Elementary School Activities: dance and games.
20. Introduction to Physical Education. (1) I and II.  
Miss Hodgson, Mr. Nordly  
An interpretation of the field designated to give the prospective major student an understanding of its scope.

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

Mrs. Bloland  
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 Saltzscheider  
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.  
Prerequisite: course 101.

105. Physiological Hygiene. (4) II.  
Mr. Henry  
Lectures and laboratory. Prerequisite: high school chemistry; Nutritional Sciences 110;  
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 activities; reaction

† To be given if a sufficient number of students enroll.
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,
maturity, and motor learning in childhood and adolescence, relation of motor perform-
ance to other aspects of behavior.

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 cul-
ture. Emphasis on the twentieth century.

130. History and Theories of Physical Education. (3) II. Miss Allison
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. Mr. Clarke
(Formerly numbered 191A.)
Prerequisite: course 130.
Principles, policies, and administrative procedures pertaining to departmental organiza-
tion, 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 191B.)
Prerequisite: course 130.
Principles of curriculum development applied to physical education including the in-
structional 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, Miss Allison
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. Pur-
pose, functions and interrelationships of community groups which serve recreational
needs. Principles of organization, leadership, programming, facilities, financing.

H195. Honors Course. (2–4) I and 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 In-
structor Certificate must complete senior lifesaving in addition to course 1 (aquatics).
Swimming, diving, water polo, lifesaving and water safety.
41. The Theory and Teaching of Gymnastics and Individual Adapted Activities. (1) I.
Mr. Keeney, Mr. Frey
Prerequisite: course I (gymnastics).
Stunts, tumbling, apparatus, calisthenics, weightlifting, bodybuilding.

42. The Theory and Teaching of Combative Activities. (1) II.
Prerequisite: course I (combatives).
Mr. Nemir, Mr. Uchida
Boxing, wrestling, combative games.

44. The Theory and Teaching of Field Sports. (2) II.
Mr. Keeney, Mr. Mathews, Mr. Levy, Mr. Wolfman
Prerequisite: course I (field sports).
Baseball, American football, soccer, softball, touch football, track and field.

45. The Theory and Teaching of Court Sports. (2) I.
Mr. Flanagan, Mr. Miller, Mr. Murphy, Mr. Mathews
Prerequisite: course I (court sports).
Badminton, basketball, handball, tennis, volleyball.

Graduate Courses for Men and Women

200. Seminar in Physical Education. (2) I and II.
Mr. Henry, Miss Hodgson, Mr. Clarke
Review of literature and research methods.

201. Seminar in Movement and Body Mechanics. (2) II.
Mr. Clarke
Neurophysiological concepts, physical laws, and kinesiology.

205. Seminar in Physiological Hygiene. (2) I.
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) II.
Prerequisite: course 110.
Miss Espenschade

211. Seminar in Motor Development. (2) II.
Prerequisite: course 111.
Miss Espenschade
Contemporary theories of development. Changing motor abilities and behavior from childhood through youth and age.

230. Seminar in Cultural and Historical Foundations of Physical Education. (2) I.
Miss Hodgson

†231. Administration of Physical Education. (2) I.
Mr. Nordly
† To be given if a sufficient number of students enroll.

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. Fetter, Ph.D., Professor of Physics.
Donald A. Glaser, Ph.D., Professor of Physics.
Erwin L. Hahn, Ph.D., Professor of Physics.
August C. Helmholtz, Ph.D., Professor of Physics.
Robert Karplus, Ph.D., Professor of Physics.
Arthur F. Kip, Ph.D., Professor of Physics.
Charles Kittel, Ph.D., Professor of Physics.
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 (Chairman of the Department).
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. Segrè, 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.
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.

‡ In residence spring semester only, 1962–1963.
ROY T. Kerth, Ph.D., Associate Professor of Physics.
Ronald 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.
H. 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.
Cinsey Anderson, Ph.D., Assistant Professor of Physics.
Eugene D. Commins, Ph.D., Assistant Professor of Physics.
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.

James R. Barcus, Ph.D., Lecturer in Physics.
Robert W. Birge, Ph.D., Lecturer in 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.
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 (Vice-Chairman of the Division).
John H. Northrup, Ph.D., Sc.D., LL.D., Professor of Bacteriology and Professor of Biophysics, Emeritus.

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.
Alexander V. Nichols, Ph.D., Lecturer in Medical Physics.
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.
Roger W. Wallace, Ph.D., Lecturer in Medical Physics.

**Letters and Science List.** All undergraduate courses in physics are included in the Letters and Science List of Courses. For regulations governing this list, see page 96.

**Departmental Major Advisers:** Mr. Anderson, Mr. Jeffries, Mr. Reif, Mr. Reynolds, Mr. Shugart, Mr. Steiner.

**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, 122, and 185 (for those who have taken 3A, 3B, 4A, 4B) or Mathematics 104 and 185 (for those who have taken 1A, 1B, 2A, 2B); 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 75.)

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. Barcus, 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. Barcus, Mr. Shugart

Three lectures and one three-hour laboratory period 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. Dransfeld, Mr. Portis, ———, ———

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. Stevenson, ———, ———

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. Birge, Mr. Shugart

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, 11A, 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 towards 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 the instructor, complete the credit under this heading.

Upper Division Courses

Courses 4A, 4B, 4C, and differential and integral calculus are prerequisites to all upper division courses except course 108A (fall), and 108B, section 2B (spring).

104. Mathematical Methods in Physics. (3) I and II. Mr. Miller

Prerequisite: senior standing, or consent of instructor.

Emphasizing vectors, matrices, symmetry principles, and invariance principles.


Mr. Commins, Mr. Dransfeld, Mr. Moyer, Mr. Reif, Mr. Steiner

105A. I: Mr. Moyer, Mr. Reif, Mr. Steiner; II: ———.

105B. I: Mr. Commins, Mr. Dransfeld; II: Mr. Moyer, Mr. Reif, Mr. Steiner.

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. Stone, ———

I: Mr. Stone, ———; II: Mr. Davis, 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. Powell, Mr. Crawford, Mr. Kerth, Mr. Brode, Mr. Thornton

110A. I: Mr. Powell, Mr. Crawford, Mr. Kerth; II: ———.

110B. I: Mr. Brode, Mr. Thornton; II: Mr. Powell, Mr. Crawford, Mr. Kerth.

Prerequisite: differential equations.
Elementary and mathematical theory of electrostatics, magnetostatics, magnetism, steady and varying currents, electron theory, and electromagnetic waves.

10C. Advanced Electrical Laboratory. (2) I and II. Mr. Shugart, Mr. Reynolds
Use and calibration of electrical instruments and electronic devices.

10D. Modern Physics Laboratory. (2) I and II. Mr. Shugart, Mr. Reynolds
Prerequisite: course 121.
Experimental foundation for the theory of atomic and nuclear structure.

112. Thermodynamics and Kinetic Theory. (3) I and II.
Mr. Reif, Mr. Reynolds, Mr. Tripp
Thermodynamics and the kinetic theory of gases, with an introduction to statistical mechanics.

115. Introduction to Quantum Mechanics. (3) I and II.
Mr. Segrè, Mr. Chinowsky, Mr. Goldhaber
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. Trilling.
Special relativity, electron physics, atomic structure, spectroscopy, X rays.

124. Introductory Nuclear Physics. (3) I and II.
Prerequisite: course 121.

I: 129A; II: 129A, 129B.
Prerequisite: course 121.
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) II.
Prerequisite: course 121.
An elementary survey of the classification and properties of solids, ionic, covalent, molecular, metallic and semiconducting crystals. Dielectric, thermal, magnetic, conductive, and mechanical properties. Superconductivity, ferromagnetism, defects in solids.

141A–141B. Solid State Physics. (3–3) I and II.
Prerequisite: course 115, to be taken concurrently, preferably with 141A.
A thorough introductory course in modern solid-state physics. Crystal symmetry; electromagnetic, elastic, and particle waves in periodic lattices; thermal, magnetic, and dielectric properties; magnetic order; magnetic resonance; theory of metals and semiconductors; superconductivity.

H197. Physics Honors Course. (2) I and II. Mr. Chamberlain.
A proseminar which includes study of a standard book on theoretical physics and reports on current theoretical and experimental problems. May be repeated for credit.
199. Special Study for Advanced Undergraduates. (1–2) I and II.

The Staff (— in charge)

All special work of upper division grade not included in courses announced above. Designed to introduce students to advanced topics and to the technique and methods of research. Credit value to be fixed in each case. Open only to honor students.

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 165.)

205A. Advanced Dynamics. (3–) I and II.

Mr. Judd, ——

Prerequisites: course 105A–105B and 104, or equivalent.


205B. Advanced Dynamics. (3) II.

Mr. Judd

Prerequisite: course 205A.

Advanced topics in classical dynamics, including selections from: hydrodynamics, magnetohydrodynamics, theory of elasticity, mechanics of periodic structures, nonlinear mechanics, 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.


Mr. Chamberlain, Mr. Lepore, Mr. Zemach

210A. I: Mr. Zemach, Mr. Lepore, II. ——, ——.

210B. I: Mr. Chamberlain, ——; II. ——, ——.

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. Kaufman

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. Nierenberg, Mr. Schwartz, Mr. Hopfield

Prerequisite: course 115.

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.

223. Group Theory and Quantum Mechanics. (3) I and II. Mr. Tinkham
   Prerequisite: course 221A, or consent of the instructor.
   Quantum mechanics of atoms, molecules, and solids, emphasizing group theoretical
   methods.

224A–224B. Nuclear Physics. (3–3) Yr. Mr. Ruderman
   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.
   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.

   Mr. Wichmann, Mr. Weinberg
   Quantization of the electromagnetic field; formal and phenomenological meson theories
   with applications; general relativity.

   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. Quantum Theory of Solids. (3–3) I and II. Mr. Kittel
   Prerequisite: course 221A or equivalent course; 141A–141B is recommended.
   Phonon, magnon, plasmon, polaron and electron fields in solids and their interactions;
   superconductivity; many-body techniques; Gren’s functions; Brillouin zones and sym-
   metry; excitons; impurity states; transport processes; Fermi surfaces; neutron scattering;
   recoilless emission; theoretical methods in magnetic resonance.

245. Elementary Particles and Resonances. (3) I. Mr. Rosenfeld
   Prerequisite: course 221A.
   For students working on the experimental physics of the elementary particles and
   their higher resonances. Classification of their properties according to mass, isotopic
   spin, strangeness, parity, and C- and G-parity. Systematization of the experimental data
   on particle production and decay.

290. Seminar. (2) I and II. The Staff (Mr. Helmholtz in charge)

295. Research. (1–6) I and II. The Staff (Mr. Helmholtz in charge)

Related Courses in Other Departments

Physical Biochemistry (Biochemistry 206).
Principles of Geophysics (Geology 122A–122B).

* Not to be given, 1962–1963.
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.

126L. Artificial Radioactivity in the Biological Sciences. (1) I and II.
Prerequisite: course 126. May be taken concurrently.
Mr. Gofman, Mr. Hayes
Laboratory work to accompany course 126.

128A–128B. Nuclear and Radiation Physics in Biology. (3–3) Yr.
Mr. Sondhaus, Mr. Wallace
128A. 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.
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 dependences 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, bioclectricity.

98. 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.


234. The Experimental Foundations for the Physics of Biological Systems.

(2) II.

The Staff (Mr. Nichols in charge)

Prerequisite: course 133A–133B, or their equivalent, and consent of the instructor. Physical properties of biological systems at the atomic, molecular, cellular, and organismal level.

290. Seminar. (1–3) I and II.

Advanced study in various fields of biophysics and medical physics.

Topics vary from year to year. Program for 1962–1963 may include seminars in (a) Effects of Radiation on Mammals (II, Kelly and E. Dobson); (j) Aging (II, Jones); (m) Kinetics of Phagocytosis (I, E. Dobson, Kelly and Parker); (n) Theoretical Biophysics (I, ———); (p) Progress in Biophysics (I, Tobias, II, Tobias); (q) Physiology of Circulation (I, Jones and E. 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)

Staff Seminar in Medical Physics. (No credit) I and II.

The Staff (Mr. Lawrence in charge)

Weekly presentation by members of the staff and visitors.

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).

* Not to be given, 1962–1963.
Laboratory in Physiochemical Biology (Zoology 102). Genetics (Zoology 114).
Optics and Metrology in Biology (Zoology 119A–119B).
Electrical Measurements in Biology (Zoology 120).

**PHYSIOLOGY**

(Department of Anatomy and Physiology; for courses in Anatomy, see page 174.)

(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.*
Lester Packer, 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. Gordan, 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 96.

*Departmental Major Advisers:* Mr. Cook, Mr. Pace.

**The Major.** Required: course 1–1L (5) or Zoology 1A–1B (8) or Biology 11A–11B (6); Physics 2A–2B (6), 3A–3B (2); Chemistry 1A–1B (10), 5 (3), 8 (3); Mathematics 5A–5B or 16A–16B. Recommended: Anatomy 25; Chemistry 9, 109; Physics 132.

The major must include courses 100A–100B (6), 100L (2), 110A–110B (6), 112 (3); the remaining 7 units necessary to complete the required 23 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 above.
(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) Pass with a grade of C or better Chemistry 109 (Physical Chemistry) or Physics 132 (Modern Physics).

(5) Submit a satisfactory thesis based upon the work performed for course Physiology 199.

Lower Division Courses

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.

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. Packer
Prerequisite: Chemistry 1A–1B, 8 or 12; Physics 2A–2B; course 1–1L, or Zoology 1A–1B, or Botany 1, or consent of the instructor. 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 and its regulatory mechanisms.

100L. General Physiology Laboratory. (2) I. Mr. Packer
Prerequisite: course 100A (should be taken concurrently).

102. Physiology of Human Development. (2) I. Mrs. Timiras
Prerequisite: course 1, or Zoology 1A–1B, or equivalent.
Functional changes in man from prenatal life to maturity.

103. Human Physical Growth. (3) II. Mrs. Eichorn
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 at Berkeley, 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.

105. Physiology of the Aging Process. (2) II. Mr. Chaikoff, Mr. Cook, Mr. Jones, Mrs. Timiras
Prerequisite: course 1, or Zoology 1A–1B, or equivalent.
Physiological changes from maturity to old age.

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
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 165.)

200. Seminar in Cell Physiology. (1) II. Mr. Macey, Mr. Packer
Prerequisite: courses 100A–100B and Chemistry 109.

201A–201B. Research. (2–8; 2–8) Yr. The Staff (Mr. Cook in charge)

204. Seminar in the Endocrines. (1–3) I. Mr. Chaikoff

205. Physiological Action of Drugs. (2) I.
   Mrs. Timiras
Prerequisite: courses 110A–110B, 112, 100A–100B, 100L.
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 organic and cellular
levels.

206. Neurophysiology. (3) II. Mr. Freeman
Prerequisite: consent of the instructor.

207. Seminar in Environmental Physiology. (1) I. Mr. Pace
Prerequisite: courses 107 and 110A–110B.
Topics will vary from year to year.
10. Physiological Transport Processes. (2) II. Mr. Macey
Prerequisite: differential and integral calculus, elementary physiology. Recommended: Physical Chemistry 110A–110B.
Transport processes in metabolic systems with selected applications to passive and ex
table membranes, cellular, cardiovascular, renal, and respiratory systems.

17. Space Physiology. (2) II. Mr. Pace
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.

Seminar in Physiology. (No credit) I and II. The Staff
Approximately two meetings per month.
Department meetings for the presentation of original work by the faculty, visiting lecturers, and graduate students.

PLANT BIOCHEMISTRY
(For courses in Plant Biochemistry, see Biochemistry, page 202.)

PLANT NEMATOLOGY
(For courses in Plant Nematology, see Entomology and Parasitology, page 449.)

PLANT NUTRITION
(See Soils and Plant Nutrition, page 553.)

PLANT PATHOLOGY
(Department Office, 147 Hilgard Hall)
Kenneth F. Baker, Ph.D., Professor of Plant Pathology.
John W. Oswald, 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.
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, Emerit
us.
Thomas E. Rawlins, Ph.D., 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.
Milton N. Schroth, Ph.D., Instructor in Plant Pathology.

Robert V. Bega, Ph.D., Lecturer in Plant Pathology.
Lysle D. Leach, Professor of Plant Pathology, Davis (Chairman of the Department).

Departmental Major Adviser: Mr. Weinhold.

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 65). (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.

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
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.

† Not including Mathematics C or D.
‡ In addition to University requirements.
22. Plant Pathology Methods. (3) II. 
Lecture and laboratory. Prerequisite: course 120. 
Laboratory methods used in the study of plant diseases.

23. Principles of Plant Pathology. (3) II. 
Prerequisite: course 120. 
Principles broadly applicable to fungus, bacterial, virus, and nutritional diseases of plants.

126. Plant Virology. (3) II. 
Lecture and laboratory. Prerequisite: course 120 or consent of instructor. 
Viruses as causal agents of plant diseases.

127. Plant Disease Control. (3) I. 
Lecture and laboratory. Prerequisite: course 120. 
Exclusion, eradication, protection, immunization, therapy.

199. Special Study for Advanced Undergraduates. (1–5) I and II. 
Mr. Weinhold (in charge), Mr. Baker, Mr. Bega, Mr. Gold, Mr. Oswald, Mr. Parmeter, Mr. Raabe, Mr. Schlegel, Mr. Schroth, Mr. Synder, Mr. Takahashi, Mr. Toussoun, Mr. Wilhelm, Mr. Yarwood

Graduate Courses

(Concerning conditions for admission to graduate courses, see page 165.)

201. Seminar in Plant Pathology. (1) I and II. 
Mr. Baker, Mr. Yarwood

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.

225. History and Literature of Plant Pathology. (2) II. 
Mr. Baker 
Lectures with discussions. 
Prerequisite: consent of the instructor. 
The development of concepts in plant pathology.

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. Schlegel, Mr. Schroth, Mr. Takahashi, Mr. Toussoun, Mr. Weinhold, Mr. Wilhelm, Mr. Yarwood

**POLITICAL SCIENCE**

(Department Office, 202 South Hall)

Charles Aikin, L.L.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.
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 (Chairman of the Department).

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 (Vice-Chairman of the Department).

Robert W. Anderson, Ph.D., Assistant Professor of Political Science.
Richard H. Cox, Ph.D., Assistant Professor of Political Science.
D. Jay Doubleday, Ph.D., Assistant Professor of Political Science.
James J. Heaphey, Ph.D., Assistant Professor of Political Science.
Chalmers A. Johnson, Ph.D., Assistant Professor of Political Science.
Eugene C. Lee, Ph.D., Assistant Professor of Political Science and Assistant Director, Bureau of Public Administration.

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.

Virginia T. Adloff, Ph.D., Lecturer in Political Science for the Spring Semester.
Joan Bondurant, Ph.D., Lecturer in Political Science.
Conrad Brandt, Ph.D., Lecturer in Political Science.

* In residence spring semester only, 1962–1963.
Hugh M. Clokie, Ph.D., Lecturer in Political Science.
Margaret Fisher, Ph.D., Lecturer in Political Science.
William H. Gardner, M.A., Lecturer in Political Science.
Stefan Riesenfeld, Professor of Law and Lecturer in Political Science.

Letters and Science List. All undergraduate courses in political science except course 18S are included in the Letters and Science List of Courses. For regulations governing this list, see page 96.

The American Institutions Requirement. This requirement may be satisfied by completing an approved course, or by passing an examination. See page 30B.

Departmental Major Advisers: Mr. Aikin, Mr. Apter, Mr. Bellquist, Mr. Blaisdell, Mr. Cox, Mr. Haas, Mr. Harris, Mr. Lenczowski, Mr. Lipson, Mr. Mosher, Mr. Odegard, Mr. Pauker.

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 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 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 in Public Administration. The minimum requirement for admission to the program is 12 units of substantial upper division courses in economics, political science, psychology, cultural anthropology, history or sociology, or their equivalents. For further information, see Mr. Victor Jones.

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. Odegard, Mr. Schaar

   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.

   Two lectures and two section meetings per week. Mr. Lipson, _______
   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 satis-
factory equivalents may be admitted to upper division courses other than those listed on page 159 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. Jacobson, Mr. Scabury.

A special program of study extending through the junior and senior years for political science majors who are on the honors list. Under some circumstances, students may be admitted to the program in the second semester of the junior year. Instruction by weekly seminar meetings and tutorials.

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

The Staff (Mr. Bellquist in charge)

Group I—American Government

(The following courses listed in other Groups may also be regarded as belonging to Group I to meet the requirements of concentration: 113, 128A, 128B, 157A, 157B, 158, 159, 175.)

100A. Government in the United States. (3) I.

Mr. Doubleday

Not open to students who have taken course 1 or 151 (as formerly numbered).

A survey of the powers, structure, and operations of government at national, state, and local levels.

101A. Basic Factors in American Politics. (3) II.

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.

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. Jones

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) I.

Mr. Lee

Legislative, administrative and judicial system; politics and elections; city and county government; California in the federal system.

105A. The Legislative Process. (3) II.

Mr. Doubleday

A study of the organization and functioning of the legislative bodies, with particular attention to Congress and state legislatures, functions; membership; committee system; executive-legislative relations; pressure groups; lobbying; movement for reform.

Group II—Political Theory

110A. Contemporary Issues and Political Theory. (3) I and II.

Mr. Cox,

I: Section I. Mr. Cox; Section II. ____________________________
II: Section I. ____________________________; Section II. ____________________________

Introductory inquiry into some of the main concepts of political philosophy and their relevance to modern society. Emphasis on such concepts as: nature and purpose of the political community; justice, freedom, equality, political obligation, power. Alternative solutions offered by communism, liberalism, utopianism.
111A. Principles of Political Theory. (3) I.

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.


118A–118B. History of Political Theory. (3–3) Yr.

Mr. Wolin

Major political theories from the Greeks to the modern period.

118A. Classical and Medieval theories; Machiavelli and the beginnings of modern political theory.

118B. Political thought during the Reformation; the emergence of liberalism, conservatism, and revolutionary theories.

Group III—International Relations

120A–120B. Elements of International Relations. (3–3) Yr.

Mr. Seabury, Mr. Cox

120A. The International Society. I and II. Mr. Seabury, 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.

Mr. Seabury

Analysis of competing concepts of the American “national interest” operative since World War I: Wilsonianism, isolationism, the Open Door, the Monroe Doctrine, and the Good Neighbor Policy; continentalism; national security, containment and liberation; their relation to substantive policies, and the character of American democracy.

128B. The Conduct of American Foreign Relations. (3) II.

Mr. Bellquist

Diplomacy and the conduct and control of foreign relations. The Department of State and the Foreign Service. Case studies in recent diplomacy to illustrate policy formation and execution. Some comparative materials will be introduced but emphasis will be placed upon the United States.
131A. Soviet Foreign Policy. (3) II.


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.

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.

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) II. Mr. Haas

Politics of community-building among the states of the West.

Group IV—Comparative Government

140A–140B. Comparative Analysis of Political Systems. (3–3) Yr. Mr. Apter

Course 140A is not prerequisite to 140B.

140A. An examination of structural theories and propositions which have emerged from the study of comparative politics.

140B. The examination of methods for systematic comparative studies and their application through group projects.

141A–141B. Government in the Soviet Union. (3–3) Yr.

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.

Mr. Lenczowski, ________

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.

* Not to be given, 1962–1963.
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.

143B. I.

Mr. Pauker, Mr. Johnson

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. 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.). Mr. Lipson.

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.

146A–146B. Political Institutions in Africa South of the Sahara. (3–3) Yr.

(Formerly numbered 142D–142E.)

Mr. Rosberg, Mrs. Adloff

146A. Survey and analysis of indigenous African political institutions and of the problems of the Africans in tribes, villages, towns, and cities. European influence on African ways of life examined.

146B. British statecraft in Africa: nation-building, economic development, social progress, Dominion-colony relations, and international questions. Comparison with French, Portuguese, and South African colonial statecraft.

147A–147B. Government and Politics in Western Europe. (3–3) Yr.

Mr. Clokie

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.

Mr. Bellquist

Constitutionalism and parliamentarism in the Scandinavian states—Denmark, Finland, Iceland, Norway, and Sweden. Constitutional history and present governmental systems. Inter-Scandinavian cooperation.

° Not to be given, 1962–1963.
148. Governments of Latin America. (3) II.
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.
A study of the position of the executive branch of government in the American constitutional system, of the foundation of administrative power, of the area of judicial supervision of administration, and of the liability of public offices and of the state based on misuse of administrative power.

157A–157B. Constitutional Law of the United States. (3–3) Yr. Mr. Aikin
157A. The federal system.
157B. Civil liberties.

158. Government and Business. (3) I.
A study of the basis of national and state control of industry and agriculture, and the extent to which government may control competition, maintain prices, protect home industries, prevent waste, establish quality standards, regulate conditions of labor, etc.

*159. American Judicial Administration. (3) I.
The organization and operation of American courts. Problems of jurisdiction, staffing, civil and criminal procedure.

Group VI—Parties, Pressure Groups, Public Opinion, and Political Behavior

160A–160B. Pressure Groups and Political Power. (3–3) Yr.
An examination of the internal government and politics of the private association. Materials will be drawn from trade unions, the church, agricultural, business, professional, and other organizations. Special attention will be paid to the concepts of majoritarianism, constitutionalism, oligarchy, and constituency.
160B. Private Power and Public Policy.
The nature and sources, strategy and tactics of group power within the context of the American institutional setting. Business, agriculture, labor, religion, the professions as organized power. Ramifications for a democratic society.

* Not to be given, 1962–1963.
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. Odegard, Mr. Doubleday
I. Mr. Doubleday; II. Mr. Odegard
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.

Group VII—Public Administration and Public Policy

175. National Administration of the United States. (3) II. Mr. Lepawsky
Not open to students who have completed formerly given course 176. The processes of policy formulation and administrative management in relation to economic, resource, welfare, strategic, and other governmental affairs, emphasizing long-range and current trends in the national administration of the United States.

180. Administrative Theory. (3) I. Mr. Heaphey
Critical analysis of theories of organization and administration.

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) II. Mr. Lepawsky
Programs and policies for the conservation, development, and administration of natural resources.

° Not to be given, 1962–1963.
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) II.  
Graduate Instruction
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.

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.

202A–202B. Comparative Politics. (3-3) Yr.  
Mr. Lipson, Mr. Clokie
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 constitutional forms; the standard theories of party government; current trends in political analysis.

203A. International Relations. (3) II.  
Mr. Seabury
The bases of international relations in conflicting ideologies and philosophies. Special problems; imperialism, demagogy, economic relations, regionalism, military, and geographic factors.

204A–204B. Public Administration. (3-3) Yr.  
Mr. Harris, Mr. Lepawsky
An advanced study of the theory and practice of public administration.

209A–209B. European Political Thought in the Nineteenth Century.  
(3-3) Yr.  
Mr. Wolin
An examination of the principal themes of political thought in England and on the Continent from the French Revolution to World War I.

210. 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.

215A. China as a nation in the Oriental world; impact of the Occident and its repercussions; internal and external aspects of the struggle for the creation of a modern democratic state; China in world politics.

215B. China from Monarchy to Republic. China's republican experiment, its problems, failures, and successes. China's internal politics and external relations under Communist rule.

*216. Government and Politics in Japan. (3) I.

How Japan is governed, with consideration of major changes in her basic political structure and policies under Allied military occupation.

220. Theories of International Relations. (3) I and II.

Mr. Cox

Historical development and present range of political thought on relations between nations; origins and implications of the idea of sovereignty; the theory of an international community; theories of imperialism; Christian, Communist, and Fascist ideas; geopolitical theories.

221. Nationalism and Imperialism. (3) II.

Mr. Haas, Mr. Pauker

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 potential in relation to national power; international trade and autarchy; place of propaganda and diplomacy.

*229. International Relations of the Southeast Asian Region. (3) I.

Mr. Pauker

A study of the regional and international relations of the Southeast Asian societies: emphasis will be placed on twentieth-century developments with such topics as neutralism, policy toward other Asian communities, and relations with the United States receiving special attention.

235A–235B. Municipal 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. (3–3) Yr.

Mr. Bellquist

Unless well prepared in European government, beginning graduate students are not admitted to this Seminar.

240C–240D. Research in Comparative Government. (3–3) Yr.

Mr. Retzlaff, Mr. Rosberg

240E. Scope and Method: Comparative Government. (3) I.

Prerequisite: open only to teaching assistants in Political Science 2. Comparative politics of Western and non-Western countries; parliamentary democracy, oligarchy, and totalitarian government; problems of politics in industrialized and late developing nations.

* Not to be given, 1962–1963.

242A–242B. Major Problems of the Middle East. (3–3) Yr.

A study of selected problems in politics, international relations, political theory and institutions of Moslem and non-Moslem states in the area.

Mr. Lenczowski


A study of basic social, economic, and cultural problems of the contemporary Far East area.

Mr. Scalapino

243C′–243D. Political Problems of Southeast Asia. (3–3) Yr.

An advanced study of special socio-political problems of the key Southeast Asia countries, with emphasis upon the institutional structures, ideological patterns, and shifting socio-economic conditions of these societies.

Mr. Pauker

245A–245B. Problems of India and Pakistan. (3–3) Yr.

Mr. Retzlaff

246. African Political Institutions. (3) I and II.

Mr. Rosberg

248A′–248B. Governments and International Relations of Latin America. (3–3) Yr.

Mr. McClosky

250. Bibliography and Research Methods. (3) 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.

Mr. Odegard

251. Research in American Government. (3) I.

Mr. Harris

(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.

252A′–252B. Legislative Process. (3–3) 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.

253A–253B. Political Behavior. (3–3) Yr.

Mr. Aikin

Fundamental principles of constitutional law; leading cases; judicial decisions affecting the liabilities, rights, duties, and procedures of governmental officers and agencies.

257A–257B. Constitutional and Administrative Law. (3–3) Yr.

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. (3–3) Yr.

Mr. Odegard

* Not to be given, 1962–1963.
260. International Relations. (3) II.
Research seminar on selected topics, with emphasis chiefly upon contemporary approaches to the study of international relations.

261. International Organization. (3) I.
Mr. Haas
The application of social science theory to research on international organizations.

262. Seminar in International Law. (3) I and II.
Mr. Riesenfeld, Mr. Cox
Selected problems in modern international law.

263A–263B. American Foreign Policy. (3–3) Yr.
Mr. Blaisdell
The theme of the seminar is designed semester by semester by consultation with the students desiring to work in the field of current American foreign policy.

264A*–264B. International Relations of the Far East and Pacific Area.
(3–3) Yr.
Mr. Brandt

*265A–265B. Dependent Peoples and Trusteeships. (3–3) 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.

*270A–270B. Federal Administration. (3–3) Yr.
Special studies in problems of federal administration.

270C. Federal and Intergovernmental Administration. (3) 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. (3) I.
Mr. Heaphey
Analytical comparison of administrative systems in various countries.

272. State Administration. (3) II.
Mr. Doubleday

273. Public Personnel Administration. (3) II.
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. (3) II.
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. (3) 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. (3–3) Yr.
Mr. Waldo

282. Governmental Problems of Metropolitan Areas. (3) II.
Mr. Jones
(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.

* Not to be given, 1962–1963.
285A–285B. Regional Planning and Resources Management. (3–3) Yr. Mr. Lepawsky

286. Public Enterprise: Its Forms, Methods, and Directions. (3) II. ———


290A–290B. Scope and Method of Political Science. (3–3) Yr. Mr. Jacobson

290A. Science as an ideology: the contributions of philosophies and theories, methods, and results in the natural and social sciences to a science of politics.

290B. Individual research in selected topics in scope and methods.

291. American Political Theory. (3) II. Mr. Jacobson

Basic problems of political theory will be examined within the context of American political development.

292A–292B. European Political Theory. (3–3) Yr. Mr. Burdick, ———

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. (3) I. ———

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.

Courses Common to All Groups

298. Individual Study (1–4) I and II. The Staff (Mr. Schaar in charge)

Prerequisite: consent of the instructor and the graduate adviser.

Open to qualified graduate students who wish to pursue special studies and research under the direction of a member of the staff.

299. Directed Research. (1–6) I and II. The Staff

Prerequisite: consent of the thesis supervisor and the graduate adviser.

Open to qualified graduate students who wish to pursue special studies and research under the direction of a member of the staff.

Related Courses in Other Departments

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

Freedom of Speech (Speech 123).

* Not to be given, 1962–1963.
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 must be taken at Davis: (1) General University requirements. (2) College of Agriculture requirements (see page 65). (3) Animal Science Curriculum requirements: (a) General—Chemistry and/or biochemistry, 16 units. Economics, 3 units. English and/or speech, 6 units. Physics, 6 units. Zoology, 8 units. Bacteriology or botany, 4 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), 54 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. Mr. Taylor
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.

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: courses basic to the problems elected, and consent of the instructor.
Problems may be elected relating to the nutrition, breeding, incubation, physiology, or egg and meat quality of chickens.
Graduate Course

(Concerning conditions for admission to graduate courses, see page 165.)

200A–200B. Research in Poultry Husbandry. (1–6; 1–6) Yr.
Mr. Lepkovsky, Mr. Lerner, Mr. Taylor

PSYCHOLOGY

(Department Office, 3210 Tolman Hall)

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. Ghiselli, Ph.D., Professor of Psychology.
Harrison G. Gough, Ph.D., Professor of Psychology.
Mason Haire, Ph.D., Professor of Psychology.
David Krech, Ph.D., Professor of Psychology.
‡Catherine Landreth, 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.
Alex C. Sherriffs, Ph.D., Professor of Psychology.
M. 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.
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.

Edward N. Barnhart, Ph.D., Lecturer in Psychology and Associate Professor of Speech.

Charles N. Cofer, Ph.D., Visiting Professor of Psychology.

Susan M. Ervin, Ph.D., Lecturer in Psychology and Assistant Professor of Speech.

Walter J. Freeman, Ph.D., Lecturer in Psychology and Assistant Professor of Physiology.

Robert E. Harris, Ph.D., Lecturer in Psychology and Professor of Medical Psychology.

Jerry Hirsch, Ph.D., Visiting Associate Professor of Psychology for the spring semester.

Marjorie P. Honzik, Ph.D., Lecturer in Psychology.

Benjamin G. Rosenberg, Ph.D., Visiting Associate Professor of Psychology.

William M. Scott, Ph.D., Visiting Associate Professor of Psychology.

Letters and Science List. All undergraduate courses in this department except 104, 114, 117, 184, 185, 186, and 187 are included in the Letters and Science List of Courses. For regulations governing this list, see page 96.

Department Major Advisers: Mr. Ballachey, Mr. Block, Mr. Coffey, Mr. French, Mr. Ghiselli, Mr. Speisman, Mr. Tryon, Miss Bridgman.

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 at choice among Anatomy 25, Anthropology 1, Genetics 10, or Zoology 10.) Second-year high school algebra is prerequisite to course 5. Courses 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 to include the following: (1) 100A, 100B, 100C, 100D, 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 (see below); (4) a minimum of 3 courses divided between the following two lists of courses: (a) 108A, 108B, 130A, 130B, 131, 147, 161. (b) 114, 117, 142, 143, 144, 149, 165A, 165B. (5) a minimum of 3 units from among the following: 104, 107, 146B, 186. 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 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.
Abnormal Psychology: courses 160, 168.
Clinical Psychology: courses 162, and 165A or 165B or 168.
Developmental Psychology: courses 112, and 113 or 114 or 118.
Differential Psychology: courses 146A and 146B or 149 or 165A or 165B.
Experimental Psychology: courses 130A or 130B or 131.
Industrial Psychology: courses 185, and 187 or 188.
Personality: courses 148A, and 148B or 136 or 145 or 149.
Physiological Psychology: courses 108A, 108B.
Social Psychology: courses 145, and 142 or 143 or 144.

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. Crutchfield
Three lectures and one section meeting per week. Open to entering freshmen.

1B. General Psychology. (3) I and II. Mr. Jarrett, Mr. McKee
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. Brown, ______
Three hours of lecture 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.
14. Childhood and Adolescence. (3) I and II.  
Mr. McKee, ———
Prerequisite: course 1A. Primarily for nonmajors.
Intellectual, social, and personality development during childhood and adolescence.

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–100C–100D. Survey of General Psychology. (2–2–2–2) I and II.  
Mr. Cornsweet, Mr. Ritchie, Mr. Smith, Mr. Block
Prerequisite: course 1A, 1B, 5.
Advanced coverage of concepts, theories, methods, and findings related to selected special topics representing a broad spectrum of scientific psychology.
100A. Sensory and perceptual processes. I. Mr. Cornsweet.
100B. Introduction to principles of learning, performance, and thinking. II. Mr. Ritchie.
100C. Developmental and differential variability. I. Mr. Block.
100D. Personal and social aspects of behavior. II. Mr. Smith.

H101. Honors Seminar. (3) I and II.  
Mr. Ritchie, Mr. French
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. Sampson
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) I.  
Prerequisite: course 1A, 1B, 5.
Research and theories of communication including physical, physiological and psychological aspects of speech sounds, auditory perception and communication.

107. 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, Mr. French

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.

112. Developmental Psychology. (3) I and II. Miss Landreth, ______

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 and Maturity. (3) II.

Prerequisite: course 1A, 1B, 5. Primarily for majors in psychology.

A survey of current research.

114. Laboratory in Child Psychology. (2) I and II. Mr. McKee, Mr. Mussen

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.

116. Tests and Measurements of Infants and Preschool Children. (2) II.

Prerequisite: course 5 and 112. 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) I. Mrs. Honzik

Prerequisite: consent of instructor.

Laboratory work accompanying course 116.

118. Participant Observation. (3) I and II. Miss Landreth

(Formerly Home Economics 135.)

Prerequisite: course 111 or 112.

Participant observation of young children’s reactions and interactions with young children and adults in a variety of behavior settings.

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. Cofer

(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. Cofer
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.

140. Social Psychology. (3) I and II. Mr. Ballachey, Mr. Scott
(Formerly numbered 145A.)
Prerequisite: course 1A. Primarily for majors in psychology, may not be taken for credit by students who have received credit for 141.
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.

141. The Psychology of Social Problems. (3) II. Mr. Ballachey
Prerequisite: course 1A. Primarily for non-majors; may not be taken for credit by students who have received credit for 140.
Selected social problems in the light of social psychological research and theory. Such problems as mental illness, prejudice and desegregation, propaganda, delinquency, social conflict, will be treated.

142. Attitudes, Beliefs, and Persuasion. (3) I. Mr. Ballachey
Lectures and laboratory. Prerequisite: course 1A, 1B, 5 and 100D or 140.
Nature and measurement of attitudes and beliefs, theory of attitude change, experiments or field studies concerning attitudes and attitude change.

143. Group Structure and Process. (3) I and II. Mr. Sampson, Mr. Coffey
Lectures and laboratory. Prerequisite: course 1A, 1B, 5 and 100D or 140.
Psychological nature of social groups with emphasis on processes in small groups.

*144. Language and Cognition. (3)
Lectures and laboratory. Prerequisite: course 1A, 1B, 5 and either 100D, 140, 130A or 130B or a background in linguistics.
Introduction to psycholinguistics, emphasizing the relevance of language structure for cognitive processes, the psychological analysis of meaning, the development of language as an aspect of cognitive development in children.

145. Personality in Society and Culture. (3) I. Mr. Sampson
(Formerly numbered 141.)
Prerequisite: course 1A and 100D or 140.
Social and cultural determinants of personality.

*146A. Differential Psychology. (3) I.
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.

* Not to be given, 1962-1963.
46B. 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.

47. Behavioral Genetics. (3) II.  
Mr. Hirsch  
Lectures and laboratory.  
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 or psychological theory and research design.

48A–148B. Personality. (3–3) Yr.  
Mr. Lazarus, Mr. Block, Mr. Speisman  
148A. I. Mr. Lazarus; II. Mr. Block.  
148B. II. Mr. Speisman.  
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.

149. Personality Assessment. (3) II.  
(Formerly numbered 140.)  
Lectures and laboratory. Prerequisite: course 1A, 1B, 5.  
Analysis of concepts and methods used in assessing personality.

150A. Comparative Psychology. (3) I.  
Mr. Beach  
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  
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.  
Biosocial 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.

* Not to be given, 1962–1963.
165A–165B. Introduction to Clinical Methods. (3–3) Yr.
Mr. Rosenberg, Mr. Tuddenham, Mr. Mendelsohn
165A. I. Mr. Rosenberg; II. Mr. Tuddenham
165B. II. Mr. Mendelsohn
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) I and II.
Prerequisite: course 1A.
Mr. Sarbin, Mr. Rosenberg
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. Personnel and Industrial Psychology. (3) I.
Prerequisite: course 1A.
A discussion of techniques for the selection and classification of employees, the psychological aspects of study of work methods, conditions of work, training, employee motivation, and morale.

186. Theory of Mental Measurement. (3) I and II.
Mr. Ghiselli
Lectures and laboratory. Prerequisite: course 1A, 1B, 5.
Scaling of psychological measurement, reliability and validity of tests, dimensions of psychological traits.

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) I.
Prerequisite: course 1A, 1B, 5.
Perceptual and attitudinal organization in industrial situations, role perceptions in labor and management relations, genesis of attitudes, morale surveys.

II195. 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. Sarbin
Prerequisite: graduate standing.
An intensive consideration of major areas and problems in psychology.

* Not to be given, 1962–1963.
202A–202B. Proseminar in Clinical Psychology. (3–3) Yr. The Clinical Staff
Prerequisite: graduate standing. Required of graduate students in the clinical training
program. Can be taken concurrently with 201A–201B.
Basic theoretical and methodological issues in clinical psychology.

Mr. Smith, Mr. Sampson
Prerequisite: graduate standing. Can be taken concurrently with 201A–201B.
Critical analysis and discussion of assigned readings in the research and theoretical lit-
erature. The fall semester deals with the more individually oriented aspects of social psy-
chology; the spring semester with group aspects. Graduate students planning to specialize
in social psychology are recommended to enroll in their first year.

204A–204B. Proseminar in Physiological Psychology. (3–3) Yr.
Mr. French, Mr. Rosenzweig
Prerequisite: graduate standing. Can be taken concurrently with 201A–201B.
Current theories and research on relations between biological processes and behavior.

205A–205B. Proseminar in Learning. (3–3) Yr. Mr. Riley, Mr. Postman
Prerequisite: 130A–130B or any equivalent course. Can be taken concurrently with
201A–201B.
Current theories and research in conditioning, discrimination learning, transfer of train-
ing, verbal learning, memory and problem solving.

207. Quantitative Methods in Psychology. (3) II.
Mr. Jarrett
Quantitative research methods in psychology. Rational and empirical equations, statisti-
cal testing of hypotheses.

228. The Conceptual Framework of Psychology. (3) II.
Mr. Cofer
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.

231. Electrical Models in Research and Theory Construction. (3) II.
Mr. Cornsweet
Lectures and laboratory. Prerequisite: graduate standing.
The use of electrical models in the formulation of psychological theory, with particular
applications in physiological psychology. Actual models will be constructed.

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.

(2–2–2–2) Yr.
Mr. Tuddenham, Mr. Gough, Mr. Coffey,
Mr. Lazarus, Mr. Sarbin
Lectures and laboratory. Prerequisite: course 202A and 202B, and/or consent of the
instructor. All sections required of graduate students in the clinical program.

261A. Assessment of capacity and intellectual functioning. I, Mr. Coffey; II, Mr.
Tuddenham.
261B. Assessment of personality by means of structured tests. II, Mr. Gough.
261C. Assessment of personality by means of free response and unstructured tests. II,
Mr. Lazarus.
261D. Assessment of personality by means of the clinical interview. I, Mr. Sarbin.

* Not to be given, 1962–1963.
262A–262B–262C. Case Conference Research Methods. (2–2–2) I and II.
Mr. Coffey, Mr. Mendelsohn, Mr. Speisman

Lectures and laboratory. Prerequisite: course 202A–202B, and 261A–261B–261C–261D or equivalent. All sections required of graduate students in the clinical program. Clinical research involving subjects in the clinic and in cooperating agencies. Experience in clinical agencies. Weekly conference on case material.

262A. Evaluation and diagnosis. I, Mr. Mendelsohn.
262B. Individual psychotherapy. II, Mr. Speisman.
262C. Group psychotherapy. II, Mr. Coffey.

290. Seminar. (2) I and II.
The Staff

Advanced study in the following areas of modern psychology: (a) Measurement, I, Meredith; II, ———; (b) Learning, I, Cofer; II, Riley; (c) Physiological, I, Rosenzweig; II, Freeman; (d) Individual Differences, II, Tryon; *e Constitutional, II, ———; (f) Developmental, I, Musser; II, Mckee; (g) Perception, I, Cornsweet; *(h) Psychological Change, I, II, ———; *(i) Attitudes, Beliefs, and Persuasion, II, Scott; (j) Personality Assessment, I, Gough; (k) Socialization: The Individual in Society and Culture, II, Sarbin; *(l) Behavior Disorders, I, ———; *(m) Language, Cognition, and Communication, I, II, ———; *(n) Perception and Personality, I, II, ———; (o) Group Structure and Processes, I, Coffey; (p) Personality, I, Block; (q) Dynamic Psychology, I, Lazarus; II, Mendelsohn; (r) Animal, I, Ritchie, II, Beach; *(s) Medical, I, II, ———; (t) Clinical Research, I, Speisman; (u) Industrial, I, Ghiselli; (v) Human Relations, I, Haire, II, Porter; *(w) Theories of Therapy, I, II, ———; (x) Differential and Animal Social Psychology, II, Hirsch.

298. Research Methods. (3) II.
Mr. Ballacey, Mr. Block, Mr. Ghiselli, Mr. Lazarus, Mr. Meredith

Prerequisite: this course required of all first-year graduate students, unless specifically excused.

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

(Deartment Office, 19 Earl Warren Hall)

Jessie M. Bierman, M.D., M.S.P.H., Professor of Maternal and Child Health.
Sanford S. Elberg, Ph.D., Professor of Immunology and Bacteriology.
William Griffiths, Ph.D., Professor of Public Health.
Warren J. Kaufman, Sc.D., Professor of Sanitary and Radiological Engineering and Professor of Sanitary Engineering.
Percy H. McGauhey, M.S., Professor of Public Health Engineering and Professor of Sanitary Engineering, and Director of the Sanitary Engineering Research Laboratory.
Stewart H. Madin, Ph.D., D.V.M., Professor of Public Health.
Sven Nissen-Meyer, M.D., Ph.D., Professor of Biostatistics.

* Not to be given, 1962–1963.
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.
Irving R. Tabershaw, B.S., M.D., Professor of Occupational Medicine.
Keith O. Taylor, Ph.D., M.B.A., Professor of Hospital Administration.
Bernard D. Tebbens, Sc.D., Professor of Industrial Hygiene Engineering.
Jacob Yerushalmy, 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.
Walter S. Mangold, B.S., Professor of Public Health, Emeritus.
A. Harry Bliss, M.S., M.P.H., Dr.P.A., Associate Professor of Public Health.
Chin Long Chiang, Ph.D., Associate Professor of Biostatistics.
Nell F. Hollinger, Ph.D., Associate Professor of Public Health.
Ruth L. Huennemann, Sc.D., Associate Professor of Public Health Nutrition.
Edith M. Lindsay, Ed.D., 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.
Reuel A. Stallones, M.D., M.P.H., Associate Professor of Public Health.
William Taylor, Ph.D., Associate Professor of Biostatistics.
Alan Burkhalter, Ph.D., Assistant Professor of Toxicology.
Robert C. Cooper, Ph.D., Assistant Professor of Public Health.

Len H. Andrus, M.D., Lecturer in Public Health.
Mary F. Arnold, Dr.P.H., Lecturer in Public Health.
Rodney R. Beard, M.D., M.P.H., Clinical Professor of Occupational Health.
Albert R. Behnke, Jr., A.B., M.D., Lecturer in Public Health.
John E. Bell, E.D., Lecturer in Public Health.
Moritmer A. Benioff, M.D., 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 H. 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.
Henry B. Bruyn, Jr., M.D., Lecturer in Public Health.
Sylvia C. Bryson, M.A., Lecturer in Public Health.
Harold D. Chope, M.D., Dr.P.H., Lecturer in Public Health.