al academic areas for their own sake, whereas the other colleges emphasize the study of these areas in relation to applied arts and sciences.

A school normally begins instruction at the upper division or graduate level and is designed to provide a student with training preparatory to a specific profession. The school presumes its students to have acquired before entrance some background in general academic areas. The degrees offered by the schools are accredited by state and national boards and associations for the various professions, and normally allow the graduating student a direct entry into the field.

Each of the colleges and schools has its own administrative officials and its own regulations for earning degrees, and since all undergraduate students at the University belong either to a college or a school, they are expected to satisfy requirements for the degree on three levels: University, college or school, and field of concentration. A broad survey of the colleges and schools and their degree programs is provided in the Courses and Curricula section of this catalog. For further information, see the individual school or college announcements.

**Special Studies.** Special Studies provide innovative and interdisciplinary programs of study not within the colleges and schools. Students are encouraged to avail themselves of the courses offered in Special Studies which provide credits directly applicable to a University degree. The Special Studies are established upon a network of interrelationships on the campus among colleges, schools, and departments, and, in certain cases, in conjunction with community groups, other UC campuses, and other universities.

### Key to Symbols

The following symbols are used in the departmental faculty rosters and course listings:

**Faculty Roster**

- On leave, Fall, Winter, Spring
- On leave, Fall
- On leave, Winter
- On leave, Spring
- On leave, Fall and Winter
- On leave, Winter and Spring
- On leave, Fall and Spring
- Recalled to active service

**Course Listings**

- **1-99** Lower division courses, including courses designated by a letter. Open to freshmen and sophomores; not acceptable for upper division credit.
- **100-196** Upper division courses. Ordinarily open to students who have completed at least one lower division course in the given subject, or two years of college work.
- **197** Field study (upper division). Effective fall 1973, the student is limited to ten units of credit for courses numbered 197, with a maximum of five units in any one quarter. This is not retroactive for any student who had accumulated more than ten quarter units of credit for 197 by the end of the spring quarter 1973, but such a student may not enroll in subsequent quarters for additional credit.
- **198** Directed group study (upper division). Students should not expect to use more than a total of ten units of 198 credit for a bachelor's degree without the permission of their dean.
- **199** Supervised independent study and research courses for undergraduates (upper division), which may be graded only Passed or Not Passed. Students must be in good standing (2.0 grade-point average or better). They must obtain the prior consent of the instructor who is to supervise the study, the major adviser, and the chairperson of the department in which the study is to be conducted (or the equivalent). This approval must be based upon a written proposal submitted to the chairperson. The instructor shall indicate consent in writing—for example, by initialling the student’s study list adjacent to the 199 entry. The approvals shall show that their background is adequate for the proposed study, and must have completed at least 90 units of undergraduate work. The total units in any one quarter in 199 courses may not exceed 5. On the advice of the instructor or the instructor concerned, the dean of a student’s college or school may recommend exceptions to the limitations listed.

**Courses and Curricula**

Colleges and Schools are presented alphabetically as indicated in the Table of Contents. Following the Colleges and Schools is a list of Special Studies. Departments are treated as subdivisions within Colleges, Schools, and Special Studies. If you are unable to locate the department of your choice, consult the Index.
School of Business Administration

School of Business Administration Office, 350 Barrows Hall

Professors: David A. Auker, Ph.D. David A. Alhadeff, Ph.D. K. Roland A. Artis, Econ.Dr. Frederick E. Balderston, Ph.D. Wayne S. Boudet, Ph.D., C.P.A.

Assistant Professors: David F. Bebbel, Ph.D. Percy M. Boreham, Ph.D. Timothy R. Critchfield, Ph.D. George R. Decker, Ph.D. David W. Estenson, Ph.D. Robert N. Freeman, Ph.D. Gilson, Harwood, Ph.D. Robert G. Harris, Ph.D.


Undergraduate School of Business Administration

The Undergraduate School of Business Administration administers students at the junior level and offers a curricular leading to the undergraduate degree of Bachelor of Science in Business Administration. The primary function of the School is to prepare students for responsible positions in administration and management.

Prior to admission to the School, you should obtain an Announcement of the Undergraduate School of Business Administration, available in 310 Barrows Hall. This contains complete information concerning academic regulations for admission as well as details about important prerequisites and degree requirements. Because there are many more applications than spaces available, completion of the prerequisites does not guarantee admission to the School. As a professional school, we expect students to come to us with strong academic records in their lower division work either at Berkeley or elsewhere, particularly in the courses specified as prerequisites. Requests for advice on selecting general education courses should be addressed to the Office of the Associate Dean, 310 Barrows Hall.

Lower Division. Students preparing for admission to the Undergraduate School of Business Administration may be required to lower division courses in any college or school in the University, or equivalent courses at other institutions. Counselors in the Undergraduate School of Business Administration will assist lower division students in selecting courses prerequisite to the upper division business administration curriculum. Detailed information on required preparation is available in the Announcement of the Undergraduate School of Business Administration.

Upper Division. Upper division courses which are required in Business Administration are:

100 — The Price System and Business Enterprise, 101 — Business Fluctuations and Forecasting, 111 — Social and Political Environment of Business, 120 — Managerial Accounting.

And, at least three of the following courses:


Beyond these requirements, additional courses within a subject matter field must be taken. Advisers will assist students in the selection of these courses.

The following subject matter fields are available:

Accounting, Finance, Management Science, Marketing, Organizational Behavior and Industrial Relations, Production Management, Real Estate and Urban Land Economics, Transportation.

Graduate School of Business Administration

The Graduate School offers curricula leading to the Master of Business Administration degree and to the Ph.D. degree.

The M.B.A. Program offers opportunity for advanced and specialized training based either upon the fundamental undergraduate curriculum in Business Administration or upon undergraduate study in other fields. The core courses for the master's degree include basic work in economic analysis, quantitative decision models and techniques, accounting, political, social, and organizational behavior. All graduate students must maintain a B average in all courses and must pass a comprehensive examination. You may pursue a program leading to the Ph.D. in Business Administration if you wish to prepare for university and college teaching and research or for high-level research positions in business or government.

For detailed information, consult the Announcement of the Graduate School of Business Administration.

The Graduate School also offers an evening program in San Francisco leading to the Master of Business Administration degree. For further details, write to the Director, San Francisco Evening MBA Program, 350 Barrows Hall, University of California, Berkeley, California 94720.

Preparation for Graduate Study. Admission to the Graduate School of Business Administration requires evidence of superior scholarship and an acceptable bachelor's degree. In evaluating applications, merit, demonstrated capacity for leadership, and intellectual activity of a higher order are taken into account.

The Graduate Program. Two degrees, the M.B.A. and the Ph.D., are offered. The Master of Business Administration degree requires a maximum of six quarters of which the first three quarters are composed of special core courses (BA 101G, 102G, 105G, 107G, 108G, 110G, 120G, 121G, 130G, 150G, and 160G). Students who have already achieved a degree in the areas covered by one or more of the special core courses, through equivalent work at the University of California or at another institution of acceptable standing, may be exempted from relevant core courses on the basis of the prior work and/or passing a waiver examination. Fields of emphasis for the MBA include: Accounting, Economic Analysis and Policy, Finance, General Management, International Business, Marketing, Management Science, Organizational Behavior and Industrial Relations, Political, Social, and Legal Environment of Business, Real Estate and Urban Land Economics, and Transportation.

All master's students must maintain a B average in all courses taken during the degree program and must satisfy a comprehensive examination requirement. "G" courses are open only to graduate students in the Graduate School of Business Administration. The Ph.D. program is open to students from any undergraduate or graduate major. A background in quantitative tools is desirable. For residency and other requirements, please consult the Announcement of the Graduate School of Business Administration as well as the Announcement of the Graduate Division.

Lower Division Courses

1. Introduction to Accounting. (8) Two 1 1/2-hour lectures; 3 hours of discussion per week. Prerequisite: sophomore standing. Required for admission to the School of Business Administration. The identification, classification, measurement, and financial effects of economic events on enterprises; the contemporary model and its origins.

The Staff (Mr. Cerf in charge) (F, W, Sp)

Upper Division Courses

Prerequisites: basic micro and macro economic theory; Statistics 21 or equivalent, Econometrics 16A or 16B or equivalent, and Computer Science 3 or equivalent are required for nearly all upper division courses. Junior standing is required for all upper division courses.

100. The Price System and Business Enterprise. (4) Four and one-half hours of lecture per week. Prerequisite: must have completed basic micro and macro economic theory; Mathematics 16A or 16B, Statistics 2 or equivalent, Econometrics 16A or 16B, and Computer Science 3 or equivalent are required for nearly all upper division courses. Junior standing is required for all upper division courses.

The Staff (Mr. Alhadeff in charge) (F, W, Sp)

101. Business Fluctuations and Forecasting. (5) Four and one-half hours of lecture per week. Prerequisite: course 100. Analysis of the market system with emphasis on the factors responsible for the economic institutions and business policies which are necessary as a result of business fluctuations.

The Staff (Mr. Alhadeff in charge) (F, W, Sp)

102. Managerial Economics. (5) Four or 4 1/2 hours of lecture per week. Prerequisite: courses 100 and 101 or the equivalent. Analysis of the theory and practice of decision making in business firms, utilizing the concepts and techniques of managerial economics. The business decisions to be investigated include pricing policies, internal transfer pricing, inventory management.

103. Forecasting for Managerial Decisions. (5) Four or 4 1/2 hours of lecture per week. Prerequisite: courses 100 and 101 or the equivalent. Theory and analysis of the long-run and short-run forecasts of economic activity.

The Staff (Mr. Alhadeff in charge) (F, W, Sp)

105. Economics of Regulated Industries. (5) Four or 4 1/2 hours of lecture per week. Prerequisite: course 100 or equivalent. Survey of industry structures and regulations in the transportation, energy, communications and financial sectors of the American economy. Application of economic analysis to the administrative regulation of prices, investment, service quality and other managerial decisions. Analysis of regulatory policies and alternatives to economic regulation, including market competition and public ownership.

110. Legal Environment of Business. (5) Three 1 1/2-hour lectures per week. An analysis of the law and the legal process, executive and managerial decisions and implications of law, legal reasoning and the operation of law within the U.S. federal system, followed by a discussion of the problems resulting from contracts and related topics, business associations, and the impact of law on economic enterprise.

The Staff (Mr. Tyson, Mr. Cdnant, Mr. M. Smith (F, W, Sp)

NOTE: For key to symbols, see page 36.
111. Social and Political Environment of Business. (5) Four hours of lecture per week. Prerequisite: course 100; recommended: professional verification of financial and related information, including ethical, legal and other professional issues, historical developments, and current events. Mr. Boutell (F, W, Sp).

112. Business in Its Historical Environment. (5) Four hours of lecture per week. This course will examine the historical development of the business firm, including historical periods of business development and institutions. Role of business in the development of social values, goals, and national priorities. The expanding role of the corporation in dealing with its environment. Problems and issues. Mr. Pratt, Mr. Vogel, Mr. Harris, Mr. Brown (F, W, Sp).

113. Legal Aspects of Business Transactions. (5) Three 1 1/2-hour lectures per week. Prerequisite: course 110. A review of the legal implications of contracts, sales, credit, insurance, and real property; taxes, gifts, and other dispositions of property; the use and realty of use; transfers; titles; development rights and the regulation thereof in the public interest. Mr. M. Smith (W).

117. Business, Government and Law in the American Political Economy. (5) Four or 4 1/2 hours of lecture per week. Prerequisite: recommended: course 110, 117, or 117-A. Students explore the complex relationships between the "public" and "private" sectors in the American political economy. Focus is on the interaction of governmental regulations, business organizations, and legal processes which provide the framework for both economic and political activity in the United States. Course may be repeated for credit upon consent of the instructor. Mr. Epstein (F).

120. Managerial Accounting. (5) Two 1 1/2-hour lectures and three hours of discussion per week. Prerequisite: course 121. The use of accounting systems and their outputs in the process of managing an enterprise. Classification of costs and revenues on several bases for various uses; budgeting and standard cost accounting; analyses of relevant costs and other data for decision-making.

The Staff (Mr. Cerf in charge) (F, W, Sp).

121. Financial Accounting I. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: courses 1 and 120. Required for those specializing in accounting. Continuation of course 121. Accounting for partnerships; consolidated financial statements; adjustments of inventories; use of price index accounting for the financial effects of pension plans, other advanced accounting problems.

Mr. R. Freeman (F, Sp).

122. Financial Accounting II. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: course 121. Required for those specializing in accounting. Continuation of course 121. Accounting for long-term investments and sources of long-term capital; funds statements, financial analysis. Mr. Ohlson, Mrs. L. Skelton, Mr. Staubus (F, W, Sp).

123. Problems of Financial Reporting. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: course 122 or the equivalent. Accounting for partnerships; consolidated financial statements; adjustments of inventories; use of price index accounting for the financial effects of pension plans, other advanced accounting problems.

Mr. R. Freeman (F, Sp).

124. Cost Accounting. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: courses 1 and 120. Intensive study of basic cost accounting and its uses in pricing, inventory, and planning decisions. Mr. Crichfield, Mr. Kwon (F, W, Sp).

125. Administrative Accounting. (4) Three 1 1/2-hour lectures and two hours of discussion per week. Prerequisites: 120 or consent of the instructor. Introduction to accounting and its uses in analyzing, planning, and controlling the operations of organizations.

Mr. Rogers (Sp).

126. Auditing. (6) Three hours of lecture and two hours of discussion per week. Prerequisite: course 121. Completion of course 121 strongly recommended. Emphasis on professional development of public and management accountants. Mr. M. Smith (W, Sp).

127. Accounting Systems for Management Information. (5) Three lectures of hour and one week. Prerequisite: five hours of lectures and three hours of discussion per week. Mr. Boutell (F, W, Sp).

128. Federal Income Taxation. (5) Four and one-half hours of lecture per week. Prerequisite: course 121 and consent of instructor. The study of accounting systems, including the tax treatment of assets, liabilities, and income. Mr. M. Smith (W).

129. Field Study in Accounting. (5) Hours to be arranged. Prerequisite: course 121 and consent or consent of the instructor. A planned program of exposure to actual accounting practice designed to broaden the student's understanding of the theory of accounting. Assignment to special corporations, CPA firms, or government agencies for orientation and work experience. Research reports based on field study required. Mr. Cerf (in charge) (W).

130. Financial Management. (5) Four and one-half hours of lecture per week. Prerequisite: courses 100 and 120. Study of sources of funds through an enterprise. Cash management, source and application of funds, term loans, types and uses of financial instruments, and insolvency, with emphasis on the structure and the effects of financial management. Mr. Bosco, Mr. Tyndall, Mr. Grauer (F, W, Sp).


133. Investments. (5) Three 1 1/2-hour lectures per week. Prerequisite: course 130 or by permission of the instructor. Sources and demand for investment capital, operations of security markets, determination of investment policy, and procedures for analysis of securities. Mr. Goshay (W, Sp).

137. Economics of Insurance. (5) Three 1 1/2-hour lectures per week. An introduction to the underlying principles of insurance theory and analytical study of the practices in the more important branches of the insurance business. Mr. Goshay (W).

138. Contemporary Problems of Insurance. (5) Three 1 1/2-hour lectures per week. Prerequisite: course 137. Selected topics of current interest in insurance; special topics in life insurance, corporate risk management, and social insurance. Mr. Goshay (W).

140. Introduction to Production Management. (5) Three hours of lecture and one and one-half hours of discussion per week. Management problems related to the specification and control of standards with respect to processes, products, equipment, and jobs: elementary models for scheduling, maintenance, and inventory control; and various control techniques and their use to resolve problems in production, incentive, and inventory control.

Mr. Rogers (Sp).

141. Planning of Production Facilities. (5) Four hours of lecture per week. Prerequisite: course 140 or the equivalent. Economic aspects of the design and establishment of industrial facilities. Special problems of labor, location; scale of operations and layouts; line-balancing and waiting line analysis; systems for personnel and quality control. Mr. M. Smith (W).

142. Production Control Systems. (5) Four hours of lecture per week. Prerequisite: course 140 or equivalent. Development and operation of systems for production control, with special emphasis upon the control of projects. Mr. M. Smith (W).

144. Management Science Workshop. (5) Four hours of lecture and one and one-half hours of discussion per week. Prerequisite: course 121. Course consists of laboratory work to prepare a report dealing with a concrete problem.

Mr. Shogan (F).

145A. Survey of Operations Research. (5) Four and one-half hours of lecture per week. Prerequisite: basic concepts of calculus, algebra, probability, and statistics. Introduction to the techniques and methods of operations research. Mr. M. Smith (F). Mr. Estenson (F).

146A. Applications of Linear Models to Management Decision Making. (5) Four and one-half hours of lecture per week. Prerequisite: course 145A. Introduction to the theory of linear models, including design of experiments and analysis of variance. Mr. Estenson (F).

146B. Application of Stochastic Models to Decision Making. (5) Four and one-half hours of lecture per week. Prerequisite: course 145A or 145B. Stochastic models of decision problems arising in sales, installment buying, inventory planning, and controlling the operations of organizations.

Mr. M. Smith (W).

147. Computers and Modern Organizations: Theory and Application. (5) Four and one-half hours of lecture per week. Prerequisite: course 145A or 145B. Emphasizing control and decision making, this course includes studies of computer systems, accounting systems, and organizations. Mr. Estenson (F).

150. Organizational Behavior. (5) Four and one-half hours of lecture per week. Prerequisite: course 110. An introduction to the field of management or familiarity with one computer language. A survey course concerned with the importance of computer applications in organizations. Mr. Estenson (F).

151. Management of Human Resources. (4) Three and one-half hours. Prerequisites: course 108G and consent of the instructor. The designs of a variety of human resource problems. Mr. Estenson (F).

155. Labor and the Law. (5) Four and one-half hours of lecture per week. Prerequisite: course 151. The role of the legal system in determining the rights of employees is discussed. Mr. Estenson (F).

156. Collective Bargaining Systems. (5) Four and one-half hours of lecture per week. The nature, institutions, and process of collective bargaining. Mr. Estenson (F).
trial relations systems in major industries, in public employment, and in other countries. Mr. Strauss (W)

160. Marketing. (F, S) Four and one-half hours of lecture per week. Core courses 160 or equivalent. The evolution of markets and marketing; market structure, organization and management, marketing functions, pricing, advertising, promotion, marketing cost and efficiency; public and private regulation. Mr. Balderston, Mr. Nicosia, Mr. Hargert (F, W, Sp)

162. Retailing. (F, S) Three 1 1/2-hour lectures per week. Three hours of course 160 or 162 or 165 and development of retail management types; geographical structure of retail trade, assortments of goods and services; store management; government regulations. Mrs. Johnson (F, Sp)

163. Advertising. (F, S) Three 1 1/2-hour lectures per week. Prerequisite: course 160. Basic concepts and functions of advertising in the economy; consumer motivation; problems in utilizing advertising and measuring its effectiveness. Mr. Nicosia (Sp)

164. Industrial Procurement. (F) Four and one-half hours of lecture per week. Prerequisite: course 160. The interaction of buyer and seller in a non-ultimate consumer environment. The problems met in purchasing by industrial organizations and governments; major buying policies; vendor selection; quantity and quality determination; and relation of buying price, production cost and all-in cost. Mr. Nicosia (W)

165. Marketing Management. (Sp) Three 1 1/2-hour lectures per week. Prerequisite: course 160. Analysis of marketing functions primarily in manufacturing firms including marketing policy, servicing and evaluation; development of marketing organization within the firm. Mr. Moyer, Mr. Carman (W, Sp)

166. Wholesaling. (F, S) Three 1 1/2-hour lectures per week. Prerequisite: course 160. The importance of wholesaling; its place in the marketing structure; functions of wholesaling; the agency structure of wholesaling; energy and performance requirements; trends and costs, profits, and efficiency.

168. Marketing Policies and Problems. (F, S) Four and one-half hours of lecture per week. Prerequisite: course 160 or consent of instructor. Special topics in marketing including geographic structure, consumer behavior, pricing, competition, and other topics. Course may be repeated for credit. Mr. Hargert (Sp)

180. Introduction to Real Estate and Urban Land Economics. (F, S) Three 1 1/2-hour lectures per week. The nature of real property, market analysis; construction, cycles; mortgage lending; equity investment; real estate administration; metropolitan growth; urban land utilization; real property value concepts. Mr. W. Smith, Mr. F. Smith (W, Sp)

181. Valuation of Real Property. (F, S) Three 1 1/2-hour lectures per week. Prerequisite: course 160 or equivalent. Valuation of appreciated properties and methods; the role of value estimates in private land-use and real estate investment decisions and in the interpretation of public policies affecting real estate development. Mr. W. Smith (W)

182. The Financial Management of Real Estate Resources. (F) Four and one-half hours of lecture per week. Analysis of real estate investment opportunities and strategies; equity financing; mortgage market structure; effects of credit on demand; equity investment criteria; public policies in real estate finance and urban development. Mr. Wendt (Sp)

185. Introduction to International Business. (F) Four and one-half hours of lecture per week. Prerequisite: one of course 120G, 106G, 120 or equivalent. A survey including environmental, economic, political, and social constraints on doing business abroad; effects of overseas business organization and management; and foreign investments. Special topics on international banks; foreign market analysis and operational strategy of a firm doing business outside the United States; and development of the international operations of a firm. Mr. Wendt (F)

190. Introduction to Organization and Decision. (S) Four and one-half hours of lecture per week. Normalization of behavior under uncertainty; games and the analysis of conflict in organizations; computer simulation of organizational behavior; approaches to organization design. Mr. Wendt, Mr. Auerbach (F, Sp)

191. Experimental Courses. (S) Four hours of lecture per week. Prerequisite: consent of instructor. Design of experiments for the year and will be announced at the beginning of each quarter.


198. Directed Study. (1-5) The Staff (Mr. Moyer in charge) (F, W, Sp)

199. Supervised Independent Study and Research. (S) Offered by regulation only. Mr. Auerbach (F) Reference list on page 38. Must be taken on a passed/not passed basis.

The Staff (Mr. Moyer in charge) (F, W, Sp)

First-Year Courses For Graduate Students

Note: The following first-year courses are open only to graduate students. Admit only under special circumstances. Other students require prior approval from the Associate Dean of the Graduate School of Business Administration.

101G. Economic Analysis for Business Decisions I. (F, W) Four and one-half hours of lecture per week. Prerequisite: course 107G or equivalent. Economic analysis at the microeconomic level. Topics include supply and demand, market equilibrium, product and factor markets, and the regulation and marketing decision-making of firms. Mr. Harsanyi, Mr. Marschak (F, W)

102G. Economic Analysis for Business Decisions II. (S) Four and one-half hours of lecture per week. Prerequisite: course 107G or equivalent. Economic analysis at the macroeconomic level. Topics include inflation, interest rates, unemployment, and other topics covered in the specific of the U.S. business cycle and its relevance to the economy. Mr. Artle, Mr. Maisel, Mrs. Flanagan (F, W)

106G. Business Computing. (F, S) Formerly 104G, 105G, 106G, 108G. Three hours of lecture and one and one-half hours of laboratory per week. Prerequisite: consent of instructor. Introduction to business computing: systems analysis and design, use of computer languages, end-user application development. Mr. Auerbach, Mr. McCullough (F, S)

107G. Quantitative Analysis for Business Decisions I. (F) Three hours of lecture and one and one-half hours of discussion section per week. Prerequisite: one course in the calculus. Introduction to optimization techniques and to decision making under uncertainty. Topics include the mathematics of finance, the applications of calculus, probability theory and decision theory, including Bayes’ Theorem and the value of information. Mr. Greenberg (F)

108G. Quantitative Analysis for Business Decisions II. (S) Three hours of lecture and one and one-half hours of discussion section per week. Prerequisite: course 107G or equivalent. Introduction to statistical analysis and its application to the problems of busi- ness. Topics include descriptive statistics, estimation, tests of hypotheses, analysis of variance, regression and correlation, and time series analysis. Mr. Krell (Sp)

111G. Political, Social and Legal Environment of Business. (F, W) Three hours of lecture per week. Prerequisite: one of course 101G, 102G, 107G or 107G or equivalent. The role of the state and legal institutions in a democratic society; the framework within which the business system operates. Mr. Conant, Mr. Holcomb, Mr. Fox (F, W)

120G. Accounting I: Financial Reporting. (F) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: admission to the Graduate School of Business Administration. The components of financial statements, the accounting and reporting of general purpose financial reports. The text of the course is to be used as a guide. Mr. McMillan, Mr. Volcker (W, Sp)

121G. Accounting II: Managerial Accounting. (W) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: course 120G or equivalent. An introduction to an information system which provides dependable, timely, and relevant information to all decision makers. This course information needs of managers are identified and developed by which managerial accounts can provide necessary data through appropriate budgetary, control, and financial systems. Mr. Kwon, Mr. Crichfield, Mr. Downes (W, Sp)

130G. Financial Policies of Business. (F) Three hours of lecture per week. Prerequisite: courses 101G, 102G, 107G or equivalent. An emphasis upon financial problems and policies of corporations; the role of commercial banks, institutional and other investors in supply of capital to corporations. Mr. Grauer, Mr. Babbel (F, W)

150G. Organizational Behavior. (F, S) Four and one-half hours of lecture per week. A general description and analytical study of the psychological behavior of individuals in organizations. Mr. Harsanyi, Mr. Lander (F, S)

160G. Marketing Organization and Management. (F, Sp) Four and one-half hours of lecture per week. Prerequisite: course 101G or equivalent. Topics include an overview of the marketing system and the marketing concept, buyer behavior, market research, segmentation, and the strategic use of advertising, sales force strategies, and public relations, and the role of value estimates in private land-use and real estate investment decisions and in the interpretation of public policies affecting real estate development. Mrs. Roberts, Mr. Miles (F, W)

161G. Market Structure and Economic Performance. (F, W) Three hours of lecture per week. Prerequisite: courses 101G, 102G, 107G and 107G or equivalent. The examination of the behavior of firms in competitive environments; optimal strategies through time; strategies in the presence of imperfect information and in situations involving risk. Mr. Auerbach, Mr. McCullough (F, W)

162G. Introduction to International Business. (S) Three hours of lecture per week. Prerequisite: one of course 101G, 102G, 107G or equivalent. An introduction to international business and the impact of international factors on firm behavior. Mr. Auerbach, Mr. McCullough (F, W)

201. Statistical and Econometric Methods for Business. (F, W, Sp) Three hours of lecture per week. Prerequisite: one of course 101G, 102G, 107G or equivalent. Topics include an overview of statistical methods and economic models with special emphasis on practical applications of the theory. Mr. McCullough (F, W)

202. Statistical and Econometric Methods for Business, II. (Sp) Three hours of lecture per week. Prerequisite: one of course 101G, 102G, 107G or equivalent. Topics include an overview of statistical methods and economic models with special emphasis on practical applications of the theory. Mr. McCullough (F, W)

203. Market Failures and the Firms. (F) Three hours of lecture per week. Prerequisite: one of course 101G, 102G, 107G or equivalent. An introduction to the theory and use of statistical and econometric methods with special emphasis on practical applications of the theory. Mr. McCullough (F, W)

204. Forecasting Methods for Business. (W) Three hours of lecture per week. Prerequisite: one of course 101G, 102G, 107G or equivalent. An introduction to the theory and use of statistical and econometric methods with special emphasis on practical applications of the theory. Mr. McCullough (F, W)

205. Management in the Public and Not-for-Profit Sector. (F) Three hours of lecture per week. Prerequisite: one of course 101G, 102G, 107G or equivalent. An introduction to the theory and use of statistical and econometric methods with special emphasis on practical applications of the theory. Mr. McCullough (F, W)
recent advances in managerial and behavioral account-
ing, the influence of research on public policy. Com-
petition theory and allocation of resources. Mr. Merg.

223B: Mr. Pennan (W), 223C: Mr. Crichfield (Sp)

224. Advanced Managerial Accounting. (4) Three
hours of lecture per week. Prerequisite: course 121G
and 209 or equivalent. This course provides an over-
view and application of the basic principles of man-
agerial accounting and emphasizes their application
to the decision-making processes of business firms.
Topics covered include cost behavior, forecasting,
management decisions, and the use of computer
systems. Mr. Wheeler (W, Sp)

225. Selected Topics In Managerial Accounting.
(4) Three hours of lecture per week. Prerequisite: 121G
and 209 or equivalent. The emphasis of this course
is to provide a survey of the major topics in the
field of managerial accounting. Topics covered may
depend on the interests of the instructor. Mr. Merg.

226. Seminar In Auditing. (4) Two 1 1/2-hour lec-
ture-per-week meetings. Prerequisite: consent of in-
tuctor. Advanced study of the auditing function; de-
velopment of auditing standards; application of statistical
methods to auditing; and income tax auditing. Mr. Pyle.

227. Control Aspects of Information Systems. (4)
Three hours of lecture per week. Prerequisite: 126 and
127. Seminar in current professional problems and
emerging issues concerning financial systems; includ-
ing auditing and other control aspects of these sys-
tems. Mr. Boustis (Sp)

228. Advanced Topics In Income Taxation. (4)
Two 1 1/2-hour meetings per week. Prerequisite: 129.
This course provides a review of state and local tax law
and related topics as determined by the instructor.
Mr. Smith (W)

(4) Three hours of lecture per week. Prerequisite: con-
tent of instructor. Advanced study of the planning
function; decision-making operations in the context
of strategic planning; and implementation of flexible
control systems. Mr. Pyle (F, W, Sp)

230. Theory of Finance. (4) Three hours of lecture
and one and one-half hours of discussion per week.
Prerequisite: courses 130G and 209 or equivalent.
This course examines the behavior and interactions of
multi-national firms and financial institutions. Mr. Hakansson, Mr. Pyle (W, Sp)

231. Corporate Financial Management. (4) Three
hours of lecture per week. Prerequisite: course 230.
This course focuses on financial decisions concerning
the acquisition and utilization of plant assets, the
management of working capital, and the determination
of the capital structure of the firm. Mr. Downes, Mr.
Rubinstein, Mr. Leland (F, W, Sp)

232. Money Markets and Financial Institutions. (4)
Three hours of lecture per week. Prerequisite: courses
130G and 209 or equivalent. This course examines
the behavior and interactions of financial interme-
tiaries. Organization and functions of money markets
and financial systems; the valuation of financial
assets and the influence of financial intermediaries
and monetary policy. Mr. Pyle, Mr. J. Skelton, Mr.
Barnett (F, W, Sp)

(4) Three hours of lecture per week. Prerequisite:
course 230. Structure and operation of securities mar-
ket. Analysis of investment opportunities in the
business cycle, and money market developments. Conside-
ration of individual and institutional investment policies
and principles of security analysis. Mr. Hoag, Mr.
Rubinstein, Mr. Logue (W, Sp)

234. Advanced Topics In Business Finance. (4)
Three hours of lecture per week. Prerequisite: course
231. Normative models of financial decisions by busi-
ness firms, financial regulation and the business firm,
and empirical studies in business finance. Mr. Downes

235. Advanced Topics In Financial Institutions.
(4) Three hours of lecture per week. Prerequisite: 232.
This course provides an in-depth examination of the
operations of financial institutions and the interac-
tion of financial markets. Topics to be covered will vary.
Mr. Pyle (Sp)

236. Advanced Topics In Securities Markets and
Investment. (4) Three hours of lecture per week. Prere-
quity: course 232. Normative models for investment
management, valuation of securities, behavior of stock
prices, and empirical studies on securities prices and
portfolio behavior. Topics covered will vary.
Mr. Rosenhain, Mr. Hoag (F, Sp)

238A-238B-238C. Doctoral Seminar In Finance. (4-
4-4) Three hours of lecture, two one-hour dis-

**239 Seminar In Insurance. (4) Three hours of
meetings per week.

Four hours of lecture per week. Prerequisite: course
145A or 145B or equivalent. This course examines
and application to production management areas of
process selection, output determination, facilities
development, production planning, and control.
While emphasis is placed upon analysis of determinis-
tic linear systems, approaches for less restricted cases
are also covered. Mr. Downes (F, W, Sp)

242. Facilities Planning and Production Control.
(4) Formerly 241. Four hours of lecture per week.
Prerequisite: course 145A or 145B or 146A or equi-
ol. Design of product and process layout, inventory
system, systems, line-balancing, waiting line
applications to production programs, and aspects of
control. Mr. Downes (F, W, Sp)

243. Analysis for Production Management. (4) Two
hour sessions per week. Prerequisite: consent of in-
tuctor. Students are expected to have some dem-
strated competence in mathematical and statistical
analysis. Examination of the various quantitative
methods of quantitative analysis employed in produc-
tion management decision making. Probabilistic mod-
els and traditional methods are developed for designing
inventory systems, executing "statistical" quality con-
trol plans, choosing among equipment alternatives, or
in production management. Selected topics from pro-
eduction theory. Mr. Grinold (F)

244. Applied Probability Models In Management.
(4) Three hours of lecture per week. Prerequisite:
course 246A. Models for decision making in an uncer-
tain environment with special attention to the interac-
tion of time, uncertainty, and risk. Application to capacity expansion with uncertain de-
mand, investment-consumption decisions, stock op-
ening pricing, and exploration for natural resources.
Mr. Grinold (W)

248A. Quantitative Planning Models. (4) Three
hours of lecture per week. Prerequisite: courses
107G, 108G, and 109G or equivalent. This course
focuses on the use of linear programming techniques and
related topics as determined by the instructor.
Lectures will discuss subject areas related to the
field problems being considered and will also include
student presentations.

(4) Three hours of lecture per week. Prerequisite:
course 246A. Models for decision making in an uncer-
tain environment with special attention to the interac-
tion of time, uncertainty, and risk. Application to capacity expansion with uncertain de-
mand, investment-consumption decisions, stock op-
ening pricing, and exploration for natural resources.
Mr. Grinold (W)
current production problems. Integration of production planning within the overall objectives of the firm; problems of formulating and executing production policy and decision-making.

249. Philosophy of Systems Science. (4) Four hours of lecture per week. This seminar is on the concept of social systems improvement by means of in- dividual and team processes, operations research, etc. An emphasis is placed on the basic philosophical issues involved in the evaluation of system performance.

253. Labor-Management Relations in the Public and Non-Profit Sectors. (4) Three hours of lecture per week. Analyzes issues created by the expansion of collective bargaining in public and non-profit sectors. Examples: selection of bargaining agents, representation units, bargaining topics and procedures and conflict resolution. Approach is comparative in terms of current production problems. Integration of production topics in collective bargaining in public and non-profit sectors.

254. Philosophy of Systems Science. (4) Four hours of lecture per week. Mr. Churchman (F, Sp).

255. Seminar in Manpower Economics and Labor Markets. (4) Three hours of lecture per week. Dynamics of the labor force, manpower policies, employment discrimination, and unemployment. Analyses of wage and salary administration and labor market behavior of occupational groups: production and clerical workers, managerial and professional workers. Problems of wage and salary policies of the firm, union and national economy.

Mr. Garbarino (Sp)

256. Seminar in Collective Bargaining. (4) Three hours of lecture per week. Prerequisite: course 154 or consent of instructor. Studies of the bargaining process. Emphasis on collective bargaining and interpretation of collective agreements, including contract negotiation and arbitration of grievances; processes of disputes settlement; comparative international systems.

Mr. Garbarino (W)

257. Human Behavior in Organizations. (4) Three hours of lecture per week. Prerequisite: course 150 or equivalent or consent of instructor. A consideration of the various ways in which environmental and technological factors impinge upon the structure and management of organizations. Subjects include: individual, group, organizational growth, structure, control systems, professionalism, and reactions to change and uncertainty.

Mr. J. Freeman (F)

258. Technology, Organization, and Environment. (4) Three hours of lecture per week. Prerequisite: course 150G or equivalent or consent of instructor. A consideration of the various ways in which environmental and technological factors affect the individual and collective behavior of organizations; application of behavioral science to decision-making; product-market behavior; property rights and valuation; residential and non-residential markets; construction; debt and equity financing; public controls and policies.

Mr. Myers (Sp), Mr. Bob, Mr. Roberts (Sp), Mr. Orton (Sp)

259. Special Topics in Organizational Behavior. (4) Three hours of lecture per week. Prerequisite: course 150G or equivalent or consent of instructor. Analysis of recent literature and developments related to personality, motivation, stress, decision-making, leadership, behavior in role, behavior on teams, professionalism, and reactions to change and uncertainty.

Mr. J. Freeman (F, W)

260. Consumer Behavior. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Examines concepts and theories from behavioral science useful for the understanding and prediction of market place behavior and decision-making. Emphasis on applications to the development of marketing policy planning and strategy and to various decision areas within marketing.

Mr. Malm (F, W)

261. Marketing Management and Strategy. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Focus is on the study of marketing case problems in a variety of industrial and commercial environments and on assessment of their marketing strategies and practices. Case perspectives range over all parts of the marketing process: product, sales, distribution, advertising, sales promotion; personnel management; operating policies; cultural studies of management and organizations.

Mr. Malm (F, W)

262. Retailing Policies and Problems. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Analysis of the role of retailing as a marketing function 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.

Mr. Bucklin (F)

263. Advertising Management. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent; course 260 is recommended. A specialized course in advertising focusing on management and decision-making. Topics include objective-setting, copy decisions, media decisions, budgeting, and execution of advertising programs; research and planning methods appropriate to these decision areas. Other topics include social/economic issues of advertising, advertising and non-profit organizations.

Mr. Myers (Sp)

264. Industrial Marketing Behavior. (4) Three hours of lecture per week. Prerequisite: course 160G or the permission of the instructor. An examination of the environment of an industrial firm and its interdependence with the firm’s marketing decisions. Models of organizational decision-making and decision processes; behavioral characteristics of industrial procurement and selling processes. Applications of basic disciplines (economics/social psychology) and their specific methods.

Mr. Nicosia (Sp)

265. Marketing Organization. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Problems of marketing organization: the integration of marketing at the wholesale and retail levels and of the marketing channel; spatial aspects of marketing at each level and throughout the channel; specialization and integration in marketing problems; development of marketing organization; problems of "orderly" marketing.

Mr. Balston (Sp)

266. Marketing Research. (4) Three hours of lecture and one hour and one-half hours of discussion per week. Prerequisite: courses 160G and 160B. Nature and significance of marketing research methods; investigation and analysis of specific marketing research problems, including class research problems; presentation and research report; evaluation of the effectiveness of marketing research.

Mr. Wilton (F, W)

267. Seminar in Marketing. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent or consent of instructor. An intensive review of literature in the theory and practice of marketing. Emphasis on development of research methods; marketing problems unique to international operations, the marketing decision function; the marketing research function; the marketing development function; the marketing planning function; the marketing control function.

Mr. Myers (Sp), Mr. Aaker (F, W, Sp)

268. Real Estate and Urban Land Economics. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Intensive review of literature in the theory and practice of real estate and urban land economics; market analysis; land and building behavior; property rights and valuation; residential and non-residential markets; construction; debt and equity financing; public controls and policies.

Mr. Myers, Mr. Holton, Mr. Aaker (F, W, Sp)

269. Real Estate and Urban Land Economics. (4) Three hours of lecture per week. Mr. Rosen (W)

270. Seminar in Urban Economic Resource Policy. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Special topics in housing and land use. Determinants of land use policies and urban development; the urban economy; the interaction of business institutions and public agencies in the performance of urban functions; determinants of land-use policies; environmental impacts; economic aspects of property rights; unmet housing needs.

Mr. Wendt (F)

271. Seminar in Real Estate Investment Analysis. (4) Three hours of lecture per week. Prerequisite: consent of the instructor. Analysis of selected problems and special studies; cases in residential and non-residential development and financing, urban redevelopment, real estate taxation, mortgage market developments, equity investment, valuation, and zoning.

Mr. Rosen (W)

272. Applied International Economics. (4) Three hours of lecture per week. Prerequisite: courses 101G and 102G or equivalent. Analysis and review of international and comparative economic theory, the effectiveness of economic policies in developed and developing nations, and the role of international economic theory applied to highly topical subjects in the international economy; the interaction of business institutions and public agencies in the functioning of urban functions; determinants of land-use policies; environmental impacts; economic aspects of property rights; unmet housing needs.

Mr. Wendt (F)

273. Applied International Economics. (4) Three hours of lecture per week. Prerequisite: courses 101G and 102G or equivalent. Analysis and review of international and comparative economic theory, the effectiveness of economic policies in developed and developing nations, and the role of international economic theory applied to highly topical subjects in the international economy; the interaction of business institutions and public agencies in the functioning of urban functions; determinants of land-use policies; environmental impacts; economic aspects of property rights; unmet housing needs.

Mr. Wendt (F)

274. Applied International Economics. (4) Three hours of lecture per week. Prerequisite: course 260 or consent of instructor. A summary of management problems unique to international operations including organization, accounting, tax planning, financial management, and especially marketing, supplemented with cases.

Mr. Holton (W, Sp)

*286M. International Business Management. (4) Three hours of lecture per week. Prerequisite: completion of all master's level courses bearing "G" suffix. Students planning to take or have taken BA 285, BA 286 and/or BA 287. A comparison of management problems unique to international business, including the study of international trade theory, the analysis of international issues, and the study of foreign investment, organization, financial management and especially marketing, supplemented with cases.

287. International Financial Management. (4) Three hours of lecture per week. Prerequisite: courses 130G and 285 or their equivalents. The financial problems facing an international-oriented corporation. The firm's role in the global economy, foreign exchange markets, international sources of funds, foreign stock markets, direct foreign investment, capital structure, multinational financial management, accounting for multinational business, international taxation, and foreign equity ownership.

Mr. Eneig, Mr. Babbel (W, Sp)

288. Seminar in International Business. (4) Three hours of lecture per week. Prerequisite: course 286 or consent of the instructor. Seminar techniques will be applied to international business field. The subject of the seminar generally varies from quarter to quarter. May be repeated with consent of instructor. (F, Sp)

289. Organization and Decision. (4) Four hours of lecture per week. Prerequisite: primarily for students at the master's level. Problems in the design of organization based on rational individual behavior; individual behavior under uncertainty. Games and the study of conflict in organizations. Relevance of experimental organization and design concepts.

Mr. Balston (Sp), Mr. Marschak (W)

290. Experimental Courses. (4) Courses will vary from year to year and will be announced at the beginning of each quarter.

The Staff (F, W, Sp)

292A-292B-292C-292D. Integral Concepts in Marketing and Theory in Business Administration. (4-4-4-4-4)

293. Two two-hour meetings per week. Prerequisite: completion of all master's level courses bearing "G" suffix. Students who wish to take this course in fall term must be enrolled in a fall term course bearing "G" suffix.

Mr. Rusbey (W)

294. Two two-hour meetings per week. Prerequisite: completion of all master's level courses bearing "G" suffix. Students who wish to take this course in fall term must be enrolled in a fall term course bearing "G" suffix.

Mr. Rusbey (W)

295A-295B. Entrepreneurship and Business Development. (4) Prerequisite: successful completion of all master's level courses bearing "G" suffix. 295A prerequisite to 295B. Guest lecturers discuss various aspects of starting, operating and expanding the owner-managed business. Each student must complete a detailed business plan that will be submitted to outside reviewers.

The Staff (F, W)

**NOTE:** For key to symbols, see page 36.
prepares a business plan for a new company for which financing is sought. The integration of financial planning, marketing, accounting, and organizational problems requires the student to demonstrate competencies in each of these fields. Credit and grade awarded upon completion of full sequence. Mr. Holton, Mr. Hetzel (F, W)

294. Special Topics In Business Administration. (2-4) 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 quarter. The Staff (F, W, Sp)

295. Seminar In Business Administration. (2-4) 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 quarter. The Staff (F, W, Sp)

296. Individual Research In Business Problems. (1-6) The Staff (Mr. Bucklin, Mr. Rogers in charge) (F, W, Sp)

300. Professional Preparation For Teaching Assistants. (1-4) Special Study under the direction of a staff member with emphasis on the teaching of undergraduate courses in business administration. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Bucklin in charge) (F, W, Sp)

301. Individual Study For Master's Students. (1-6) Individual study for the comprehensive requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a master's degree, must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Rogers in charge) (F, W, Sp)

302. Individual Study For Doctoral Students. (1-6) By appointment only. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves or the various examinations required of candidates for the Ph.D. degree. May not be used to satisfy unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Rogers in charge) (F, W, Sp)

IDS 175. Introduction To The Ethics And Value Assumptions Of Planning And Systems Design. (4) See Interdepartmental Studies for the complete description of this course.

IDS 180. Economic And Biological Feedback Systems. (3) See Interdepartmental Studies for the complete description of the course.


IDS 209A-209B-209C. Economics Of Decision, Information, And Organization. (5-4-4) See Interdepartmental Studies for the complete description of this course.

IE 100. Cultural Traditions Of India. (1-4) See International Education for the complete description of this course.

IE 200. International Traditions Of India. (1-4) See International Education for the complete description of this course.

IE 400. Modernization In Contemporary India. (1-4) See International Education for the complete description of this course.

IE 497. Internship In India. (1-5) See International Education for the complete description of this course.

College of Chemistry

College of Chemistry Office, 420 Latimer Hall

The College of Chemistry comprises two departments, the Department of Chemistry and the Department of Chemical Engineering. The College offers programs leading to the B.S., M.S., and Ph.D. degrees in chemistry or chemical engineering. The College of Letters and Science offers a chemistry major leading to an A.B. degree through a curriculum with a greater proportion of courses in the humanities and social sciences than is included in the B.S. chemistry program.

Recommended high school preparation for Chemistry or Chemical Engineering should include: chemistry (1 year); physics (1 year); mathematics (4 years) including trigonometry, intermediate algebra, analytic geometry. Where the choice is available, the preferred foreign language is German.

For more specific description of the programs for the various degrees, as well as options of specialization, see the Announcement of the College of Chemistry.

Chemical Engineering

Office, 201 Gilman Hall

Professors:
Alexis T. Bell, Sc.D. 
Eugene E. Petersen, Ph.D.
Alwin S. Foss, Ph.D. 
John W. Prange, Ph.D.
Edward A. Grete, Ph.D. 
Michel Shem, Ph.D. (Vice Chairman)
Donald N. Hanson, Ph.D. 
Charles W. Tobias, Ph.D.
William C. King, Sc.D. 
Theodore Vermuelen, Ph.D.
Charles S. Lewis, Ph.D. 
Ralph E. Blue, M.S.
Harvey W. Blanch, Ph.D. 
H. Rogers (Vr)
Clayton J. Radke, Ph.D. 
Dennis W. Hess, Ph.D.
Douglas W. Fuenteas, Sc.D. 
Lecturers:
E. Morse Blue, M.S. 
Rolf H. Muller, Ph.D.
Herbert Klein, M.S. 
Artur F. Morgan, Jr., Ph.D.
Alton S. Michaels, Sc.D. 
J. Frank Valle-Restrie, M.S.
Arthur T. Morgan, Jr., Ph.D.

The College of Chemistry offers a major in chemical engineering leading to the B.S. degree. The program equips the student for professional work in development, design, and operation of chemical processes and of process equipment. Students with high scholastic attainment are well prepared to enter graduate programs. The curriculum is accredited by the Engineers Council for Professional Development.

Chemical Engineering Major

The requirements for the degree are: A total of 180 quarter units. Mathematics: 1A, 1B, 1C and one of 51A, 51B, 51C. Physics: 5A, 5B, 5C, 5D, 5E, Chemistry: 1A, 1B, 1C, 1D, 1E, 1F, 4A, 4B, 4C; 12A, 12B, 14, 110A, 110C, 111A, 111B, Chemical Engineering: 140, 141A, 142, 150, 151A, 151B, 152, 153, 160. Six additional units of elective courses in chemical engineering; 10 units of upper division advanced technical electives; 20 units of courses in the College of Engineering, approved by the student's adviser. Satisfactory of the American History and Institutions requirement; 27 units in the humanities and social sciences, chosen from a list provided by the College of Chemistry.

Interdisciplinary Options. Students can select their courses in the chemical engineering electives, the advanced technical electives, and many of the College of Engineering courses so as to explore scientific fields, or so that they supplement one another and provide an in-depth study of a single field and its relation to chemical engineering. The options now available are: (1) Science for the chemical engineer, applied physics, systems analysis and applied mathematics, materials constitution and conversion; polymers, energy, earth, ocean and atmospheric sciences, environmental balance, applied biology, and resources and processing, business organization and enterprise, and science education. Further information is available from the Department of Chemical Engineering.

Double Major Programs with the College of Engineering. In addition to the interdisciplinary options described above, two double major curricula involving the Colleges of Engineering and Chemistry are offered. These are: (1) Chemical Engineering/Materials Science Options, (2) Chemical Engineering/Nuclear Engineering. These curricula include the core courses in both departments and require the same number of units and length of time to complete as the single major programs. Details on these curricula can be found in the Announcements of the College of Chemistry and the College of Engineering.

Graduate Study

Students interested in graduate study are invited to write to the Department of Chemical Engineering for information.

Lower Division Course

40. Modern Chemical Technology. (3) Three hours of lecture per week. Prerequisite: Chemistry 1A. Application of chemical science and engineering to socially and economically significant problems. Case studies illustrate the roles of research, development, and production in the chemical professions. Suggested for freshmen and sophomores in the Colleges of Chemistry and Engineering as preparation for others interested in exploring chemical technology. Mr. Foss, Mr. Williams (W)

Upper Division Courses

Stated prerequisites for each course indicate the desirable background level. Students majoring in other engineering or physical science fields should consult the instructor to determine whether they have acquired sufficient preparation.

**100. Introduction To Chemical Process Technology.** (4) Four 1-hour class meetings per week. Prerequisite: upper division standing in Bacteriology, Biological Chemistry, Engineering, Mathematics 2A, Physics 2A, or consent of instructor. Not open for credit to students who have credit in courses 152, 153, or equivalents. Principles of fluid flow, heat transfer and diffusion transport and their application in important natural phenomena and in the processing and purification of materials. Illustrative topics will include selected problems in applied biology, biomedicine, engineering, food processing, and environmental control.

140. Elements Of Chemical Process Analysis. (4) Four 1-hour class meetings per week. Prerequisite: Chemistry 14 (or consent of instructor), and prior elementary knowledge of Fourier programing or concurrent enrollment in Computer Science 11. Analysis and interpretation of chemical and energy balances on batch systems, and on flow systems in steady or unsteady state. Thermodynamic properties of mixtures, liquids, and solids, including mixtures, useful for calculations applying to the chemical process industries. Sources of data; use of tables and graphs; iteration methods. Mr. LV (F), Mr. Williams (W), Mr. Grens (Sp)

141A. Chemical Engineering Thermodynamics. (4) Four 1-hour class meetings per week. Prerequisite: a knowledge of Fourier programing or concurrent enrollment in Computer Science 11. Thermodynamic behavior of pure substances. Flow systems, power cycles, refrigeration, gas liquefaction. Properties of solutions, computer solution of chemical and equilibria for homogeneous and heterogeneous systems. Mr. Hess (F), Mr. Vermuelen (W), Mr. Petersen (Sp)

141B. Chemical Engineering Thermodynamics. (3) Three 1-hour class meetings per week. Prerequisite: course 141A. Process-oriented, advanced-level problems in selected topics, such as phase equilibrium, chemical equilibria, interfacial phenomena, electrolytes, and polymers. Mr. Shn (W)

142. Chemical Kinetics of Industrial Processes. (3) Three 1-hour class meetings per week. Prerequisite: course 142 or equivalent introduction to kinetics. Physical and chemical characterization of catalysts; catalytic kinetics; analysis of reaction systems; reactor design. Laboratory experiments in catalytic activation, combustion, chemical equilibria, and reactor performance. Mr. Bell, Mr. Petersen, Mr. Vermuelen (Sp)

143. Chemical Reactor Design and Catalysis. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 142 or equivalent introduction to kinetics. Physical and chemical characterization of catalysts; catalytic kinetics; analysis of reaction systems; reactor design. Laboratory experiments in catalytic activation, combustion, chemical equilibria, and reactor performance. Mr. Bell, Mr. Petersen, Mr. Vermuelen (Sp)

146. Principles of Electrochemical Processes. (3) Three 1-hour lectures per week. Prerequisites: Chemistry 141A and either 150 or 100, or senior standing in physical science or engineering. Principles and application of electrochemical equilibria, kinetics, and transport processes. Technical electronics and electrochemical energy conversion. Mr. Tobias (F)
150. Fluid Flow and Heat Transfer Processes. (4) Four 1-hour class meetings per week. Prerequisite: Mathematics 5IC is recommended. Principles of fluid mechanics and heat transfer with applications to chemical engineering problems. Mr. Williams (F), Mr. Radke (W), Mr. Johnson (Sp)

151A–151B. Chemical Engineering Laboratory. (4-6) Two 4-hour laboratories per week. Sequence beginning each quarter.

151A. Emphasis on basic relationships in heat, mass and momentum transfer in equilibrium and nonequilibrium systems, and interactions of these processes. Experimental study and analysis of results, and preparation of written reports are stressed. Mr. Hanson (F); Mr. Lynn (W); Mr. Lyon (Sp)

151B. Prerequisite: course 153. Experiments in mass transfer, simultaneous heat and mass transfer, vaporization and condensation, and separation by distillation. Mr. Hanson (F); Mr. Lynn (W); Mr. Lyon (Sp)

152. Separation Processes. (3) Three 1-hour class meetings per week. Prerequisite: course 14 A (which may be taken concurrently). Principles of equilibrium and nonequilibrium processes. Mixtures of homogenous species. Design of stage separation processes including distillation, absorption, extraction, and crystallization.

153. Mass Transfer Processes. (4) Four 1-hour class meetings per week. Prerequisite: course 150 with a grade of C— or higher. Students with consent of instructor. Principles of mass transfer of a phase occurs when mass transfer and/or change of phase. Simulation and study of phase change. Mr. Grens (F), Mr. Wilke, Mr. Blanch (Sp)

155. Particulate Systems. (3) Three 1-hour lectures per week. Prerequisite: course 150 or knowledge of elementary fluid mechanics. Production and separation of particulates; including force and flow; dust and mist collection, sedimentation, crystallization, and coagulation processes.

156. Transport Phenomena. (3) Three 1-hour lectures per week. Prerequisite: course 153 or senior standing in physical science or engineering. The differential equations of momentum, energy, and mass conservation for laminar and turbulent flow and to interphase transfer. Mr. Williams (Sp)

157. Polymer Science and Technology. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: Materials Science and Engineering 130 or graduate standing. Chemical polymerization, processing technology, and applications. Emphasis on polymerization, characterization, and mechanical properties. Mr. Williams, Mr. Shen (W)

159. Process Technology of Solid-State Materials and Chemical Engineering. (3) Three 1-hour class meetings per week. Prerequisite: course 150 or senior standing in physical science or engineering. One course in organic chemistry. Introduction to the physical and chemical behavior of organic polymers. Properties of solutions, melts, glasses, elastomers, and ceramics. Electrochemistry, polymerization, processing technology, and applications. Mr. Foss (F), Mr. Blue (W); Mr. Quady (Sp)

160. Chemical Process Design. (4) Four 1-hour class meetings per week. Prerequisite: course 153. Design principles for chemical processing equipment. Design of integrated chemical processes with emphasis on economic factors. Mr. Blue (W); Mr. Quady (Sp)

162. Dynamics and Control of Chemical Processes. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: Mechanical Engineering 130 or graduate standing. Chemical engineering courses. Fluids, heat, mass, and mechanical energy. Fluid flow in pipes and heat transfer processes. Mr. Foss (F)

165. Selection and Evaluation of Chemical Processes. (3) Three 1-hour lectures per week. Prerequisite: course 152. Development and discussion of a series of realistic cases involving the engineering of chemical processes. Specific topics include process control and process and product elements. Identification and evaluation of process modifications and alternatives. Mr. Tobias, Mr. Lynn (Sp)

170. Introduction to Biochemical Engineering. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 153, which may be taken concurrently, or 100. A review of special methods and theory useful in the design and operation of processes in the biochemical industries with particular emphasis on fermentation systems. Laboratory techniques for batch and continuous culture. Mr. Wilke (F)

192. Individual Study for Advanced Undergraduates. (2–5) Prerequisite: a written proposal like that required for course 191. Independent study on theoretical or computational problems. The Staff (Mr. King in charge) (F, W, Sp)

194. Research for Advanced Undergraduates. (3–5) Prerequisite: a written proposal like that required for course 191, as described on page 36. Students with honors standing may carry out original work under the direction of one of the members of the staff. The Staff (Mr. King in charge) (F, W, Sp)

195. Special Topics. (2–4) Two to four 1-hour lectures or tutorial sessions per week. Prerequisite: consent of instructor. Lectures and/or tutorial instruction on special topics. Mr. Lyon (W), Mr. Prusnitz (Sp)

196. Special Laboratory Study. (2–5) Prerequisite: senior standing and a written proposal like that required for course 191, as described on page 36. Special laboratory work for advanced students. The Staff (Mr. King in charge) (F, W, Sp)

198. Independent Study and Research. (2–6) Enrollment is restricted to students who have a grade of C— or better in courses 150 and 151. Enrolled students must be registered in specific courses or in the *M55. Particulate Systems. (3) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 150 or consent of instructor. Principles of mass transfer of a phase occurs when mass transfer and/or change of phase. Simulation and study of phase change. Mr. Grens (F), Mr. Wilke, Mr. Blanch (Sp)

199. Supervised Independent Study and Research. (2–6) Enrollment is restricted to students who have a grade of C— or better in courses 150 and 151. Enrolled students must be registered in specific courses or in the *M55. Particulate Systems. (3) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 150 or consent of instructor. Principles of mass transfer of a phase occurs when mass transfer and/or change of phase. Simulation and study of phase change. Mr. Grens (F), Mr. Wilke, Mr. Blanch (Sp)

200. Phase Equilibria. (3) Three 1-hour lectures per week. Prerequisite: graduate standing. Molecular thermodynamics of multicomponent systems with applications to separation operations. Equilibrium properties of pure and mixed fluids. Mr. Prusnitz (F)

201. Applications of Statistical Mechanics. (2) Two 1-hour lectures per week. Prerequisite: course 240 and consent of instructor. Principles of statistical mechanics with emphasis on configurational properties of real fluids. Application of statistical mechanics to problems in solid state, liquid, and gaseous phases. Mr. King (F)

204. Cryogenic Engineering. (3) Three 1-hour lectures per week. Prerequisite: course 141A and 150 or equivalent. Low-temperature refrigeration principles and applications; gas purification, liquefaction and separation; magnetic, and desalination. Mr. Radke (F)

205. Reactor Chemistry. (3) Three 1-hour lectures per week. Prerequisite: course 244 or Chemistry 219A, or consent of instructor. Adsortion and kinetics of surface reactions, chemical reaction rates, and product yields, poisoning, selectivity and empirical activity patterns in catalysis; surface chemistry, catalytic mechanisms, heterogeneous catalysis, computer simulation of reaction research; descriptive examples of industrial catalytic systems. Mr. Bell (Sp)

206. Principles of Electrochemical Engineering. (3) Three 1-hour lectures per week. Prerequisite: graduate standing or consent of instructor. Electrode processes in electrolytic and fuel cells; chemical charge and mass transfer in ionic media. Critical scope of scale-up. Mr. Newman (F)

247. Chemical Reaction Analysis. (3) Three 1-hour lectures per week. Prerequisite: courses 230 or consent of instructor. Principles of chemical kinetic processes and rate processes of how they interact to govern the apparent behavior of chemical processes. Particles, adsorption, surface reac-

248. Applied Surface and Colloid Chemistry. (3) Three 1-hour lectures per week. Prerequisite: senior standing or consent of instructor. Principles of surface and colloid chemistry with current applications: surface chemistry, colloids, wetting, emulsions, dispersion systems, association colloids, interacting electrical double layers and colloid stability, kinetics of emulsions, and electrolytes. Mr. Hanson (F), Mr. Wilke, Mr. Blanch (Sp)

249. Biochemical Engineering. (3) Three 1-hour lectures per week. Prerequisite: Bacteriology 102: Chemistry 110B, 112E; course 153, or consent of instructor. Application of chemical engineering principles to the processing of biological and biochemical materials. Design of systems for cultivation of microbial organisms and for the separation and purification of biological products.

250. Mass Transfer. (3) Three 1-hour lectures per week. Prerequisite: graduate standing or consent of instructor. Special emphasis on chemical engineering applications. Detailed investigation of laminar flows. Mr. Newman (W)

252. Adsorption Separations in Particulate Systems. (3) Three 1-hour lectures per week. Prerequisite: course 250 (may be taken concurrently), or 153 with honors standing; Mathematics 51C or course 230, or equivalent. Introduction to equilibrium and nonequilibrium adsorption, partition adsorption and extraction, and regenerative heat transfer. Fixed-bed performance, axial dispersion; semicontinuous and discontinuous agitated systems, membrane processes, fluidized beds.

256. Advanced Transport Phenomena. (3) Three 1-hour lectures per week. Prerequisite: course 230. Formulation and rigorous analysis of the laws governing the transport of momentum, heat, and mass with emphasis on chemical engineering applications. Detailed investigation of laminar flows. Mr. Newman (W)

258. Chemical Technology of Polymers. (3) Three 1-hour lectures per week. Prerequisite: course 240 or equivalent. Application of linear and nonlinear mathematical programming to problems of optimum design and operation of chemical processes.

261. Process Simulation. (3) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: course 240 or equivalent. Application of digital computer programs of chemical processes operating in the steady state. Emphasis on decompositions of chemical process control. Practice in simulation of simple units and processes. Mr. Grens (W)

262. Chemical Process Dynamics. (3) Three 1-hour lectures per week. Prerequisite: course 230 or equivalent. Application of linear and nonlinear mathematical programming to problems of optimum design and operation of chemical processes.

263. Chemical Process Economics and Project Evaluation. (3) Three hours of lecture per week. Prerequisite: course 230 or equivalent. Emphasis on decompositions of chemical process control. Practice in simulation of simple units and processes. Mr. Grens (W)

265. Design and Engineering of Integrated Chemical
General Process Systems. (3) Two 1 1/2-hour lectures per week. Prerequisite: a comprehensive background in chemical engineering. Consideration of specific, renewal standards involving the synthesis, evaluation, selection and optimization of processing alternatives. Qualitative and quantitative studies. Criteria for engineering judgment and economic evaluation.

Mr. Lynn, T. Tobias (Sp)

295. Special Topics in Chemical Engineering. (1-4) Prerequisite: open to properly qualified graduate students. Current and advanced study of high school chemical engineering, primarily for advanced graduate students.

* 295A. Decay of Heterogeneous Catalyts. (2) Mr. Petersen


* 295C. Advanced Topics in Transport Phenomena. (2) Mr. Newman

295E. Special Topics in Energy Conversion. (2) Mr. Carnis (F)

295F. Topics in the Control of Chemical Processes. (2) Mr. Ross (W)

* 295G. Particulate Systems. (2) Mr. Goren

295H. Estimation of Physical Properties for Chemical Process Design. (2) Mr. Prassut (F, W, Sp)

* 295K. Food Processing Engineering. (3) Mr. King

295L. Molecular and Continuum Rheology. (3) Mr. Williams

295M. Optical Methods in Chemical Engineering Research. (2) Mr. Muller (F)

295N. Topics in Polymers. (2) Mr. Shon (Sp)

* 295P. Polymer Synthesis. (2) Mr. Michaels

* 295Q. Thin Film Technology. (2) Mr. Hess

* 295R. Energy Resources and Production. (2) Mr. Genn

295T. Chemical Reactor Engineering. (2) Mr. Vermeulen (W)

295U. Innovations in Food Production and Processing. (2) Mr. Morgan (W)

295W. Engineering Analysis of Microbial Processes. (2) Mr. Blackman (Sp)

* 295Y. Chemical Technology of Air Pollution Abatement. (2) Mr. Lynn

296. Special Study for Graduate Students In Chemical Engineering. (1-8) Prerequisite: consent of instructor. Special laboratory and theoretical studies. To be graded on a satisfactory/unsatisfactory basis.

The Staff (Mr. Chen in charge) (F, W, Sp)

298. Seminar in Chemical Engineering. (1) Prerequisite: consent of instructor. Special laboratory and theoretical studies. To be graded on a satisfactory/unsatisfactory basis.

The Staff (Mr. King in charge) (F, W, Sp)

299. Research In Chemical Engineering. (1-12) To be graded on a satisfactory/unsatisfactory basis.

The Staff (Mr. King in charge) (F, W, Sp)

300. Professional Preparation: Supervised Teaching of Chemical Engineering. (2) Prerequisite: graduate standing, appointment as a teaching assistant, or consent of instructor. Discussion, problem review and development, guidance of large scale laboratory experiments, course development, supervised practice teaching. To be graded on a satisfactory/unsatisfactory basis.

The Staff (Mr. Shen in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1-6) Individual study in consultation with the major field advisor for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

Mr. Lamp (in charge) (F, W, Sp)

Colloquium and Graduate Seminar. (No credit). Members of the instructing staff and graduate students Ph.D. May not be used for unit or residence requirements. Meet once a week to discuss investigations presented for qualified students to prepare themselves for development, guidance of large scale laboratory experiments, course development, supervised practice teaching, graded on a satisfactory/unsatisfactory basis. The Staff (Mr. Shen in charge) (F, W, Sp)

* 296A. Thin Film Technology. (2) Mr. Hess

* 296B. Energy Resources and Production. (2) Mr. Hess

* 296C. Energy Resources and Production. (2) Mr. Hess

* 296D. Energy Resources and Production. (2) Mr. Hess

* 296E. Energy Resources and Production. (2) Mr. Hess

* 296F. Energy Resources and Production. (2) Mr. Hess

* 296G. Energy Resources and Production. (2) Mr. Hess

* 296H. Energy Resources and Production. (2) Mr. Hess

* 296I. Energy Resources and Production. (2) Mr. Hess

* 296J. Energy Resources and Production. (2) Mr. Hess

* 296K. Energy Resources and Production. (2) Mr. Hess

* 296L. Energy Resources and Production. (2) Mr. Hess

* 296M. Energy Resources and Production. (2) Mr. Hess

* 296N. Energy Resources and Production. (2) Mr. Hess

* 296O. Energy Resources and Production. (2) Mr. Hess

* 296P. Energy Resources and Production. (2) Mr. Hess

* 296Q. Energy Resources and Production. (2) Mr. Hess

* 296R. Energy Resources and Production. (2) Mr. Hess

* 296S. Energy Resources and Production. (2) Mr. Hess

* 296T. Energy Resources and Production. (2) Mr. Hess

* 296U. Energy Resources and Production. (2) Mr. Hess

* 296V. Energy Resources and Production. (2) Mr. Hess

* 296W. Energy Resources and Production. (2) Mr. Hess

* 296X. Energy Resources and Production. (2) Mr. Hess

* 296Y. Energy Resources and Production. (2) Mr. Hess

* 296Z. Energy Resources and Production. (2) Mr. Hess

5. Quantitative Analysis, (4) Two 1 1/2-hour lectures and one 1/2-hour laboratory per week. Prerequisite: course 1C with grade of C— or higher. Acid-base, redox, complex formation equilibria and titrimetric methods in volumetric titrations. Principles and applications of coulometry, potentiometry, and polarography. Conceptual methods, measurement techniques. Selected topics in instrumental analysis.

(F, W, Sp)

8A—8B. Organic Chemistry, (4.5-4.5) Two 1 1/2-hour lectures and one 1 1/2-hour laboratory per week. Prerequisite: course 1A or 1B, plus grade of C— or higher. Primarily for students who desires additional study in organic chemistry. A study of the fundamental aspects of organic chemistry, with emphasis on materials of interest to students of the biological sciences. Students with credit in Chemistry 12A and 12B may not receive credit in the corresponding quarters of Chemistry 6: Two-quarter sequence beginning (F, Sp).

8A (F, Sp); 8B (W)

12A—12B—112. Organic Chemistry, (5-5-5) Two 1 1/2-hour lectures and one 1 1/2-hour laboratory per week. Prerequisite: course 1C or 4C, with grade of C— or higher. Primarily for students who desires additional study in organic chemistry. A study of the fundamental aspects of organic chemistry, including multiple step syntheses and the chemistry of polycyclic and heterocyclic compounds. Students with credit in course 8A and 8B may not receive duplicate credit in the corresponding quarters of Chemistry 12. Three-quarter sequence beginning (F, W, 1A; 12A (F, W); 112 (F, Sp)

14. Chemical Thermodynamics. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: course 1C or 4C. Mathematics: 1A, IB, 1C; 2A, 2B, 2C; 5A, 5B; introduction to chemical thermodynamics: Fundamentals, colligative properties, and chemical equilibrium.

(F, W, Sp)

40. Modern Chemical Technology. (3) See Chemical Engineering for the complete description of this course.

Upper Division Courses

104A—104B. Advanced Inorganic Chemistry, (3—3) Three 1-hour lectures per week. Prerequisite: course 14 (104A; nonmetallic); 104B (metallic) Two-quarter sequence beginning (F, W).

105. Advanced Quantitative Analysis. (5) Two 1-hour lectures and two 1 1/2-hour laboratories per week. Prerequisite: course 5 or 4C, 104A. (F, W)

107. Inorganic Synthesis. (5) Two 1-hour lectures and three 1-hour laboratory sessions per week. Prerequisite: course 5 or 4C, 104A. Kinetics, thermodynamics, and other studies of some inorganic reactions.

(5, W, Sp)

109A—109B. Biophysical Chemistry. (3, or 3, or 4) Four 1-hour lectures and one optional 1-hour discussion period per week. Prerequisite: course 1C or 4C, and at least one quarter course in calculus. Students with credit in course 14 may not receive credit for 109. Students with insecure backgrounds in mathematics, physics, or chemistry should enroll in the course for 4 units instead of 3. Those taking the course for 4 units will attend a 1-hour discussion class. Currently involves additional drill in problem solving and the applications of calculus in physical chemistry.
104A. Elementary chemical thermodynamics, including biologic and solids and ideal gases; solids, and chemical equilibria, active and passive transport. 

105B. Chemical kinetics, including enzyme reaction, molecular structure and interactions involved in biologic and molecular spectroscopy; biological macromolecules. 

Two-quarter sequence beginning (F, W) 

110A—111B. Physical Chemistry Laboratory. (3—3) One lecture and three 3-hour laboratory per week. Prerequisite: course 14, Physics 5E—110B—Three 1-hour lectures per week. Prerequisite: course 110A. 110C—Four 1-hour lectures per week. Prerequisite: course 110A. 110A: Quantum mechanics, atomic, periodic table, spectroscopy of simple molecules. To be followed by 110C or 110D—110B. Quantum mechanics and molecular structure. 

110C: Statistical mechanics, kinetics, complex chemical systems. Two or three-quarter sequence beginning (F, W, Sp). 

111A—111B. Physical Chemistry Laboratory. (3—3) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: course 14 with a grade of C— or higher. To be taken concurrently with 105B with consent of the instructor. Two-quarter sequence beginning (F, W). 111A (F, W), 111B (W, Sp). 


112E. Organic Chemistry, Lecture Only. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 12A with grade of C— or higher. The lecture part of course 112, intended for students in chemical engineering who wish to take organic chemistry in organic chemistry classes open to others with consent of the instructor. (F, Sp). 

112H. Organic Chemistry with Honors Laboratory. (5) Attendance at lectures in course 112 required; in addition to laboratory instruction and one 3-hour laboratory per week. Prerequisite: completion of course 12A, 12B with advanced standing, and consent of the organic chemistry laboratory experience. Advanced, multiple-step synthesis and spectroscopic and chromatographic techniques as preparation for research. 


(F, Sp). 

121. Molecular Structure and Molecular Spectroscopy. (3) Three 1-hour lectures per week. Prerequisite: course 110C. The interpretation of spectra of polyatomic molecules. The effect of molecular symmetry on spectra. Radio frequency, infrared, and microwave spectroscopy; molecular magnetic, quadrupole, electron spin, and microwave spectroscopy. (Sp). 

123. Nuclear Chemistry. (3) Two 1 1/2-hour lectures per week and one 3-hour laboratory per week. Prerequisite: course 110C and honors standing. A rigorous presentation of classical thermodynamics. Equilibrium involving real gases and real solutions. Application of tabulated thermodynamic data. Systems involving intensive variables besides pressure and temperature. (W). 

IDS 124. Chemical Methods in Nuclear Technology. (3) One and one-half hours lecture and one 4 1/2-hour laboratory per week. Prerequisite: Nuclear Engineering 102 or Chemistry 123. Experimental illustrations of the inter-relation between chemical and nuclear science and technology; fission process; chemistry of fission fragments; chemical effects of nuclear transmutation; applications of radioactivity in the study of chemical problems; neutron activation analysis. 

127. Physical Organic Chemistry. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 121 and 112C or consent of instructor. Application of regular orbital and resonance concepts to bonding, electronic properties, and the structure of organic compounds. Topics discussed include orbital symmetry reaction rules. A reading knowledge of German is recommended. 

128. Organic Chemistry—Structural Methods. (5) One 1-hour lecture and three 4-hour laboratories per week. Prerequisite: course 5 or 4C, 112; reading knowledge of German; consent or consent of instructor. Determination of organic structures by chemical and spectroscopic methods. (W); (Sp). 

129. Organic Chemistry—Synthetic Methods. (5) One 1-hour lecture and three 3-hour laboratories per week. Prerequisite: course 112, a reading knowledge of German, or consent of instructor; course 128 recommended. Advanced synthetic reactions and techniques, designed as a preparation for experimental research. (F). 

190. Individual Study for Advanced Undergraduates. (1—3) Prerequisite: consent of instructor and graduate standing. Students who wish to pursue a problem of their own choice, through reading or nonlaboratory study, may do so if their proposed project is acceptable to the member of the staff with whom they work. The Staff (Mr. Noyce in charge) (F, W, Sp). 

H194. Research for Advanced Undergraduates. (2—6) Prerequisite: consent of instructor and adviser. Students who have completed with high credit a satisfactory number of advanced courses in chemistry may undertake research under the direction of one of the members of the staff. The Staff (Mr. Noyce in charge) (F, W, Sp). 

195. Special Topics. (3) Three 1-hour lectures per week. Prerequisite: consent of instructor. Special topics will be offered from time to time. Examples: photochemical air pollution, computers in chemistry. 

The Staff (Mr. Noyce in charge) (F, W, Sp). 

196. Special Independent Study and Research. (1—5) Enrollment is restricted by regulations listed on page 13. Laboratory work may be undertaken. Must be taken on a passed/not passed basis. The Staff (Mr. Noyce in charge) (F, W, Sp). 

Teacher Training Course 

201. Undergraduate Chemistry Instruction. (2) One hour of lecture and 5 hours of laboratory per week. Prerequisite: sophomore standing, completion of Chemistry 1A—1B—1C with a grade of B- or better. Tutoring of students in Chemistry 1A—1B—1C. Students will attend a weekly meeting on tutoring methods at the Student Learning Center. A grade of C— or better. Must be taken on a passed/not passed basis. 

Graduate Courses 

204A—204B—204C. Advanced Topics in Inorganic Chemistry. (3—3—3) Three hours of lecture per week. Prerequisite: Chemistry 104A and B, Chemistry 110A and C, Chemistry 111A and B, or the equivalents of these courses. Current techniques and theory in inorganic chemistry including discussion of the structure, bonding, and reactions of inorganic compounds. Three quarter sequence beginning (F). 

206A—206B—206C. Organic Chemistry. (3—3—3) Two 1 1/2-hour lectures per week. Prerequisite: course 121. A course in organic reactions with 206A, or consent of instructor. The application to synthetic studies of current knowledge of reaction mechanisms, stereochemistry, and reaction scope. Emphasis is on typing of reactions according to mechanism. Three-quarter sequence beginning (F). 

207. Organic Chemistry. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 206C. The chemistry of heterocyclic compounds, with emphasis on those of natural origin. Must be taken on a satisfactory/unsatisfactory basis. (W). 

208. Organic Chemistry. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 206C. Kinetics and mechanism of organic reactions, mechanisms of rearrangements. Must be taken on a satisfactory/unsatisfactory basis. (F). 

209. Organic Chemistry. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 206C. The chemistry of polyvalent compounds of biological interest, with emphasis on terpenoids, steroids and related substances. Must be taken on a satisfactory/unsatisfactory basis. (W). 

210. Contemporary Organic Chemistry. (1) One hour of lecture per week. Prerequisite: graduate standing in Chemistry and instruction in the theory and practice of organic chemistry. Must be taken on a satisfactory/unsatisfactory basis. 

Graduate Courses 

219A—219B. Advanced Quantum Mechanics. (3—3) Three 1-hour lectures per week. Prerequisite: 219A, introduction to statistical mechanics, which may be taken concurrently. Two-quarter sequence beginning (W, Sp). 

221A—221B. Advanced Quantum Mechanics. (3—3) Three 1-hour lectures per week. Prerequisite: 219A, introduction to statistical mechanics, which may be taken concurrently. Two-quarter sequence beginning (W, Sp). 


228. Seminars for Graduate Students. (1—3) Besides the weekly Graduate Research Conference and weekly seminars on topics of interest in biophysical, physical, nuclear, and inorganic chemistry, there are group seminars on specific fields of research. Seminars will be announced at the beginning of each quarter. The Staff (F, W, Sp). 

229. Research for Graduate Students. (1—9) The facilities of the laboratory are available at all times to graduate students pursuing original investigations toward an advanced degree at this University. Such work is ordinarily in collaboration with a member of the staff. Credit is determined by the graduate adviser. 

School of Education 

School of Education Office, 1501 Tolman Hall 

Professors: 

Reginald L. Jones, Ph.D. 
Millicent W. K. Ed.D. 
Ronald J. Kates, Ph.D. 
Bill D. Reid, Ph.D. 
Nadine M. Lambert, Ph.D. 
David A. Beckman, Ph.D. 
Mark W. Loewen, Ph.D. 
Jerry L. Link, Ph.D. 
Larry H. Stewart, Ph.D. 
Lawrence H. Stewart, Ph.D. 
Lloyd F. Scott, Ph.D. 
Alan B. Wilson, Ph.D. 

NOTE: For key to symbols, see page 38.
100. Educational Psychology for Teachers. (3) One 2-hour lecture and one hour of discussion per week. Prerequisite: admission to a teaching credential program on a limited basis. Students will have a major interest in teaching, including child and adolescent development, educational psychology, and classroom management. All students will complete an immersion experience in classrooms. This course will be taught in various formats, including with a limited basis. Students will be required to complete a comprehensive examination at the end of the course.

115. The Exceptional Child Laboratory. (1-5) Three hours of laboratory per week. Must be taken concurrently with course 115L. Prerequisite: admission to a teaching credential program on a limited basis. Students will have a major interest in teaching, including child and adolescent development, educational psychology, and classroom management. All students will complete an immersion experience in classrooms. This course will be taught in various formats, including with a limited basis. Students will be required to complete a comprehensive examination at the end of the course.

116. The Exceptional Child. (2-2) One 2-hour lecture per week. Social stratification, economic and racial inequalities, and relationships between success and ability. Evidence on causal relationships between success and ability. A major paper and term project are required.

121. Stratification in Schools and Workplaces. (4) Four hours of lecture per week. Social stratification related to hierarchy of work roles. Schools as part of a stratification process which continues in workplaces. Correspondence between tracking in schools and segregation in labor markets. Evidence on causal relationships between success and ability. Prerequisite: admission to a teaching credential program on a limited basis. Students will have a major interest in teaching, including child and adolescent development, educational psychology, and classroom management. All students will complete an immersion experience in classrooms. This course will be taught in various formats, including with a limited basis. Students will be required to complete a comprehensive examination at the end of the course.

133C–133D. Foundations for Teaching in Secondary Schools. (1–2–1) One hour of lecture per week (F) or per quarter (W), plus fieldwork assignments in the public schools. Prerequisite: admission to a teaching credential program on a limited basis. Students will have a major interest in teaching, including child and adolescent development, educational psychology, and classroom management. All students will complete an immersion experience in classrooms. This course will be taught in various formats, including with a limited basis. Students will be required to complete a comprehensive examination at the end of the course.
vocabulary, comprehension, study skills in content fields, reading diagnosis and assessment, and associated field work. Credit and grade assigned upon completion of full sequence. The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

136. Teaching the Language Arts to Speakers of Nonstandard Dialects. (3) One 3-hour lecture and field work per week. An examination of instructional programs and materials in teaching the language arts to speakers of nonstandard dialects. The course focuses on the structure of nonstandard dialects, interference of these dialects with the teaching of the language arts, and teaching strategies to correct interference.

The Staff (F, W)

137A–137B–137C. Integrated Instruction in the Elementary School. (3–3–3) Four hours of lecture per week (W), and six hours (Sp) of lecture per week. Prerequisite: acceptance into the E.R.A. program (Education Research and Application) Seminar, workshops, to meet requirements for the multiple subject credential. Subject areas include educational psychology, reading, instructional materials and methods, learning processes, and elementary school subject areas. Credit and grade assigned upon completion of full sequence. Must be taken on a passed/not passed basis (undergraduates) or a satisfactory/unsatisfactory basis (graduates). The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (F, W, Sp)

137D–137E–137F. Integrated Instruction in the Secondary School. (3–4–5) Three hours (F), four hours (W), and six hours (Sp) of lecture per week. Prerequisite: acceptance into the E.R.A. program (Education Research and Application) Seminar, workshops, to meet requirements for the single subject credential. Subject areas include educational psychology and sociology, instructional strategies, learning processes, and secondary school subject areas. Credit and grade assigned upon completion of full sequence. Must be taken on a passed/not passed basis (undergraduates) or a satisfactory/unsatisfactory basis (graduates). The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (F, W, Sp)

138. Field Inquiry. (4) One 3-hour lecture per week. Topics: survey research methods, systematic observations, operationally defined classroom measures, simple measurement, interview technique, unobtrusive data collection. Mr. Miller (W, Sp)

139. Teaching in the Non-School Setting. (3) Formerly 191C. Three hours of lecture per week. Prerequisite: restricted to students teaching in the Lawrence Hall of Science programs or other non-school settings. A series of workshops specifically for instructors teaching in these settings. The workshops are combined with lectures and supplemented with practice. Course designed to develop skills to become effective teachers in non-school settings such as your community organizations and museums. Mr. Miller, Mr. Lowery (F)

140. Beginning Counselling. (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: consent of instructor. Introduction to the basic principles of human behavior, group counseling and consultation in schools. Emphasis on client behavior change. Mr. Rollers (F, W, Sp)

141. Introduction to Adult Education. (4) Three hours of lecture per week. A critical examination of the role and function of adult education in industrial and third world countries. A comparison of patterns of organization of formal and non-formal (adult) education will be considered. The focus of this course is enrollment limited to 15 students.

Mr. London (F, Sp)

142. Programs in Re-Education. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Junior standing. An analysis of society's efforts to conduct re-education programs in coercive settings from prisons to community based efforts.

Mr. Takagi (F, W)

**191A. Day Care and Child Development Services.** (2) Formerly IDS 232A. One 1 1/2-hour lecture per week. Prerequisite: consent of instructor. Education in day care and child development services as related to parental child rearing and to such other professions as nursing, nutrition, pediatrics, psychology and social work. To be offered 1979/80 only.

Ms. Atmy (F)

**191D. Delinquency and Delinquents.** (3) One 3-hour lecture per week. A review of definitions, measurement, intervention in public and private schools. Theories of youth delinquency and gangs, and programmatic efforts in control and prevention will be examined. To be offered 1979/80 only.

Mr. Takagi (F)

**191X. Uses of Higher Education: The Student Perspective.** (3) One 3-hour lecture/discussion per week. Prerequisite: upper division status or consent of instructor. The nature of American higher education and its historic and philosophic antecedents. Emphasis on student uses of educational systems. Issues to be examined: Fit between student and college; quality as related to diversity of institutions and students; curriculum and student needs. To be offered 1979/80 only.

Mr. Tillery (F)

192. Social Foundations of Education. (3) Two 1 1/2-hour lectures per week. A study of the historical and contemporary relations of education and society, of the roles of educators, of the theory of educational systems, from both liberal and critical perspectives of the social sciences. Mr. Leon (F); Mrs. Clifford, Mr. Wilson (Sp)

193. Psychological Foundations of Education. (3) Two 1 1/2-hour lectures per week. An examination of the relationship of the psychological disciplines to the conduct of educational programs. Mr. Jensen (F)

194. Philosophical and Humanistic Foundations of Education. (3) Two 1 1/2-hour lectures per week. A historic view of educational thought with emphasis on the epistemological, logical, and ethical foundations of the major philosophies of education. Mr. Jarrell (W); Mr. Borrowman (Sp)

195. Public Education and Public Policy. (5) Two 2-hour lectures per week. Contemporary and historical aspects of American public education. Structure and operations of contemporary public education. Controversial policy and governance issues concerning the conduct of educational programs. Mr. Jensen (F)

196. Minorities in the American Educational System. (3) One 3-hour lecture per week. Relationship of ethnic minorities to the American educational process from historical and contemporary perspectives. Attention given to the theoretical and methodological approaches used to study the education of these groups and the implications of these approaches.

Mr. Leon (W)

197. Field Studies. (1–5) Prerequisite: consent of instructor and undergraduate departmental adviser. University organized and supervised field programs in school and school-related activities. All programs must be approved by the 197 coordinator. Individual and/or group meetings with faculty sponsor and written report required. Maximum credit is 10 units; must be taken on a passed/not passed basis.

Mr. Stehr in charge (F, W, Sp)

199. Supervised Independent Study and Research for Undergraduates. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (F, W, Sp)

Graduate Courses

200. Prosomarian in Educational Psychology. (3) Three hours of lecture per week. Prerequisite: admission to graduate work in the field of Educational Psychology. Required of all first-year students. Lectures and discussions on their current research by members of the faculty. Students will be assigned a topic for each presentation; written reports required. Student papers will be examined on the basis of the understanding and generalizations to be made on a satisfactory/unsatisfactory basis.

Mr. Miller (F, W, Sp)


210A. Controversial issues regarding the field. Ms. Windmiller (F)

210B. Major theories of child development. The Staff (Sp)

210C. Psychology of instruction and survey of current trends in teaching reading, mathematics, science and social studies. Ms. Windmiller (W)


210D. Theories of consultation, related ethical and value dilemmas. Mrs. Lambert (F)

210E. Theories and procedures for the assessment of children's prerequisite skills for acquiring specific capabilities in reading and mathematics. Mr. Bower (W)

210F. Classroom management problems and exploration of parameters of school-based consultation contrasted with community-based consultation.

210L. Laboratory for School Psychology. (1) One hour of discussion and six hours of field work per week. Laboratory section to evaluate field work records. Must be taken concurrently with 210A–210B–210C and 210D–210E–210F.

Ms. Windmiller (F); Mrs. Lambert (W)

211A. Introduction to Theory and Research in Attitude Change. (3) Formerly 211. One 3-hour lecture per week and class discussion of current theory and research. Prerequisite: consent of instructor. Topics may vary.

Mr. Watts (W)

211B. Advanced Studies in Theory and Research Regarding Measurement and Change of Attitudes and Values. (3) Formerly 211B. One 3-hour lecture per week. Prerequisite: consent of instructor. Topics may vary.

Mr. Watts (W)

212. The Psychology of Reading Acquisition. (3) One 3-hour lecture and one 5-hour laboratory per week. An examination of research concerned with the psychological processes of reading acquisition. Particular emphasis will be placed on the development of prerequisites to reading acquisition, the optimal methods and materials for teaching reading skills, the transition from beginning to skilled reading, and reading comprehension. Mr. Simons (W)

**213A–213B. Standard Tests in Education 1 (1/2–1).** One 1 1/2-hour lecture and one 5-hour laboratory per week. Prerequisite: course 213A and consent of instructor. Topics of intelligence and the history and techniques of individual appraisal. Supervised practice in administration and scoring of contemporary tests of intelligence.

213C. Individual Appraisal. (4) One 3-hour lecture and one 5-hour laboratory per week. Prerequisite: course 213C and consent of instructor. Theories of intelligence and the history and techniques of individual appraisal. Supervised practice in administration and scoring of contemporary tests of intelligence.

213D. Individual Appraisal. (4) Three hours of lecture and five hours of laboratory per week. Prerequisite: course 213D and consent of instructor. Procedures for designing, implementing and scoring of individual appraisal. Supervised practice in administration and scoring of contemporary tests of intelligence, perception, adaptive behavior, and learning style.

Ms. Windmiller (Sp)

214. Human Development and Education. 214A. Play and Games in Human Learning. (3) Formerly 214D. One 2-hour lecture and one 2-hour laboratory per week. Prerequisite: consent of instructor. Multi-disciplinary examination of the modality of play and games in relation to human learning and development. Game developers and researchers in psychology and sociologists as contributors. Students will be required to spend a minimum of two hours a week observing children and adults at play.

Mr. Bower (W)

214B. Social and Emotional Development. (3) Three hours of lecture per week. Prerequisite: courses 193, 119A, 119B or equivalents. Mr. Watts (Sp)

214C. Mental Health—Individual and Group Process. (5) Twelve seminar hours per week. Prerequisite: consent of instructor.

Mr. Bower (F)

215. Advanced Topics on Exceptional Children. (3) Three hours of lecture per week. Prerequisite: consent of instructor. Topics will include problems in mainstreaming mildly handicapped children and the social psychological processes of education of exceptional children. Mr. Jones (Sp)

216. Educational Measurement. Prerequisite: courses 191A–119B and Statistics 130A or equivalent. The theory and principles of educational measurement and packaged computer programs for doing test analysis are examined.

NOTE: For key to symbols, see page 36.
graduate standing and consent of instructor. An examination of differing theoretical and methodological approaches to the construction of individual differences, with special reference to problems encountered in psychology and education. Mr. Hardisky (F).

**219B. Data Analysis for Educational Research—Practical Program Evaluation.** Prerequisite: courses 119A—119B and Statistics 130A or equivalents. Data analysis techniques and packaged computer programs widely used in educational research will be programmed and evaluated in detail. To be offered 1979/80 and 1980/1.

**219C. Data Analysis for Experimental Studies in Education.** Formerly 219A. Four hours of lecture per week. The data analysis techniques most widely used in non-experimental educational research are examined with emphasis on data where multiple measures are made on individuals. Offered in alternate years.

**219D. Data Analysis for Non-experimental Studies in Education.** Formerly 219A. Four hours of lecture per week. The data analysis techniques most widely used in non-experimental educational research are examined with emphasis on data where multiple measures are made on individuals. Offered in alternate years.

**220. Introduction to Philosophy of Education.** (Formerly 220A-220B). One 3-hour lecture per week. Philosophical analysis applied to current educational problems and key concepts.

221A. History of Educational Thought. (Formerly 221A-221B). One 3-hour lecture per week. The evolution of educational thought with respect to educational objectives, modes of human learning, and interactions between schools and other institutions. Primary emphasis will be given to American thought. Mr. Borrowman (F).

221B. History of American Education. (Formerly 221C). Four hours of lecture per week. Social and intellectual aspects of American education from the colonial period to the Civil War, with special emphasis upon adaptations of European school practices and their impact on American education. Mrs. Clifford (F).

221C. History of American Education. (Formerly 221D). Four hours of lecture per week. Social and intellectual aspects of American education from 1865 to the present, with emphasis upon reform movements and the evolution of the American university. Mr. Borrowman (W).

222. Anthropology of Education, (3) Three hours of lecture per week. An examination of the ways in which educational systems, events and issues in both western and non-western societies have been viewed from the perspective of cultural anthropology. Ms. Walker (Sp).

223A. Sociology of Education. (4) Two 1 1/2-hour lectures and 1 1/2-hour discussion per week. The organizational structure of schools, the processes of control and socialization within schools, and the functions of schools in society. Mr. Wilson (W).

223B. Sociological Theory and the Study of Education. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: Sociology 157 or equivalent. The interrelations between theoretical perspectives and the conduct and interpretation of educational research. Distinctions between and contributions of functionalism, conflict theory, evolutionary, structural interactionism and ethnomethodology as perspectives informing inquiry in education. Mr. Wilson (W).

224. Theories of the Self. (3) One 3-hour session per week. Experimental and psychosocial theories of the self from the perspective of human biology, the self, and their relations to education and development. Topics vary from quarter to quarter. (W) Existential and structuralist approaches to self from Kierkegaard, Heidegger, Scheler, Merleau-Ponty, and Ricoeur. (Sp) C. G. Jung, but with some attention to Tantric Buddhism. Mr. Jarrett (F, W).

225. Values and Education. 225A. Theory of Values and Moral Development. (4) One 3-hour lecture per week. The development of theory of value and the planning of instruction in a typology of values. Recent theories of moral education. Values implicit or explicit in teaching and counseling. Mr. Borrowman (W).

225B. Humanistic and Aesthetic Education. (4) One 3-hour lecture per week. The centrality of values in the humanities, in contrast with the natural sciences. Although some attention will be paid to philosophy and history, aesthetic values associated with literature and the arts will be emphasized. Mr. Borrowman (W, Sp).

226. Seminar in the History of Education—Selected Topics. (3) Three to four hours of seminar per week. In-depth study of one or more topics in the history of education, with emphasis upon original research by the student in independent study and shared discussions and critiques in the seminar sessions. Topic (Sp): The development of educational research in the United States: Status, functions, and impact. Mr. Borrowman (W, Sp).

227A. Education in Non-literate Societies. (3) Formerly 227C. Three hours of lecture per week. An examination of educational systems in societies in different parts of the world and emphasis on the relativistic nature of the relationships between education, culture, and social structure.

227B. Education in Developing Countries. (3) Formerly 227D. Three hours of lecture per week. The educational systems of several countries in Asia, Africa, and Latin America will be examined with the intent of understanding the problems and issues involved in creating effective education in the needs and aspirations of these developing nations. Ms. Walker (W).

228. Seminar in Sociology of Education—Selected Topics. (3) Three 3-hour seminar per week. Prerequisite: courses 192, 223A, or consent of instructor. Perspectives of contemporary sociology applied to selected topics in sociology and education. Mr. Borrowman (W).

229. Proseminar in the Sociology and Anthropology of Education: Substantive Issues, (3) Three hours of lecture per week. Prerequisite: enrollment in the Sociology and Anthropology of Education Program; other aspects may be taken with consent of instructor. An intensive examination of specific topics (e.g., the development of imagery processes; sociocultural perspectives informing inquiry in education). Mr. Borrowman (F).

230. Curriculum Development. One 3-hour session per week. Critical analyses of curriculum innovations. 230A. Reading. (3) Prerequisite: consent of instructor. Mr. Ruddell (F).

230B. Speaking, Listening, and Writing. (3) Prerequisite: consent of instructor. Mr. Marascuilo (W).

231A-D. Mathematics. (3) Prerequisite: consent of instructor. Mr. Marascuilo (W).

232A. Sociology of Education. (4) Four 1-hour classes. Prerequisite: Sociology 157 or equivalent. The interrelations between theoretical perspectives and the conduct and interpretation of educational research. Distinctions between and contributions of functionalism, conflict theory, evolutionary, structural interactionism and ethnomethodology as perspectives informing inquiry in education. Mr. Wilson (W).

232B. Sociological Theory and the Study of Education. (4) Four 2-hour classes and one 1-hour discussion per week. Prerequisite: Sociology 157 or equivalent. The interrelations between theoretical perspectives and the conduct and interpretation of educational research. Distinctions between and contributions of functionalism, conflict theory, evolutionary, structural interactionism and ethnomethodology as perspectives informing inquiry in education. Mr. Wilson (W).

233. Values and Education. 225A. Theory of Values and Moral Development. (4) One 3-hour lecture per week. The development of theory of value and the planning of instruction in a typology of values. Recent theories of moral education. Values implicit or explicit in teaching and counseling. Mr. Borrowman (W, Sp).

234. Theories of the Self. (3) One 3-hour session per week. Experimental and psychosocial theories of the self from the perspective of human biology, the self, and their relations to education and development. Topics vary from quarter to quarter. (W) Existential and structuralist approaches to self from Kierkegaard, Heidegger, Scheler, Merleau-Ponty, and Ricoeur. (Sp) C. G. Jung, but with some attention to Tantric Buddhism. Mr. Jarrett (F, W).

235A. Education in Non-literate Societies. (3) Formerly 227C. Three hours of lecture per week. An examination of educational systems in the perspective of cultural anthropology. Mr. Borrowman (W).

235B. Humanistic and Aesthetic Education. (4) One 3-hour lecture per week. The centrality of values in the humanities, in contrast with the natural sciences. Although some attention will be paid to philosophy and history, aesthetic values associated with literature and the arts will be emphasized. Mr. Borrowman (W, Sp).

236. Seminar in the History of Education—Selected Topics. (3) Three to four hours of seminar per week. In-depth study of one or more topics in the history of education, with emphasis upon original research by the student in independent study and shared discussions and critiques in the seminar sessions. Topic (Sp): The development of educational research in the United States: Status, functions, and impact. Mr. Borrowman (W, Sp).

237A. Education in Non-literate Societies. (3) Formerly 227C. Three hours of lecture per week. An examination of educational systems in the perspective of cultural anthropology. Mr. Borrowman (W).

237B. Education in Developing Countries. (3) Formerly 227D. Three hours of lecture per week. The educational systems of several countries in Asia, Africa, and Latin America will be examined with the intent of understanding the problems and issues involved in creating effective education in the needs and aspirations of these developing nations. Ms. Walker (W).

238. Seminar in Sociology of Education—Selected Topics. (3) Three 3-hour seminar per week. Prerequisite: courses 192, 223A, or consent of instructor. Perspectives of contemporary sociology applied to selected topics in sociology and education. Mr. Borrowman (W).

239. Proseminar in the Sociology and Anthropology of Education: Substantive Issues, (3) Three hours of lecture per week. Prerequisite: enrollment in the Sociology and Anthropology of Education Program; other aspects may be taken with consent of instructor. An intensive examination of specific topics (e.g., the development of imagery processes; sociocultural perspectives informing inquiry in education). Mr. Borrowman (F).

240A. Curriculum Development. One 3-hour session per week. Critical analyses of curriculum innovations. 240A. Reading. (3) Prerequisite: consent of instructor. Mr. Ruddell (F).

240B. Speaking, Listening, and Writing. (3) Prerequisite: consent of instructor. Mr. Marascuilo (W).

241A-D. Mathematics. (3) Prerequisite: consent of instructor. Mr. Marascuilo (W).

242A. Sociology of Education. (4) Four 1-hour classes. Prerequisite: Sociology 157 or equivalent. The interrelations between theoretical perspectives and the conduct and interpretation of educational research. Distinctions between and contributions of functionalism, conflict theory, evolutionary, structural interactionism and ethnomethodology as perspectives informing inquiry in education. Mr. Wilson (W).

242B. Sociological Theory and the Study of Education. (4) Four 2-hour classes and one 1-hour discussion per week. Prerequisite: Sociology 157 or equivalent. The interrelations between theoretical perspectives and the conduct and interpretation of educational research. Distinctions between and contributions of functionalism, conflict theory, evolutionary, structural interactionism and ethnomethodology as perspectives informing inquiry in education. Mr. Wilson (W).


244. Theories of the Self. (3) One 3-hour session per week. Experimental and psychosocial theories of the self from the perspective of human biology, the self, and their relations to education and development. Topics vary from quarter to quarter. (W) Existential and structuralist approaches to self from Kierkegaard, Heidegger, Scheler, Merleau-Ponty, and Ricoeur. (Sp) C. G. Jung, but with some attention to Tantric Buddhism. Mr. Jarrett (F, W).
231. Research in Curriculum and Instruction. One 3-hour session per week. Critical analyses of research in the area of curriculum and instruction. 

231A. Research in Reading. (3) An examination of selected topics on reading research including historical aspects of reading research, word recognition, models of the reading process, reading comprehension, the relationship between decoding and comprehension, and attitudes toward reading.

231B. Speaking, Listening and Writing. (3) Prerequisite: consent of instructor. Mr. Loban (W)

231C. Literature. (3) Prerequisite: consent of instructor. Mr. Loban (W)

231D. Mathematics. (3) Prerequisite: consent of instructor.

231E. Social Sciences. (3) Prerequisite: consent of instructor.

231F. Science. (3) Prerequisite: courses 119A and 119B, or equivalent, course 236F recommended, and consent of instructor. Mr. Miller (W)

231G. Instructional Foundations. (4) One 3-hour session per week. Instructional planning; approaches to instruction based on selected aspects of human learning; variables affecting instructional effectiveness.

231H. Current Issues in Curriculum and Instruction. (3) One 3-hour class session per week. Consideration and analysis of problems and issues in curriculum and instruction.

231I. Psycholinguistics and Reading-Language Instruction. (3) Prerequisite: course 281 and consent of instructor. Mrs. Fillmore (Sp)

231J. Reading and Language Measurement Instruments. (3) Formerly 236J. Prerequisite: consent of instructor. A survey and analysis of reading and language measurement instruments. Standardized readiness, decoding, and word recognition, comprehension, vocabulary, diagnostic tests and criterion referenced tests will be covered.

232. Early Childhood Programs. One 3-hour session per week. Prerequisite: previous course 232F recommended, and consent of instructor. Ms. Almy (Sp)

232A. Infant and Pre-school Programs. (3)

232B. Kindergarten and Early Primary Programs. (3) Ms. Almy (W)

232C. Selected Issues in Early Childhood Education. (3) Ms. Almy (Sp)

232D. Research in Early Childhood Education. (3) One 2-hour laboratory session per week. Prerequisite: consent of instructor. Examination of research related to a selected topic. Review of literature and methodology; data collection; interviewing; class discussions and case analyses.

233. Production of Mediated Programs. (5) Three hours of lecture and six hours of laboratory per week. An introduction to the production of mediated programs in television, radio, film, and other forms of electronic media. Emphasis will be on experimental techniques in instruction. Emphasis will be upon instructional strategies. Students will prepare simple instructional programs and use a computer to evaluate their effectiveness.

234A. Curriculum Planning: Bases for Curricular Decisions. (4) One 3-hour lecture per week. Prerequisite: graduate standing. Theories of learning and the cognitive and social factors that taxonomies in cognitive and affective domains; current structure of school curriculum; models and approaches to curriculum planning; problems associated with curriculum evaluation. Mr. Webster (F, Sp)

235B. Curriculum Planning: theories, Principles, and Practices of Instruction. (4) One 3-hour session per week. Prerequisite: consent of instructor. Course treats the following factors: theories of instruction, models of teaching, research paradigms, studies, and readings relating to teaching effectiveness. Students are required to observe and analyze the teaching act and to conduct micro-teaching exercises.

236. Advanced Studies in Elementary and Secondary Education. 

236A. Current Trends and Issues. (3) Formerly 236D. One 3-hour session per week. Prerequisite: consent of instructor. Examination of selected topics on research and trends in the public schools. Mr. Michaelis (F)

236B. Inter-Ethnic and Interpersonal Relations in Education. (4) Formerly 236H. One 3-hour lecture and one hour of field work per week. Study of the educational implications of the sub-cultures of non-Anglo minorities. Study of research regarding the etiology of prejudice and discrimination and elimination. Experiences in intercultural and interpersonal relations and field work are involved.

236C. Inservice Education—Reading and Language Development. (3) One 3-hour lecture per week. Prerequisite: consent of instructor. Emphasis on design, articulation and implementation of reading and language programs for primary grades through junior college. Dynamics of personal leadership to successful curricula implementation. Required for teachers and other students may enroll provided they have an appropriate professional placement.

240. Foundations of Student Personnel and Counseling. 

240A. Principles and Theories of Guidance. (3) One 3-hour session per week. Prerequisite: consent of instructor. Development and scope of guidance work as a profession, critical analysis of major philosophical bases, ethics, and professional responsibilities.

240B. Personality Theory and Human Development. (3) One 3-hour lecture and reading review per week. Comparison of selected personality theories basic to considering human development and effective counseling.

240C. Career Guidance. (3) One 3-hour session per week. Prerequisite: consent of instructor. Analysis of theories of and research on career development. Sources of information and interpretation of vocational data. Program applications.

240D. Appraisal in Counseling and Guidance. (3) Formerly 240E. One 2-hour lecture and one 2-hour laboratory per week. Prerequisite: consent of instructor. Theory and practice of psychological appraisal of counselees. Emphasis upon integration of appraisal and counseling. Sec. 1, Mr. Stewart (W); Sec. 2, Mr. Heist (Sp)

240E. Social and Cultural Factors in Counseling. (3) One 2-hour session per week. Course focuses on theory and research pertaining to the effect of social and cultural factors in counseling and psychotherapy. Examination of variables such as sex, ethnicity, age and social class as they affect the counseling process. Particular emphasis given to research that explores the complex interface of culture/society with individual characteristics of client and counselor.

245. Advanced Counseling. 

245A. Counseling Research and Practice. (4) One 2-hour lecture and one 3-hour laboratory per week. Prerequisite: course 145 or consent of instructor. Analysis of the research base for counseling practice and those skills associated with positive behavioral changes in counseling and educational settings based on the research literature. Mr. Rollers (F, Sp)

245B. Counseling Research and Theory. (4) One 3-hour lecture per week. Prerequisite: courses 145 and 145A, or consent of instructor. A variety of counseling theories through lectures, readings, demonstrations, and case analyses.

246. Organization and Administration of Student Personnel Programs. Two 3-hour sessions per week and reading review. An introduction to various student personnel and counseling programs and organizations. A comparison of selected organizational models and related administrative staff. Mr. Moorman (W)

248. Family Processes: Implications for Counseling and Education. (4) One 3-hour seminar per week. Investigation of family related research, development, decision-making, and classroom behavior will be studied through comparative and historical inquiries, large group discussions, small group discussions, and case analyses. A major paper is required.

249. Special Problems in Counseling Theory and Research. (3) Formerly 249. One 3-hour discussion per week. Prerequisite: consent of instructor. Designed to develop special areas of inter-disciplinary research and to analyze different problems of significance to counseling and student personnel. Topics vary from term to term. Elocution and field experience.

250. Education Policy Analysis. This series of courses introduces students to the major policy issues confronting contemporary American education and provides an opportunity to engage in the analysis of practical policy problems. The series is a requirement for students majoring in policy analysis, economics of education, planning, and education management.

250A. Introduction to Educational Policy Issues. (4) One 3-hour lecture per week. Introduces major policy issues facing contemporary education and reviews research and policy issues covered include school finance equalization, educational dominance and public participation, collective bargaining, and other related topics.

250B. Introduction to Policy Analysis. (4) One 3-hour lecture per week. Emphasizes the procedures involved in interpreting policy proposals, analyzing their consequences, and proposing alternatives. Attention given to understanding legislative language, identifying sources of useful policy information, and writing policy-related memoranda. Course forms the basis of a limited selection of federal and state policy proposals.

250C. Educational Policy Research. (4) One 3-hour lecture per week. Research focusing upon a selected set of policy issues pertinent to the area of education policy. Research is conducted for a specific "client," a state, local, or federal education agency.

250D. The Politics of Policy Analysis. (4) Formerly 250A. One 3-hour lecture per week. Concepts and methodologies of educational planning and their relationship to planning and administration; impact on political process. Planning at national, international, and regional levels.

Ms. Benveniste (Sp)

251. Foundations of Educational Administration. 

251A. School Supervision: Theory and Practice. (3) Formerly 259A. One 3-hour lecture per week. Prerequisite: administrative or teaching experience in a school setting. This course will examine the purposes, administrative functions, and theories of school supervision. Particular emphasis will be placed on the technical, research, and policy-related aspects of school supervision.

Mr. Reed (Sp)

251B. Administration of the Individual School (3) Formerly 252B. One 3-hour lecture per week. An overview of the principles of organization in the administration of elementary and secondary schools.

Mr. Mafin, Mr. Reed (F)

251C. Special Topics in Urban School Administration. (3) Formerly 259C. One 3-hour lecture per week. Various topics affecting urban school administration will be considered.

Mr. Reed (Sp)

252. Administration of Educational Personnel Services. (3) Formerly 259D. One 2-hour lecture per week. Theories, policies and practices related to the administration of educational personnel services.

Mr. Reed (Sp)

253. Education and the Law. This series is intended for students with an understanding of law and legal procedures pertinent to education. It is primarily for students in policy analysis, administration, and those in training for roles where there is a professional-client relationship.

253A. Education and Administrative Law. (4) One 3-hour lecture per week. Emphasis on the evolution of America's legal system, (2) contemporary legal structures and procedures applicable to educational law, (3) the legal aspect of personnel selection, (4) student discipline, (5) personnel performance, (6) teacher recruitment and retention, (7) teacher evaluation, (8) tenure, (9) collective bargaining, (10) racial desegregation and credentialing. Mr. Stewart, Mr. Watts (Sp)

253B. Education and Professional-Client Law. (4) One
special topics related to the structure and formation of education programs, and (4) additional topics such as political processes affecting education. The courses are intended primarily, though not exclusively, for educational professionals who have frequent contact with students in a client capacity. Emphasis is given to conceptualizing and studying personality and the psychological, social bases of general, professional and graduate education. Analytical review of research on college teaching and the measurement of purposes, curriculum, student characteristics, behavior of exceptional pupils are covered. *291D. Personality and Gender In Counseling. (3) One 3-hour lecture per week. Consideration of the college student as a developing person, learner, and participant in institutional governance. Analytical review of research on personal characteristics, campus environment and various influences and effects of college education.

268. Advanced Study In Higher Education. Pre-requisite: consent of instructor.

268A. The Student in Higher Education. (4) One 3-hour lecture per week. Consideration of the college student as a developing person, learner, and participant in institutional governance. Analytical review of research on personal characteristics, campus environment and various influences and effects of college education.

268B. The Curriculum of Higher Education. (4) One 3-hour session per week. Consideration of the philosophical, psychological, and social bases of general, liberal, undergraduate education. Analytical review of research on collegiate curriculums, programmatic innovations, and their effects.

268C. The Administration of Higher Education. (4) One 3-hour lecture per week. The government, organization, and administration of colleges and universities; the relevance of organizational and administrative theory in other fields to institutions of higher education.

268D. Professional and Graduate Education. (4) One 3-hour lecture per week. Consideration of the philosophical, psychological, social, and political aspects of professional and graduate education. Analytical review of research on research on college curriculums, programmatic innovations, and their effects.

268E. Theories and Practices of Management and Leadership in Higher Education. (4) One 3-hour lecture per week. The government, organization, and administration of colleges and universities; the relevance of organizational and administrative theory in other fields to institutions of higher education.

268F. Financing Higher Education. (4) One 3-hour session per week. Alternates methods of developing unit rate systems, revenue forecasting and budget formulas for operations and capital facilities. Strategies for effecting program planning, budgeting systems. Development of techniques for monitoring research, public service instruction, and buildings.

268G. Organizational Theory and Education. (4) One 3-hour lecture and one 1-hour discussion per week. Sociological approaches to the study of organizations with particular emphasis on individual and group life, power and authority, control analysis, role analysis. Professional and bureaucratic conflicts. Incentive systems and organizational evaluation.

268H. Seminar on Organizational Change in Education. (4) Three hours of lecture and one hour of discussion per week. Sociological approaches to organizational change, with emphasis on administrative control and authority. Participation, planning, Organizational development OD in education.

268K. Seminar on Organizational Design and Futurism. (3) Three hours of lecture per week. Emphasis upon the evolution of state sectorial planning; economic aspects of innovation. Analysis of changing social systems; group dynamics; change in the United States; the role of the United States in the world economy; innovations and their effects.


270. Adult Education and Aging. (4) One 3-hour lecture per week. A critical examination of the philosophy, policies and programs of adult education. Analysis of the influence of formal and non-formal education on the elderly.

275. Seminar in Adult Education—Selected Topics. (4) Formerly 275A--275B--275C. One 3-hour seminar per week, in-depth analysis of selected topics in adult education. Research and critical evaluation of existing research by students will be discussed and evaluated in seminars sessions. Topics: (Sec 1) sociology of adult education; (Sec 2) problems of work and leisure; (Sec 3) community development.

280A. Seminar on Organizational Design and Futurism. (3) Three hours of lecture per week. Emphasis upon the evolution of state sectorial planning; economic aspects of innovation. Analysis of changing social systems; group dynamics; change in the United States; the role of the United States in the world economy; innovations and their effects. Major attention will be given to interaction between theory and practice.

281. Basic Concepts in Language and Reading Development. (3) One 3-hour session per week. Pre-requisite: consent of instructor. An introduction to the relationship between language and society; linguistic and sociolinguistic contexts of language and cognition; the reading process; instructional approaches to reading and reading development; strategies and techniques for teaching reading; the aesthetics of language and literature.

280B. Experimental Courses. (1--5) One 3-hour lecture or discussion per week. Consideration of the college student as a developing person, learner, and participant in institutional governance. Analytical review of research on personal characteristics, campus environment and various influences and effects of college education.

280C. The Liberal Arts College. (3) One 3-hour session per week. Consideration of the college student as a developing person, learner, and participant in institutional governance. Analytical review of research on personal characteristics, campus environment and various influences and effects of college education.

280D. Methodology of Curriculum and Program Evaluation. (4) One 3-hour session per week. A systematic examination and critical analysis of evaluative research concepts, methods and procedures used in the appraisal of standard curricular programs, programs, projects, and modes of instruction in all types of educational institutions. Prerequisites: consent of instructor, combined with some field work where possible.

280N. Methodology of Language and Reading Research. (3) Three hours of lecture per week. Consideration of the college student as a developing person, learner, and participant in institutional governance. Analytical review of research on personal characteristics, campus environment and various influences and effects of college education.

290A--290B--290C. Evaluation of Innovative Projects. (1--2--4) One 3-hour seminar alternate weeks. Consideration of the college student as a developing person, learner, and participant in institutional governance. Analysis of published research studies and is intended to complement coursework in statistics and measurements.

290E. Advanced Topics in Evaluation. (4) Formerly 255B. One 3-hour lecture per week. Detailed treatment and discussion of a few topics in research design and analysis. May be taken for credit in any semester.

291. Concepts and Practices in Instructional and Curricular Changes In Higher Education. (4) One 3-hour lecture per week. An examination of the nature and application of research on teaching and learning. Focuses on change in both traditional and nontraditional forms of postsecondary education. Emphasis on teaching methodologies, curriculum alternatives, learning environment, faculty development, and technological and media delivery systems. Prerequisites: consent of instructor (1979/80 and 1980/81 only). The Staff (Sp)
5. Internship In School Psychology. (1-3) Two hours of lecture and one hour of discussion with mental health consultant per week. Supervised assignment to schools in the district in capacity of school psychologist. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

294A. Applied Social Research and Humanistic Leadership Program. (2) Two hours of lecture and nine-24 hours of supervised field work per week. Prerequisite: admission to Advanced Reading-Language Leadership Program. Application and evaluation of theoretical knowledge through implementation of exemplary reading-language programs in individual classrooms and school districts. Must be taken on a satisfactory/unsatisfactory basis. Ms. Buckley (F, W, Sp)

340. Internship in Student Personnel and Counseling Leadership Program. (2) Two hours of lecture and nine-18 units of supervised field work per week. Restricted to students admitted to the Counseling Program. Prerequisite: consent of instructor. Supervised internship in a variety of student personnel and counseling roles and settings: (1) individual and/or group counseling, (2) teaching and training, (3) consultation and organizational development, (4) administration of counseling and/or student personnel programs, and (5) other self-designed internships. Final entry into supervised teaching in quarters other than fall may be possible in some programs or teaching fields, subject to special arrangement. Supervisory Staff (F, W, Sp)

297. Thesis Seminar. (1-8) Prerequisite: consent of instructor. Recommended for M.A. students working on seminar papers or theses, and doctoral students preparing dissertation proposals. Unit credit awarded according to work accomplished. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Sp)

298. Special Topics in the Methodology of Educational Research. (1-6) One hour of laboratory per week for 298A; two hours per week for 298B and 298C. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

299. Supervised Teaching. (3-12) One to three units of supervised field work per week. Supervised teaching may begin with the opening of the public schools in the fall and extend through the spring quarter. Initial entry into supervised teaching in quarters other than fall may be possible in some programs or teaching fields, subject to special arrangement. The Staff (F, W, Sp)

200. Professional Courses

310. Internship In School Psychology. (1-3) Two hours of lecture and one hour of discussion with mental health consultant per week. Supervised assignment to schools in the district in capacity of school psychologist. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

334A-334B-334C. Supervised Teaching. (3-12-3-12) One to three hours of lecture and 9-30 hours of field work in the public schools per week. Prerequisite: Enrollment is limited to students admitted to an internship program (multiple subject or single subject). Students enroll in this course for a maximum of 18 units. The number of units and hours of lecture and field work vary with individual programs and with the quarter in the program sequence. The sequence in supervised teaching may begin with the opening of the public schools in the fall and extend through the spring quarter. Initial entry into supervised teaching in quarters other than fall may be possible in some programs or teaching fields, subject to special arrangement. Credit and grade assigned upon completion of full sequence. Supervisory Staff (F, W, Sp)

335. Field Work for Advanced Reading-Language Leadership Program. (2) Two hours of lecture and four hours of field work per week. Prerequisite: admission to Advanced Reading-Language Leadership Program. Application and evaluation of theoretical knowledge through implementation of exemplary reading-language programs in individual classrooms and school districts. Must be taken on a satisfactory/unsatisfactory basis. Ms. Buckley (F, W, Sp)

Note: For key to symbols, see page 35.
Transportation Engineering
Division Office, 215 McLaughlin Hall

Professors:
- James M. Anderson, Ph.D.
- Tor L. Brekke, Dr. Ing.
- Keith C. Granath, Ph.D.
- Donald L. Henderson, Ph.D.
- James M. Duncan, Ph.D.
- William L. Garrison, Ph.D.
- Ben C. Gerrard, Jr., B.S. R.S.
- Robert P. Goodman, Ph.D.
- John Lythgoe, Ph.D.
- Aod O'Day, Jr., Ph.D.
- John K. Mitchell, Sc.D.
- Francis H. Moftit, M.C.E.

Associate Professors:
- Carl L. Monniosmith, M.S.
- Gordon F. Newell, Ph.D.
- Harry Bolton Seed, Ph.D.
- Harold E. Davis, M.S.

Emeritus:
- Don M. Flood, B.S. (Emeritus)
- Paul F. Keim, M.Sc.
- W. Norman Kennedy, B.S. (Emeritus)
- Ralph A. Moyer, M.S., M.E., C.E., Sc.D. (hon.) (Emeritus)

Lecturers:
- Clarence K. Chan, M.S.
- Edward C. Sullivan, Ph.D.
- Thomas A. Lang, M.S.
- Richard M. Zott, M.A.

Civil engineering is concerned with the planning, design, and construction of public and private works such as buildings, bridges, dams, transportation systems and water supply systems. The civil engineer must have a full understanding of the physical and economic aspects of structures and systems. The four-year undergraduate curriculum leading to the B.S. degree is designed to provide a basic and fairly coherent background in civil engineering and related fields. This curriculum may provide a student with a direct entry to professional experience upon graduation or with preparation for graduate study. Students may arrange their programs to integrate graduate and undergraduate study into a five-year program, leading to the bachelor's degree by the end of the fourth year and the master's degree by the end of the fifth year.

Curriculum for the Bachelor's Degree
A total of 180 units is required. The program of study is described in detail in the Announcement of the College of Engineering (available without charge from the College of Engineering, University of California, Berkeley, California 94720). All students must complete a total of 27 units of humanities and social sciences and 17 units of free electives including a minimum of 12 units which must be upper division, and a minimum of three courses, at least one of which is in upper division, must be taken from a single department. Other courses include:

Lower Division. Required: Mathematics 1A–1B, 1C, Chemistry 1A–1B, Physics 5A–5B–5C–5D, Engineering 25, 26, 36 and 45, Civil Engineering 10, Computer Science 1, and Statistics 25. Electives 20 units including at least 18 units in humanities or social sciences.

Upper Division. Required: Mechanical Engineering 164A. Civil Engineering 110, 118, 121, 130A, 131, 133 or 134, 140, 141, 165A–165B, 170, 192, and 194. Electives: 15 units of upper division civil engineering courses, 26 units of electives including 9 upper division units in humanities and social sciences and 17 units of free electives including a minimum of 12 units which must be upper division.

Graduate Study
Graduate programs of study leading to the master's and doctoral degrees are available in the major civil engineering fields: air pollution, construction, geodesy and photogrammetry, hydraulics, geology, geotechnical engineering, ocean engineering, structural engineering and structural mechanics, transportation, and water resources. For details, please consult the Announcement of the College of Engineering.

Electrical Engineering and Computer Sciences
Department Office, 231 Cory Hall
and pipeline computers, performance analysis, of algorithms, artificial intelligence, complexity, theory, pattern classification, and learning systems. 

Curriculum for the Bachelor's Degree

A total of 180 units is required for the bachelor's degree with the following minimum requirements:

I. (a) Sixty units in the College of Engineering with 45 units in upper division. (b) Engineering 17, 45, and Computer Science 1 or 4 units of Computer Science 15.

II. Four upper division laboratory courses in Electrical Engineering and Computer Sciences. (c) Forty upper division laboratory courses in Electrical Engineering and Computer Sciences. 1 (e) Eight units in engineering not in Electrical Engineering and Computer Sciences, not including Engineering 17 and 45, and Computer Science 1 or 15. 2

Beyond satisfaction of the minimum requirements for the B.S. degree, students follow one of three basic paths in selecting their major program. They may elect the general Electrical Engineering and Computer Sciences program in which they will receive an introduction to a large number of areas outlined above. They may plan their curriculum in one of the four main programs in the Department of Electrical Engineering and Computer Sciences: electronics, computer sciences, and biology. Or they may plan an individual program to suit their special needs or interests. 

Lecturers and Consultants:

H. T. H. Wu, Ph.D.

H. H. T. W. L. Hartman, Ph.D.

Computer Science Division

Division Office, 573 Evans Hall

Professors: Herbert B. Baskin, M.S.

Evelyn R. Berking, M.P.

Alan B. Blumberg, Ph.D.

Arthur G. B. Bruck. M.D.

Margaret K. Bream, Ph.D.

Michael Moskowitz, Ph.D.

Richard M. Karp, Ph.D.

Edward F. Kelson, Ph.D.

M. Stuart Lynn, Ph.D.

(Director: Computer Science, U.C. Berkeley)

Associate Professors: Allen M. Despain, Ph.D.

Richard B. Faubh, Ph.D.

Richard E. Field, Ph.D.

David A. Patterson, Ph.D.

Professor: L. Curt Widdoes (in Residence)

Lecturers and Consultants: Aazd Bilour, Ph.D.

Michael J. Clancy, M.S.

Patrick Glass, Ph.D.

Programs in computer science are offered by the Department through its Computer Science Division.

With the rapid growth in technology, electronic engineering now encompasses solid-state devices, integrated circuits, microwave electronics, quantum and optical electronics, bioelectronics, radiobiology, and propagation, plasma, power systems, control systems, communications, information theory, circuit theory, large-scale networks and systems, ecological systems and network recognition.

Computer science pervades nearly every aspect of modern engineering and science. The field encompasses theory, software, and hardware. These include analysis of algorithms, artificial intelligence, complexity, theory of computation, computer architecture and machine organization, computer graphics, data base management systems, formal languages and automata theory, information theory, numerical analysis, parallel

and quantum electronics, optical electronics, superconductivity, using the latter in integration.

"Systems: For students whose interests fall into areas of electrical, computer systems, control theory, communication theory, finite-state systems, mathematical programming, system theory, and large-scale systems.

Bioinformatics: Students interested in animal control systems, physiological modeling of neural systems, application of circuit and system techniques to living systems, and ecological systems.

Computer Science: For students interested in machine organization and logical design, programming languages and systems, digital devices and circuits, digital programming and artificial intelligence, switching and automata theory, algebraic theory of machines, mathematical theory of languages, coding theory, pattern classification, and learning systems. This program is offered by the Department through its Computer Science Division.

Undergraduates who wish to major in computer science may do so either through the College of Letters and Science or through the College of Engineering. Details of the Computer Science Major in the College of Letters and Science may be found in the Letters and Science section of this Catalog, under Computer Science.

Graduate Program

To prepare the graduate student for work in the rapidly developing fields of electrical engineering and computer sciences, the Department offers a wide selection of courses, seminars, and a reasonable amount of freedom for meeting degree requirements. Since no single sequence of courses is required, students are free to design programs to suit their particular needs and interests, in consultation with a faculty advisor in their field.

Graduate degree programs are available as preparation for research and teaching (Master of Science and Doctor of Philosophy), and for careers in design, development, and management (Master of Engineering and Doctor of Engineering). The Master of Science program requires about one year of study. About three additional years are usually required for the Doctor of Philosophy. The Master of Engineering degree requires five quarters of study and includes a minor in a technical subject outside the major and a second minor in a non-technical subject such as law, business administration, etc. The Doctor of Engineering program, of about two years duration, builds on the course work for the Master of Engineering and requires a one-year internship in a design and development organization. Students with either a B.S. or an M.S. who intend to study for the D.Eng. should apply first for the M.Eng. program.

Details of the available fields of graduate study in electrical engineering and computer sciences are described in the Announcement of the College of Engineering. For further information on graduate programs and procedures, see the Electrical Engineering and Computer Sciences Graduate Orientation Notes, available from 197 Cory Hall.

Engineering Science

The student in engineering science studies in one of several areas where engineering closely interacts with the natural sciences, mathematics, statistics, or medicine. Students in this program may choose to prepare for graduate study in the engineering fields, the natural sciences, or medicine. The undergraduate Engineering Science program is offered by the individual engineering departments.

Programs for the Bachelor's Degree

The undergraduate Engineering Science curriculum is multidisciplinary and is administered by the Engineering Science Committee. Acceptance and continuation in this program is dependent on ini...
in the engineering science curricula requires a minimum grade point average of 3.00. All engineering science programs must include a total of 27 units of humanities and social studies of which 9 units must be upper division; a minimum of three courses, at least one of which is in upper division, must be taken from a single department.

Lower Division. Required: (for all upper division programs in engineering science) Mathematics 1A–1B–1C, or Chemistry 7A–7B; Mathematical Physics 1A; or Chemistry 11A–11B; Biology 1A–1B–1C; Mechanical Engineering 102 or Physics 112–113; Engineering Physics 4A–4B; Geophysics 122A–122B; Civil Engineering 139 or Mechanical Engineering 185; Computer Science 1A–1B; or Computer Science 41, or Biomedical Engineering 140A–140B; or one of the following two groups: Group I: Mechanical Engineering 105A, 105B; Group II: Mathematics 112, 113, or Mathematics 115. Students who transfer from other UC campuses may be eligible for the M.S. and Ph.D. degrees in engineering science. Programs of study and research leading to a graduate degree in engineering science are offered by all of the engineering departments. These programs emphasize the theoretical principles of mathematics, chemistry, physics, and biology on which developments in engineering and the applied sciences are based.

Industrial Engineering and Operations Research

Department Office, 4135 Etcheverry Hall

Professors: Richard E. Barlow, Ph.D.
Edward R. F. W. Grossman, Ph.D.
Stuart E. Dreyfus, Ph.D.
David Gale, Ph.D.
C. Roger Glasser, Ph.D.
Raymond C. Gassio, M.S.
William S. J. J. J., Ph.D.

Associate Professors: Ian Aster, Ph.D.
James T. Laxley, Jr., M.S.

Lecturer: Stephen Loner, Ph.D.

Industrial engineering and operations research in a modern field of systems design, analysis, and control which is concerned with integrated systems of machines, and material and their interaction with their environment. Increased emphasis is placed upon applications in socio-engineering, such as water resources management, transportation systems, pollution and waste disposal systems, and highway accident prevention, as well as the classical studies of production, inventory control, scheduling, systems reliability, engineering incentives, organization, and man-machine systems.

Graduate Programs

Graduate programs leading to the M.S., M.Eng., Ph.D., and D.Eng. are offered in the following areas of study.

Graduate Programs

Assurance Research. This program prepares students for advanced work in the theory of systems science. The development of quantitative model structures and the necessary methods of analysis and optimization are emphasized. Undergraduates from scientific disciplines other than engineering may be accepted into these programs. A master’s degree may be earned by thesis or by comprehensive examination. Doctoral degrees require original research in the major and one or two minor fields followed by submission of a thesis demonstrating ability to conduct independent advanced research. Graduate students are required to complete a minimum of the Human Engineering and Organizational Sciences Laboratory, and in the Operations Research Center.

The department requires all graduate applicants to submit Verbal and Quantitative Aptitude scores of the Graduate Record Examination. Further information on graduate programs may be obtained by application for M.S. work in the M.E. Program or by write or visit the department.

Manufacturing Engineering

Manufacturing Engineering is an interdisciplinary program offered jointly by the Department of Industrial Engineering and Operations Research and the Department of Mechanical Engineering. The program will train engineers in an integrated view of properties of materials, manufacturing process fundamentals, productive system analysis, and systems design and synthesis.

Curriculum for the Bachelor’s Degree

A total of 180 units is required, including:

Graduate Programs

Lower Division. Mathematics 1A–1B–1C, 5A–5B–5C; Chemistry 1A–1B; Physics 5A–5B–5C–5D; Computer Science 1, 2

A total of 180 units is required, including:

Electives: (1) Must include a total of 27 units of humanities and social studies of which 9 units must be upper division; a minimum of three courses, at least one of which is in upper division, must be taken from a single department.

Electives: (1) Must include a total of 27 units of humanities and social studies of which 9 units must be upper division; a minimum of three courses, at least one of which is in upper division, must be taken from a single department.

Electives: (1) Must include a total of 27 units of humanities and social studies of which 9 units must be upper division; a minimum of three courses, at least one of which is in upper division, must be taken from a single department.
The Department of Materials Science and Mineral Engineering administers undergraduate programs in materials science and mineral engineering and graduate programs in materials science, mineral engineering, and engineering geology. (The undergraduate program in engineering geology is part of Engineering Science.)

Materials science deals with natural and man-made materials—their extraction, development, and characterization for uses particularly in advanced applications such as solid-state electronics, atomic energy, and aerospace industries. A student in the materials science and engineering curriculum is provided a basic background in chemistry, physics, and engineering and an opportunity to build on this foundation to a field of specialization: ceramic engineering, extractive metallurgy, or physical metallurgy.

Engineering geology applies the discoveries and knowledge of mathematics, statistics, physics, chemistry, and the geosciences to our total environment: the solid earth, the oceans, the atmosphere, and space. The program provides education in the fundamental subject matter necessary for engineering occupations in the earth sciences and in the petroleum and minerals industry. A student majoring in engineering geology is provided with the knowledge and skills necessary for a career in the petroleum and minerals industry or related fields.

Electro Metallurgy. The design, development, and control of processes which will characterize, extractive and utilizing metals and alloys. The field has two main areas of specialization.

Extractive Metallurgy. Studies of the scientific and engineering principles utilized in recovering metals from their ores and in refining them to the desired purity. The subject includes mineral processing as well as smelting, leaching, and electrochemical methods of refining and recovering metals and requires using some of the most recent advances in chemistry and physics.

Physical Metallurgy. Primarily studies the relationships between the chemical and physical structure of materials and their properties. The improvement and control of properties of metals for advanced applications is a broad field within which primary emphasis can be directed toward fundamental physics, chemistry, or engineering. Because of the ever-increasing demand for improved or better characterized materials, fundamental and applied research in the field is extremely active, providing a wide choice of rewarding career opportunities.

Mineral Engineering. Society is increasingly dependent upon supplies of fuels, metals and non-metallic ores, and construction materials for its continued well-being. The program in mineral engineering is designed to equip persons with the scientific, technological, economic and social skills needed to provide supplies of minerals in the face of increasing difficulties and rising demand. Nowhere are these skills needed more than in the management of all the resources of the mineral industry - geologic, economic, technologic and human. Accordingly, the first two years of the four-year undergraduate curriculum in mineral engineering are designed to provide students with a solid foundation in the basic sciences. The two senior years are devoted to the application of the scientific and technological basis of the field, to enable students to apply it productively to meeting the vital needs for minerals.

Materials Science and Engineering Program

Students in all programs in materials science and engineering must complete a total of 180 units.

Lower Division. Required: Mathematics 1A-1B-1C, 5A-5B-5C; Chemistry 1A-1B; Physics 5A-5B-5C; Engineering 36, 45; Computer Science 1; 26 units of electives. * Note: Physics 5E and 8 units of mathematics, if not taken in the lower division, may be taken in the junior year without any delay in progress toward the degree provided a total of 80 units has been completed in the first two years.

Upper Division. Required: Civil Engineering 110, Electrical Engineering and Computer Sciences 109; * Materials Science and Engineering 100, 101, 102, 103, 107, 108, 109, 109L, 121L, 122L, 122, 141L, 141, 142, and 41 units of electives. * Options. Students interested in either the metallurgy or ceramic engineering options should state their preference so that an appropriate faculty adviser can be assigned. A limited number of elective courses are available in either option.

Mineral Engineering Program

Lower Division. Required: Mathematics 1A-1B-1C; 5A-5B-5C; Chemistry 1A-1B; Physics 5A-5B-5C; Engineering 36, 45; Computer Science 1; Civil Engineering 10, Geology 5; 19 units of electives.

* Note: Physics 5E and 8 units of mathematics, if not taken in the lower division, may be taken in the junior year without any delay in progress toward the degree provided a total of 80 units has been completed in the first two years.

Upper Division. Required: Engineering 200; Civil Engineering 119, 130A, 155A; Electrical Engineering and Computer Sciences 109; * Materials Science and Engineering 100, 101, 102, 103, 107, 108, 109, 109L, 121L, 122L, 122, 141L, 141, 142, and 41 units of electives. * Options. Students interested in either the metallurgy or ceramic engineering options should state their preference so that an appropriate faculty adviser can be assigned. A limited number of elective courses are available in either option.

Graduate Study in Materials Science

Qualified holders of the bachelor's degree in fields such as ceramic engineering, metallurgy, physics, chemistry and various fields of engineering can all successfully undertake graduate study in materials science.

The graduate program emphasizes research. Technical areas such as transmission electron microscopy, field ion microscopy, X-ray diffraction topography, mass spectrometry, spectrometry, magnetic property measurements, micro-probe X-ray emission spectroscopy, and some aspects of thermodynamics and reaction kinetics.

Mechanical Engineering

Department Office, 6193 Etcheverry Hall

Graduate Program in Engineering Geoscience

This program is directed toward graduate education and research in applied geophysics. The course of study leads to the M.S., Ph.D., and D.Eng. degrees and is designed for students with undergraduate degrees in geophysics, engineering geology, physics, or mathematics. An M.S. program is available for persons currently in industry or government who wish to undertake graduate work in the geosciences. The program currently stresses study in mineral and oil exploration, engineering seismology, and applications of geophysical techniques in geological engineering and mapping, ocean engineering, and ground water hydrology.

Through the cooperation of the Department of Geology and the Department of Civil Engineering, students are encouraged to take courses in that department to complete requirements for the major in Engineering Geoscience. Courses in the Department of Geology and Geophysics that may constitute part of the major are: Geophysics 121A-121B, 122A-122B, 204A-204B, 208, Geology 108, and 150.
Curriculum for the Bachelor's Degree

A total of 180 units is required, including:

**Lower Division.** Mathematics 1A–1B–1C, 51C, 51A, 51B; Chemistry 1A–1B; Physics 5A–5B–5C–5D–5E; Mechanical Engineering 25, 26, 36, 45; 24 units of electives. 7


**Mechanical Engineering Options.** The following groups of technical electives are suggested to aid undergraduates in their choices of specific professional goals. Each group contains more courses than can be taken within the standard allowance of technical electives, and there is no requirement that all electives selected be from any single group.

1. **Applied Mechanics.** Engineering 115, 116, 117, 118; Mechanical Engineering 129, 133, 134, 160, 162, 164, 173, 174, 175, 185, 282A; Mathematics 104A.
2. **Automatic Controls.** Engineering 116, 118; Mechanical Engineering 133, 134, 172, 175; Electrical Engineering and Computer Sciences 119, 126A–126B.
3. **Biomechanical Engineering.** Biology 111–116; Mechanical Engineering 110, 131, 134, 151, 153, 159; Anatomy 108; Physiology 1, 109, 110, 132.
5. **Environmental Engineering.** Engineering 117, 150, 151, 152, 160, 161; Mechanical Engineering 110, 142, 145, 147, 151, 155, 159, 173, 174; Civil Engineering 140; Nuclear Engineering 153; Geography 146; Architecture 110.
6. **Fluid Mechanics and Aeronautics.** Engineering 116, 117; Mechanical Engineering 133, 134, 147, 151, 159, 162, 164, 175; Civil Engineering 130B, 166; Physics 132. Astronomy 101.
7. **General Mechanical Engineering.** Engineering 117; Mechanical Engineering 133, 134, 147, 151, 158, 185.
8. **Heat and Mass Transfer.** Engineering 117; Mechanical Engineering 151, 155, 158.
9. **Materials Processing and Manufacturing Management.** Mechanical Engineering 101, 121, 123, 127, 133, 134, 151; Industrial Engineering and Operations Research 154, 166, 176, 180; Business Administration 111, 155, 159; Economics 121A–121B; Engineering 102, 120.
11. **Naval Architecture.** Naval Architecture 151, 152A–152B, 153, 154A–154B; Civil Engineering 131, 130B; Mechanical Engineering 133, 159, 162, 175; Mathematics 120A–120B–120C.
12. **Nuclear Engineering.** Nuclear Engineering 101A–101B, 102, 120, 150A–150B, 160A–160B, 162; Mechanical Engineering 151, 155, 159; Physics, 137A–137F; Mathematics 120A–120B–120C.
13. **Petroleum Engineering.** Mechanical Engineering 148, 149, 151, 159; Geology 5, 112A, 116A; Civil Engineering 118; Mineral Engineering 116; Engineering 160.

Graduate Study

Both master's and doctoral programs are available. The student may choose either a scientific emphasis in particular areas or integrated studies directed to professional objectives. Master of Science and Ph.D. degrees are the relevant degrees for the scientific emphasis, and Master of Engineering and D.Eng. degrees for the professional one. Specialization is offered in the following areas: (1) Dynamics and Dynamical Systems, (2) Fluid Mechanics, (3) Heat and Mass Transfer, (4) Mechanical Design, (5) Mechanics of Deformable Media, (6) Thermodynamics, (7) Bioengineering, (8) Environmental Engineering. Details on various aspects of graduate study are available from departmental brochures and from the Announcement of the College of Engineering.

Nuclear Architecture

Department Office, 202 Naval Architecture Building

Professors: J. Randolph Pauling, Jr., Henry A. Schade, Dr. Ing., D.Eng.

William G. Webster, Ph.D.

John V. Wehauzen, Ph.D.

(Chairman)

Lecturers:

Aalt E. Mansour, Ph.D.

Oswald J. Stibb, M.S.

The Department of Naval Architecture offers courses in the fundamentals of marine-vehicle design and the theories of ship structures and ship hydrodynamics.

There is no undergraduate major, but undergraduate courses are offered, and students interested in naval architecture may elect courses in this department as an option within the mechanical engineering major.

Graduate study is offered in the areas of ship structures and ship hydrodynamics, leading to both the master's and doctor's degrees. The graduate student normally must take Naval Architecture 240A–240B–240C, and 241A–241B–241C. Other courses are chosen according to the student's background and objectives. With sufficient undergraduate preparation, a student may earn a master's degree in three quarters of study. Further details on graduate programs (including the program in ocean engineering) are available from the department upon request.

Nuclear Engineering

Department Office, 4103 Etchery Hall

Professors:

Paul L. Chamble, Ph.D.

Lawrence M. Grossman, Ph.D.

Selig N. Keating, Ph.D.

Donald R. Odak, Sc.D.

Thamas H. Piggford, Sc.D.

Stanley G. Prusak, Ph.D.

Lawrence Ruby, Ph.D.

Virgil E. Schrock, M.S., M.E.

Associate Professor:

George Yasidinoglu, Sc.D.

*Electives include: (a) a total of 27 units of humanities and social studies of which 9 units must be upper division; a minimum of three courses, at least one of which is in upper division and at least one of which must be taken from a single department. (b) also include 18 units of upper division technical electives in engineering, physical sciences, mathematics, or statistics. To provide added depth in one or more areas of mechanical engineering, all students must complete at least 10 units of upper division mechanical engineering courses (out of the 18 required).
In addition to the double major programs within the College of Engineering described above, two double major curricula featuring the College of Engineering and the College of Chemistry are offered. These are: (1) Materials Science and Engineering/Chemical Engineering and (2) Nuclear Engineering/Chemical Engineering.

These curricula include the core courses in both departments and require the same number of units and length of time to complete as the single major programs. Details on these curricula can be found in the Announcements of the College of Chemistry and the College of Engineering.

Environmental Engineering. The College of Engineering offers a series of courses in environmental engineering open to all junior and senior engineering students and to qualified students in other fields. The courses are intended to provide a sound introduction to the problems of environmental engineering and to demonstrate the interconnectedness of problems in such areas as air pollution, water pollution, solid waste disposal, and nuclear power generation.

These courses, listed as the Engineering 150 series, are taught on an interdepartmental basis and bring together a number of faculty with expertise and interests in one or more of the programs.

For those students interested in applying their engineering background to the solution of specific environmental problems, graduate study is strongly recommended, and particulars of these programs are given under "Interdisciplinary Graduate Programs." Interdisciplinary Graduate Programs

The problems engineers face in professional practice are often of an interdisciplinary nature and possibly without precise engineering solutions. The Interdisciplinary Graduate Studies Programs at Berkeley emphasize the technical aspects of engineering and the social and economic spheres in which engineering decisions must be made. These programs are designed to encourage a student to take graduate level courses in different departments both within and outside the College of Engineering while pursuing a degree in a department. Study in these programs leads to degrees in Master of Science, Master of Engineering, Doctor of Philosophy in Engineering or Engineering Science.

The Interdisciplinary Studies Center is not a department—it is an administrative unit established within the College of Engineering to help those graduate students who want to pursue an interdisciplinary course. Each of the programs listed below is under the direction of an interdisciplinary committee. The committees organize a wide range of activities: course offerings, group studies, seminar courses, and public lectures by faculty and distinguished visitors. Group study is encouraged and results in the publication of Interdisciplinary Studies Reports. The nature of the Center provides a breadth of training in writing and oral presentation not always available in traditional departmental programs, while departmental requirements insure the technical breadth.

Interdisciplinary graduate programs currently offered are as follows:

Bioengineering

Earthquake Engineering

Energy and Energy Resources

Environmental Engineering

Mining and Mineral Resources

Ocean Engineering

Urban and Public Systems

When you apply to Graduation Admissions, please indicate your interest in Interdisciplinary Studies by specifying one of the programs listed above and state the department with which you wish to be associated: Civil Engineering, Electrical Engineering and Computer Sciences, Industrial Engineering and Operations Research, Materials Science and Mineral Engineering, Mechanical Engineering, Naval Architecture, or Nuclear Engineering.

Detailed information regarding these programs may be obtained by writing to the Dean of Interdisciplinary Studies, College of Engineering, University of California, Berkeley, California, 94720.

Engineering

Lower Division Courses

17. Introduction to Electronics. (4) Three hours of lecture and two hours of recitation per week. Prerequisite: Physics 5C. Principles of electric circuits; conduction of electric currents in semiconductors; the semiconductor p-n junction; the transistor; principles and applications of basic electronic circuits. Mr. Lieberman, Mr. Schwarz (F, W, Sp)

17-1. Introduction to Electronics (Self-paced). (4) Formerly 17S. Variable hours per week. Prerequisite: Physics 1A. Theory and problem solving. "Exposure" to the fundamental concepts of electronic circuits. Analysis of the important internal and external characteristics of electronic blocks used in analog and digital systems. Mr. Miller, Mr. Welford (F, W, Sp)

25. Descriptive Geometry. (3) One hour of lecture and one 3-hour laboratory per week. Prerequisite: Math 1A - may be taken concurrently. Fundamentals of orthographic projection with applications to three-dimensional problems. Descriptive geometry including the true length and point view of lines and the edge view and true shape of plane surfaces. Mr. Lutone (F, W, Sp)


36. Engineering Mechanics I. (3) Three hours of lecture per week. Prerequisite: Physics 5A and Mathematics 1C. A vectorial treatment of the principles of statics of particles and rigid bodies. Application to problems of equilibrium of two-dimensional and three-dimensional systems. Work and potential energy, the principle of virtual work, and statics in equilibrium. Mr. Corcos, Mr. Cunningham, Mr. Willis, Mr. Hsu, Mr. Der Kuieragh (F, W, Sp)

44. Mineral Resources Engineering. (3) Three hours of lecture, 3 hours of laboratory per week. Prerequisite: Chemistry 1A, Mathematics 1A, or equivalent. The mineral resources available in the United States and world-wide with a discussion of metals (metals and ceramics, etc.) and energy. Exploration for such sources. Existing and proposed industrial processes of mining and processing of mineral materials and energy. Mr. Evans, Mr. Morrison, Mr. Holstein (Sp)

45. Properties of Materials. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: Physics 5A. Applications of basic principles of physics and chemistry to the selection and use of engineering materials. Examination of the mechanical, chemical, functional behavior of metals, ceramics, and ceramics and the properties of semiconducting materials. Mr. Kirtz, Mr. Williams (F, W, Sp)

47. Supplementary Work In Lower Division Engineering. (1-5) Prerequisite: limited to students who must make up a fraction of a required lower division course. May be taken only with permission of the Dean of the College of Engineering. Students with partial credit in a lower division engineering course may complete the work under this heading. May be repeated for credit. Mr. Hopkins (F, W, Sp)

Upper Division Courses

100. Materials and Methods Used in Manufacturing. (3) Three 1-hour lectures per week. Prerequisite: Engineering 45. Study of the materials and production processes of importance in contemporary technology, with demonstration of businesses and process such as machining, forming, casting, and welding. Mr. Dornfield (F)

102. Introduction to Operations Research. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Mathematics 41 or 5A. Introduction to models and methods of operations research. Problems in business and management situations. Mr. Steidel (W)

115. Methods of Linear Algebra. (3) Three hours of lecture per week. Prerequisite: Mathematics 41 or 5A. Review of matrix algebra: formulation of problems in engineering and methods of solution. Cartesian tensors and their applications to physical problems. Mr. Neureuther (F, W, Sp)

116. Application of Complex Variables. (3) Three hours of lecture per week. Prerequisite: Mathematics 5C-1. Methods of theoretical engineering analysis, application of complex variable theory to the design and analysis of engineering systems. Mr. Lottone (F)

117. Methods of Engineering Analysis. (3) Three hours of lecture per week. Prerequisite: Mathematics 5C-1. Methods of theoretical engineering analysis, techniques for analyzing partial differential equations and the use of special functions related to engineering systems. Mr. Steidel (F, W, Sp)

118. Application of Numerical Methods to Engineering Problems. (3) Three hours of lecture per week. Prerequisite: Mathematics 5C-1. Application of numerical methods to the solution of engineering problems. Solution, by compiler languages, of linear algebraic equations, roots of polynomials, interpolation, extrapolation, ordinary differential equations, error analysis. Digital computer time available for course work. Mr. Wills (W)


147. Supplementary Work In Upper Division Engineering. (1-3) Prerequisite: limited to students who must make up a fraction of a required upper division course. May be taken only with permission of the Dean of the College of Engineering. Students with partial credit in an upper division engineering course may complete the work under this heading. May be repeated for credit. Mr. Steidel (W, Sp)

150. Environmental Engineering: Air Pollution. (3) Three 1-hour lectures per week. Prerequisite: Chemistry 1B, Physics 5C, Math 5C. An introduction to the technology of air pollution dealing with air pollutants, effects, sources, combustion processes, control technology, and abatement. Mr. Sawyer, Mr. Thomas (Sp)

151. Environmental Engineering: Water Pollution. (1-3) Three 1-hour lectures per week. Prerequisite: Chemistry 1B, Mathematics 5C, Physics 4C. An overview of the environmental problems and techniques of pollution in the marine, fresh water, and marine waters. Consideration is given to water conditioning and to the nature, treatment, and disposal of industrial wastes and domestic sewage. Mr. Pearson (F)

152. Environmental Engineering: Solid Waste Management. (3) Three 1-hour lectures per week. Prerequisite: Engineering 45. Introduction to the practices and issues of solid waste management. Technological, economic, social, and environmental aspects. Application of systems analysis and operations research. Institutional, legal, social, and environmental aspects. Mr. Rose (Sp)

160. Energy and Power. (4) Four hours of lecture per week. Prerequisite: Physics 5D, Math 5C or equivalent. Sources, conversions, transmission, and requirements of energy in human society, concentration of solar, nuclear, and electric power. Thermodynamic principles. Fossil fuel; nuclear fission and fusion, and hydroelectric power.

NOTE: For key to symbols, see page 38.
10. Engineering Survey Measurements. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 119 or course 230A. Application of plane surveying to vertical and horizontal measurements; survey computations; principles of least squares adjustment; survey plans and specifications; essential surveying equipment;影响 of geological features on engineering works.

11. Engineering Geology. (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: course 118 or an introductory course in geology. Study of the influence of geological conditions on the design and construction of structures.

12. Introduction to Geological Engineering. (3) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 118 or an introductory course in geology. Introduction to the application of geological data in engineering of underground openings, and dams, and reservoirs. Field trips to engineering sites.

13. Soils and Foundation Engineering. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 118. Principles of soil mechanics and their application to soils and rocks. Soil investigation, design of foundations, and construction problems in foundation engineering.

14. Soil Properties and Their Engineering Applications. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 118. Laboratory testing of soils and use of results in solving geotechnical problems. Students assume the role of consultant. Instructor assumes role of client. Soil test results are used to develop recommendations that are conveyed in three short engineering reports.

15. Asphalt and Asphalt Mixtures. (2) One 1-hour lecture and one 3-hour laboratory per week. Prerequisite: senior standing in civil engineering. Physical properties of asphalts, aggregates, and their combinations; principles and practices in the design, construction, and control of asphalt mixtures; laboratory tests for mixtures and aggregates; mix design; specimen preparation and stability and durability evaluation.

16. Engineering Geology. (3) Three hours of lecture and one 3-hour laboratory per week. Prerequisites: knowledge of soils and rock properties; principles of physical and structural geology; influence of geological features on engineering works. Field trips.

17. Soil Mechanics and Foundation Design. (3) Three lecture hours per week. Prerequisite: course 118. Principles of foundation design; ultimate bearing capacity of soils; theory of consolidation and its application; back-analyzing the settlement of buried structures; axial bearing capacity; methods of minimizing settlements; effect of settlement on structures; lateral pressures on retaining walls; design of embankments.

18. Structural Design In Timber. (3) Three hours of lecture per week. Prerequisite: course 120 or equivalent. Characteristics and properties of wood as a structural material; design principles; influence of wood and its end use; and of entire structures of wood. Topics include: working stresses, design and detail of plain and glued beams, columns, connections and fastenings.


20. Structural Systems II. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 118 or an introductory course in geology. Study of the influence of geological conditions on the design and construction of structures.

21. Structural Systems III. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 118. Principles of foundation design; ultimate bearing capacity of soils; theory of consolidation and its application; back-analyzing the settlement of buried structures; axial bearing capacity; methods of minimizing settlements; effect of settlement on structures; lateral pressures on retaining walls; design of embankments.

22. Building Structures. (3) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 118. Principles of foundation design; ultimate bearing capacity of soils; theory of consolidation and its application; back-analyzing the settlement of buried structures; axial bearing capacity; methods of minimizing settlements; effect of settlement on structures; lateral pressures on retaining walls; design of embankments.

23. Introduction to Industrialized Building Systems. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 132. Selection, design, production, and construction of industrialized building systems. Construction aspects of precast concrete systems are emphasized. Homework assignments are based on case studies of actual buildings.

24. Building Codes. (3) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 120. Architectural design of frame structures; shear and moment diagrams, stress distributions in beams; stress and buckling behavior of columns. Design of beams and columns in steel, timber and reinforced concrete.

25. Special Topics in Civil Engineering. (1-3) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: senior standing in civil engineering. Topics are selected each semester by the instructor. Instructor approval necessary.
130A. Mechanics of Materials I. (4) Formerly 130C. Four hours of lecture per week. Prerequisite: Engineering 36. 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.

The Staff (Mr. Popov in charge) (F, W, Sp)

130B. Mechanics of Materials II. (4) Four and one-half hours of lecture per week. Prerequisite: course 130A. Analysis and design of reinforced concrete structures; prestressed concrete structures; design and analysis of mechanical and electrical systems. The Staff (Mr. Scordelis in charge) (F, W, Sp)

131. Introduction to Structural Analysis. (3) Three one-hour lectures and one 3-hour laboratory per week. Prerequisite: course 131 and Mechanical Engineering 104A. Analysis of response of structures to dynamic loads with emphasis on response to earthquake ground motion. Basic concepts in earthquake resistant design of buildings.

The Staff (Mr. Mahin in charge) (F, W, Sp)

132. Introduction to Dynamics of Structures and Earthquake Engineering. (3) Two 1 1/2 hours of lecture per week. Prerequisite: courses 131 and 132. Introduction to the principles and methods involved in the analysis of the major responses of structures to earthquake ground motion. Emphasis on the use of computer programs for the analysis of typical structural systems.

Mr. Penzien (Sp)

133. Theory of Reinforced Concrete Design. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 131 and 132. Advanced topics in the design of structural systems reinforced with steel reinforcement. The Staff (Mr. Mahin in charge) (F, W, Sp)

134. Elements of Metal Structures. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 131. Introduction to design of metal structural members and connections. Mr. Bouwkamp, Mr. Polivka (F, Sp)

135. Reinforced Concrete and Prestressed Concrete Design. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: CE 131, 133. Analysis, design, and in-service behavior of reinforced concrete and prestressed concrete. The Staff (F, W)

136. Advanced Structural Analysis. (3) Three hours of lecture and two 2-hour laboratory periods per week. Prerequisite: course 131. Advanced computer-based analysis of structural systems and reinforced concrete systems. Mr. Powel (W)

137. Synthesis and Design of Structural Systems. (4) Two 1 1/2 hour lectures and one 3-hour laboratory period per week. Prerequisite: courses 131, 134. Planning and design aspects of structural systems. Mr. Sackman (W)

138. Introduction to Mechanics of Solids. (4) Three 1 1/2 hour lectures per week. Prerequisite: CE 130A or Physics 105A; or consent of instructor. Stress-strain relations in engineering materials; plasticity; creep, relaxation, thermal effects; solution of problems in elasticity and inelasticity.

Mr. Sackman (F, Sp)

140. Water Resources Engineering. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 156B (may be taken concurrently). Steady flow; flow in open channels; flow in pipes; effects of friction; design of water distribution systems and systems for water-supply systems. The Staff (F, W, Sp)

141. Water Quality Management. (3) Three hours of lecture per week. Prerequisite: course 140. Chemical, physical, and biological aspects of water and wastewater treatment. Theory of water and wastewater treatment plants. Special water conditioning problems including desalination and corrosion control. Water pollution control and its relation to process design. The Staff (F, W)

142. Design of Water Quality Management Systems. (4) Three hours of lecture per week. Prerequisite: course 141 (may be taken concurrently). Lectures and discussions of the nature of engineering problems in water quality management and design of processes, treatment, and design concepts of process, design, and economic evaluation. Parallel problem assignments illustrating the application of design criteria to typical units of water and waste water treatment systems.

Mr. Lawrence (W)

143. Applied Ecology. (3) Two 1 1/2 hour lectures per week. Prerequisite: course 142. Application of ecological theory to some aspects of the management of systems for water, and design aspects of structural systems; sources of pollution for those with little or no biological training. Effects of pollution in ecosystems and organisms. Relevant biological and physical principles for integrating changes in ecosystem. Realistic ecosystems will be observed and difficulties in validation of measurements shown.

Mr. Home (F)

144. Environmental and Sanitary Engineering. (3) Three 1-hour lectures per week. Prerequisite: course 142. An introduction to the principles of environmental, sanitary, and engineering systems. Lawrence (W)

145. Chemistry of Waters, (3) Three 1-hour lectures per week. Prerequisite: Chemistry 1A or equivalent. For engineering, science, and environmental health majors. Not open to civil engineering majors. The Staff (Mr. Mahin in charge) (F, W, Sp)

146A. Water Resources Chemistry. (3) One 1-hour lecture and two 3-hour laboratory periods per week. Prerequisite: Chemistry 1B. A consideration of the inorganic components in water in terms of their concentration, sources, and chemical principles employed to modify the concentration of the major anions, cations, and dissolved gases comprising natural waters. Mr. Jansen (F)

146B. Water Resources Chemistry. (2) One 1-hour lecture and one 3-hour laboratory per week. Prerequisite: Chemistry 1B. Emphasis is placed on the analysis and treatment of waters containing organic constituents. Mr. Jenkins (F, W), Mr. Thomas (W)

147. Organic Chemistry of Water and Waste Water. (3) Three 1-hour lectures per week. Prerequisite: Chemistry 1B. A consideration of the organic components of both natural and process waters. Nomenclature and reactions of pertinent organic compounds. Emphasis on the determination of the quality of waste water. Mr. Thomas (W)

148. Water and Waste Water Treatment Process. (3) Two 1 1/2 hour lectures and one 3-hour laboratory period per week. Prerequisite: course 145. Principles of chemical applied to the statics and dynamics of water and waste water. Mr. Thomas (W)

149. Analysis of Response of Structures to Dynamic Loads. (3) Three 1-hour lectures per week. Prerequisite: course 145. Principles of mechanics applied to the statics and dynamics of water and waste water. Mr. Thomas (W)

150. Hydrology. (3) Two 1 1/2 hours of lecture and one 3-hour laboratory per week. Prerequisite: course 148. The hydrologic cycle, elements of climatology and meteorology, interrelation of precipitation and runoff, ground water, surface water, and air pollution. Mr. Thomas (W)

151. Surface Water Quality Management Systems. (3) Three 1-hour lectures and three hours laboratory per week. Prerequisite: course 146A. Principles of chemical applied to the statics and dynamics of water and waste water. Mr. Thomas (W)

152. Design of Hydraulic Structures. (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: course 146B. Design of small hydraulic structures, such as culverts, drop structures, flfection elements, components of hydraulics, hydraulic models as an aid in design. Mr. Harter (F, W), Mr. Fischer (Sp)

170. Introduction to Transportation Engineering. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: Statistics 25. Objectives, characteristics, policy, economics, location, design, and operation of transportation systems.

The Staff (F, W, Sp)

171. Introduction to Traffic Engineering. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 170. Street and highway traffic problems; principles of design of thoroughfares on the basis of operational characteristics; traffic regulation and control. Mr. Cran dall (F), Mr. Fitcher (Sp)

172. Highway Design and Construction. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 121, 140, 170. Design, drainage, and construction of highways and structures: including intersections, interchanges, and pavements.

Mr. Morison (Sp)

180. Concrete Construction. (3) Two one and one-half hour lectures per week. Prerequisite: CE 110 (or equivalent). Consideration of the design and construction of reinforced concrete structures. Emphasis on the different types of reinforcing steel used in construction, including the selection of plant equipment and material, principles of planning, organization and operating construction forces. Mr. Gran dall (F)

182. Polymers in Construction. (3) One hour of lecture and three hours of seminar per week. Prerequisite: Engineering 45, Architecture 120, or equivalent. An introduction to the principles of polymer technology and to fire protection engineering which will give the students the framework for solving fire problems. Model building codes and fire safety standards. Consideration of the broad aspects of polymers in construction, particularly urban housing structures; technical requirements and performance specifications; selection of polymers; relationship of mechanical properties to microstructure; fire safety; weatherability; manufacturing techniques, use of sealants and coatings. Mr. Williamson (W)

183. Fire Protection Engineering. (3) Two 1 1/2 hour lectures per week. Prerequisite: CE 110, CE 130, and course 142. An introduction to fire protection engineering which will give the students the framework for solving fire problems. Model building codes and fire safety standards. Consideration of the broad aspects of polymers in construction, particularly urban housing structures; technical requirements and performance specifications; selection of polymers; relationship of mechanical properties to microstructure; fire safety; weatherability; manufacturing techniques, use of sealants and coatings. Mr. Williamson (W)

190. Engineering Reports. (3) One 1-hour lecture and two 1-hour exercise and analysis periods per week. Prerequisite: junior standing in engineering. Principles of written communication: formulation of ideas and information; graphical symbols in application to written and oral reporting needs in technical fields; conventions of style and usage; principles of organization and importance, construction methods and format; practice, and analysis of individual problems. Mr. Monismith in charge (W)

192. The Art and Science of Civil Engineering Practice. (1) One 1-hour lecture per week. Prerequisite: course 192. A course of lectures by distinguished engineers designed to provide the student with an appreciation of the role of science and technology in conceiving projects, balancing the interplay of conflicting demands, and utilizing a variety of disciplines to produce united and efficient systems.


194. Economics and Management of Engineering Systems. (5) Five hours of lecture per week. Prerequisite: upper division standing. Credit will not be given for both CE 194 and Economics 120. Principles of economic and management techniques applied to the planning, design, construction, operation, and management of civil engineering systems; professional relations; contracts and specifications.

Mr. Cran dall, Mr. Hester (F, Sp)

195. Directed Group Study for Advanced Undergraduates. (1–6) Four hours of lecture per week. Prerequisite: selection by engineering group. Study of a selected topic or topics in civil engineering. Mr. Mitchell (in charge) (F, W, Sp)

NOTE: For key to symbols, see page 50.
Graduate Courses

200A. Fluid Dynamics for Civil Engineers. (4) Three hours of lecture and 3 hours of laboratory per week. Prerequisite: course 165B or consent of instructor. The basic dynamics of open oceanic circulation. Fronts, eddies, and eddy currents; swells and wave fields; and air-sea interactions. Applications of the equations of potential flow and turbulence to atmospheric and oceanic flows. Mr. Chiu (Sp)

200B. Fluid Dynamics for Civil Engineers: Applications. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 165B or consent of instructor. Application of the theory of fluid motion often encountered in civil engineering practice. Topics will be chosen according to class interest. Mr. Hammack (Sp)

201A. Physical Oceanology. (3) Three hours of lecture per week. Prerequisite: course 165B or consent of instructor. Theoretical aspects of oceanic circulation, such as geostrophic, baroclinic, and barotropic flows; and the physics of ice movement. Emphasis on theories. Mr. Butterfield (Sp), Mr. Chiu (W)

201B. Applications of Physical Oceanology. (2) One 3-hour lecture and one 4-hour laboratory per week. Prerequisite: course 165B or consent of instructor. Oceanic circulation models and their applications, especially for coastal engineering problems. Mr. Butterfield (Sp), Mr. Chiu (W)

201C. Seafloor Sediments: Origin, Properties, and Environmental Significance. (3) Three lecture hours and 1 hour of laboratory per week. Prerequisite: course 165B or consent of instructor. Oceanic bottom sediments, with special emphasis on their environmental significance. Mr. Jynge (Sp), Mr. Tressler (W)

202A. Fluid Dynamics for Civil Engineers: Environmental. (4) Three hours of lecture and 3 hours of laboratory per week. Prerequisite: course 165B or consent of instructor. Fluid-fluid and fluid-solid interactions; computer modeling with application to environmental problems. Mr. Skjetne (Sp), Mr. Chiu (W)

202B. Fluid Dynamics for Civil Engineers: Transportation. (4) Three hours of lecture and 3 hours of laboratory per week. Prerequisite: course 165B or consent of instructor. Fluid-fluid and fluid-solid interactions; computer modeling with application to environmental problems. Mr. Skjetne (Sp), Mr. Chiu (W)

203A. Surface Water Hydrology. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 145. Concepts in surface water hydrology: occurrence and movement of water over the land surface. Emphasis on surface water in hydrologic cycle. Mr. Taylor, Mr. Seber (Sp)

203B. Ground Water Hydrology. (3) Two 1 1/2-hour lectures per week. Prerequisite: consent of instructor. Theory and properties of ground water. Mr. Todd (W)

203C. Advanced Applied Hydrology. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 203A or consent of instructor. Advanced application of hydrologic principles to practical problems in water resources management. Mr. Chiu (W)

204A. Hydrologic Modeling Processes. (3-3) Three hours of lecture per week. Prerequisite: course 204B or consent of instructor. Development of hydrologic models and their application to problems in water resources management. Mr. Chiu (Sp)

204B. Hydrologic Modeling Processes. (3-3) Three hours of lecture per week. Prerequisite: course 204B or consent of instructor. Development of hydrologic models and their application to problems in water resources management. Mr. Chiu (Sp)

205A. Concepts of surface water hydrology. (2) One 1-hour lecture and one 3-hour laboratory per week. Prerequisite: course 203A or consent of instructor. Introduction to the principles and applications of surface water hydrology. Mr. Taylor, Mr. Seber (Sp)

205B. Concepts of Ground Water Hydrology. (2) One 1-hour lecture and one 3-hour laboratory per week. Prerequisite: course 203B or consent of instructor. Introduction to the principles and applications of ground water hydrology. Mr. Taylor, Mr. Seber (Sp)

206. Advanced Hydraulic Flows. (3) Three hours of lecture per week. Prerequisite: course 165. Advanced topics in steady and unsteady flow in closed conduits and open channels, surface and subsurface flow, and other hydraulic applications. Mr. Harder (W)

207. Sediment Transport Mechanics. (3) Three hours of lecture per week. Prerequisite: course 166. Sediment motion, suspension, and sediment transport mechanisms. Mr. Harder (Sp)

208. Advanced Hydraulic-Structures Laboratory. (2) One 4-hour laboratory per week. Prerequisite: consent of instructor. Laboratory study of hydraulic and structural processes employed in civil engineering applications. Mr. Wiegel (Sp)

209B-209C. Hydrologic Modeling Processes (3-3-3) Three hours of lecture per week. Prerequisite: course 204B or consent of instructor. Development of hydrologic models and their application to problems in water resources management. Mr. Chiu (Sp)

210. Water Resources: Quality. (3) Three lecture hours per week. Prerequisite: course 165A, 165B, 165C, or consent of instructor. Theory and application of water quality management principles. Mr. Chiu (Sp)

211. Water Treatment: Theory and Design. (3) Three lecture hours per week. Prerequisite: course 165A, 165B, 165C, or consent of instructor. Theory and design of municipal wastewater treatment processes. Mr. Chiu (Sp)

212. Wastewater Treatment: Theory and Design. (3) Three lecture hours per week. Prerequisite: course 165A, 165B, 165C, or consent of instructor. Theory and design of municipal wastewater treatment processes. Mr. Chiu (Sp)

213. Water Resources Chemistry: Instrumental Methods. (3) One 1-hour lecture and one 3-hour laboratory per week. Prerequisite: course 165A, 165B, 165C, or consent of instructor. The application of instrumental methods to water quality analysis. Mr. Chiu (Sp)

214. Aquatic Chemistry. (3) Three lecture hours per week. Six to eight hours of laboratory per quarter. Prerequisite: course 165A, 165B, 165C, or consent of instructor. Chemistry of aquatic systems, physical and chemical properties of aquatic systems, and chemical processes in aquatic systems. Mr. Chiu (Sp)

215A. Advanced Sanitary Engineering Laboratory. (2) One 1-hour lecture and one 3-hour laboratory per week. Prerequisite: course 145, 146A, 165A, 165B, 165C. Unit operations and processes for municipal and industrial water treatment. Lectures and experiments on gas transfer, flocculation, sedimentation, and biological treatment processes. Mr. Selleck (Sp), Mr. Pearson, Mr. Lawrence (W)

215B. Advanced Sanitary Engineering Laboratory. (2) One 1-hour lecture and one 3-hour laboratory per week. Prerequisite: course 145, 146A, 165A, 165B, 165C. Unit operations and processes for municipal and industrial wastewater treatment. Lectures and experiments on sludge treatment, sludge handling, and sludge disposal methods. Mr. Selleck (Sp), Mr. Pearson, Mr. Lawrence (W)

216. Industrial Waste Control. (3) Three lecture hours per week. Prerequisite: courses 210, 211, 212. Emphasis on the design and operation of industrial units for the control of industrial waste. Mr. Chiu (Sp)

217. Reaction Kinetics In Water Processing. (2) Two 1-hour lecture periods per week. Prerequisite: course 215A or equivalent. Theory and application of kinetic models to water purification processes. Mr. Chiu (Sp)

218A. Air Pollution—Ambient Air Sampling and Monitoring. (2) Two lecture hours per week. Prerequisite: course 215A or consent of instructor. Discussion of fundamental chemistry, methods of air analysis, and various air pollutants. Mr. Thomas, Mr. Wesolowski (Sp)

218B. Air Pollution—Chemical Aspects of Combustion. (2) Two lecture hours per week. Prerequisite: course 215A or consent of instructor. Chemical aspects of combustion processes. Mr. Thomas, Mr. Wesolowski (Sp)

219. Solid Waste Management. (2) Two lecture hours per week. Prerequisite: permission of instructor and graduate standing. Emphasis on the management of solid waste. Mr. Powell, Mr. Wilson (F, Sp)

220A. Theory of Structures. (4) Three 1 1/2-hour lecture periods per week. Prerequisite: course 220A. Analysis of plate and shell structures. Mr. Clough (W)

220B. Theory of Structures. (3) Three 1 1/2-hour lecture periods per week. Prerequisite: course 220A. Analysis of plate and shell structures. Mr. Clough (W)

220C. Structural Behavior. (4) Three 1 1/2-hour lecture periods per week. Prerequisite: course 220A. Analysis of plate and shell structures. Mr. Clough (W)

221. Advanced Structural Theory. (4) Three 1 1/2-hour lecture periods per week. Prerequisite: course 215A. Applications of the finite element method to Civil Engineering problems. Mr. Tressler (Sp)

222. Model Analysis and Structural Behavior Laboratory. (2) Two lecture hours per week. Prerequisite: course 215A. Analysis of structures using the principles of structural analysis formulated in matrix algebra language. Mr. Chiu (Sp)

223. Finite Element Analysis of Structural Systems. (3) Three lecture hours per week. Prerequisite: course 220G and course 215A. Applications of the finite element method to Civil Engineering problems; including stress analysis of two- and three-dimensional solids, plates, shells, and solidification. Mr. Taylor, Mr. Wilson (F, Sp)

224. Dynamics of Structures. (3) Three 1 1/2-hour lecture periods per week. Analysis of stresses and deflections in structures due to the application of dynamic loads. Mr. Clough (W)

225. Random Vibrations of Structural Systems. (4) Four lecture hours per week. Prerequisite: course 225A or equivalent. Probability density functions, one and several variables, Gaussian distributions, non-linearities, and statistical methods. Mr. Clough (Sp)

226. Reaction Kinetics and Reactor Simulation. (3) Three 1 1/2-hour lecture periods per week. Prerequisite: course 225A or equivalent. Kinetics and reactor simulation of chemical processes. Mr. Clough (Sp)

227. Reaction Kinetics and Reactor Simulation. (3) Three 1 1/2-hour lecture periods per week. Prerequisite: course 225A or equivalent. Kinetics and reactor simulation of chemical processes. Mr. Clough (Sp)

228. Reaction Kinetics and Reactor Simulation. (3) Three 1 1/2-hour lecture periods per week. Prerequisite: course 225A or equivalent. Kinetics and reactor simulation of chemical processes. Mr. Clough (Sp)

229. Reaction Kinetics and Reactor Simulation. (3) Three 1 1/2-hour lecture periods per week. Prerequisite: course 225A or equivalent. Kinetics and reactor simulation of chemical processes. Mr. Clough (Sp)

230. Reaction Kinetics and Reactor Simulation. (3) Three 1 1/2-hour lecture periods per week. Prerequisite: course 225A or equivalent. Kinetics and reactor simulation of chemical processes. Mr. Clough (Sp)

Mr. Bertero (Sp)

242. Analysis and Design of Structural Systems. (3) Three 1-hour lectures per week. Prerequisite: course 241 or equivalent. Behavior and design. The real interpretation of structural action for purposes of design. Sources of stress and the selection of materials and their relative importance. Various kinds of loads, environmental conditions, and structural systems are considered. Mr. Blevin (Sp)


Mr. Mahin (F)

243B. Advanced Reinforced Concrete. (4) Three 1 1/2-hour lectures per week. Prerequisite: course 243A or equivalent. Advanced reinforced and prestressed concrete structures. Design for strength and ductility of ductile moment-resisting frames and frame-shear wall systems. Flexure and shear of slabs: recent advances in application of yield-line theory and strip method.

Mr. Bertero (Sp)

244. Advanced Prestressed Concrete. (4) Three 1 1/2-hour lectures per week. Prerequisite: course 135 or equivalent. Structural behavior and design of prestressed concrete elements and systems—continuous beams, slabs, bridges, buildings, and computer-aided prestress. Mr. Irfan (W)

245. Design of Concrete Shells. (4) Three 1 1/2-hour lectures per week. Prerequisite: basic courses in concrete materials and reinforced concrete. Analysis and design of reinforced concrete structural elements. Design criteria for reinforcement. Mr. Mehta (F)

246. Design of Steel Structures. (4) Three 1 1/2-hour lectures per week. Prerequisite: course 134. Topics include structural response and design of steel connections, design and testing of steel connections; selection of suitable connections; design of connection bolts and fasteners; design of steel bridges; design of steel frames; design of steel columns; design of steel special shapes; design of steel members in steel-concrete composite structures; and design of steel bridges.

Mr. Gifford (Sp)

247A. Analysis and Design of Concrete Dams. (4) Three 1 1/2-hour lectures per week. Prerequisites: course 241 and course 140. Selection of location and type; stability analysis; stress analysis of gravity, arch, multiple-arch, and buttress dams; problems imposed by construction conditions and use of mass concrete.

Mr. Scordelis (Sp)

248A. Inelastic Design of Structures. (3) Three 1 1/2-hour lectures per week. Prerequisite: course 240A. Advanced topics in design and analysis of structures subjected to earthquake loads. Limit analysis and limit design: first and second order theories. Structures subjected to proportional excitations: design of structures subjected to earthquake loads. Mr. Bertero (F)

248B. Inelastic Design of Structures. (4) Four hours of lecture per week. Prerequisite: course 248A. Inelastic analysis and design of members subjected to compressive forces; plasticity theory; load and moment analysis; analysis of plastic hinges; theory of plastic analysis of steel structures; and design of structural systems. Mr. Gifford (F)

249. Advanced Concrete Technology. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 110A or equivalent. Advanced topics in concrete technology, including properties of fresh and hardened concrete; environmental effects; durability of concrete subject to chemical attack; composition and properties of special concretes such as lightweight, heavyweight, fiber-reinforced, polymer and expansive cementitious concretes.

Mr. Polivka (W)

250. Transportation Policy and Administration. (3) Three hours of lecture per week. Prerequisite: graduate standing in engineering. Analysis of transportation demand and supply in contemporary economic, social, political, and legal settings. Comparative analysis of modes. Transportation planning and policy as instruments for socioeconomic change. Urban and rural transportation problems. Mr. Zettel (F)

251. Traffic Characteristics and Analysis. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Study of traffic characteristics and analytical techniques for planning, design, and control of urban and rural transportation systems. Traffic characteristics include flow, speed, density, and headways. Analytical techniques include statistical data analysis, time-space diagramming, relationships, queueing analysis, and shock wave theory.

Mr. May (F)

252. Systems Analysis in Transportation. (3) Two 1 1/2-hour lectures per week. Prerequisite: graduate standing in engineering or related fields. A discussion of the systems approach and its application to transportation systems. Survey of systems analysis techniques with emphasis on systems modelling, optimization, evaluation, and decision analysis techniques. Applications of systems analysis techniques to selected transportation problems. Mr. Kanafani (F)

253. Transportation Engineering. (4) Four hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Transportation engineering principles concerning characteristics of air, highway, rail, water and other modes of transportation. Determination and selection of transportation systems; terminal requirements for individual modes and interface problems among modes; environmental impacts.

Mr. Homburger (F)

254A. Transportation Demand Analysis and Forecasting. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. This course will cover fundamental principles of traffic flow and their applications to real-life situations. Attention will be given to intersections, major and minor arterial streets, and rural highways. Demand-capacity estimation and analysis will receive special attention.

Mr. May (W)

255B. Transportation System Management. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. This course is concerned with the operational management of transportation systems. The major topics to be covered include policy issues, objectives, measures of effectiveness, operational strategies, impact assessment, and travel demand responses. Special attention will be given to case studies.

Mr. May (Sp)

256. Transportation Optimization Techniques. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 240A or equivalent. Deterministic queuing models. Strategy for design and control for transportation systems and their applications to traffic control and travel demand. Mr. Daganzo (W)

257. Applications of Queueing Theory to Transportation. (3) Three hours of lecture per week. Prerequisite: course 240A or equivalent. Deterministic and stochastic queuing models. Strategy for design and control of transportation systems and their applications to traffic control and travel demand. Mr. Daganzo (W)

NOTE: For key to symbols, see page 38.
256. Freight Transportation. (3) Hours of lecture per week. Prerequisite: graduate standing. Properties of shipments; freight shipment and transportation; cost analysis; freight rate; consolidation; planning; cost, and demand analysis methodologies; Engineering Costing; data availability; current research, policy, and technology issues. Mr. Garrison (W)

259. Mass Transit Engineering. (3) Hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Nature of mass transit systems, their operation and design. Technology of transit vehicles and structures. Impact on urban land use. Public policy and financing problems. Mr. Homburger (W)

260A. Air Transport Engineering. (3) Hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Nature of civil aviation; aircraft structures, materials and systems. Air traffic control and navigation systems. Types of existing programs, identification and role of participating organizations, development of standards and specifications, and initiation of programs. Mr. Hester (Sp)

267A. Advanced Foundation Construction. (4) Hours of lecture per week. Prerequisite: courses 133 or 124 and 121. Evaluation of soil and structural problems connected with construction of deep foundations for major high-rise buildings. Design of engineering cost, soil and environmental, and management factors. Application to current major projects in urban environments. Mr. Gross (F)

267D. Advanced Construction Estimating. (3) Three hours of lecture per week. Prerequisite: course 135 and 180. Selection and evaluation of construction methods and processes for pre- and post-tensioned concrete, lightweight, high strength, and architectural concrete; precasting and segmental construction. Application to the design and cost estimation for control structures, ocean structures, and cryogenic containment. Mr. Gerwick (W) and Mr. Hester (W)

267C. Construction of Harbor, Coastal, and Ocean Structures. (4) Hours of lecture per week. Prerequisite: course 121, 133, 134. Construction methods and equipment for construction of cofferdams, caissons, harbors, marine terminals, oil and gas platforms, power plant intakes and discharges, submarine oil and gas pipelines, dredging, offshore platforms, Arctic Ocean structures subsea and deep ocean foundations. Mr. Gerwick (W)

267D. Advanced Construction Estimating. (3) Hours of lecture per week. Prerequisite: course 181. Estimating techniques for cut-and-cover, tunnelling, earthwork, and specialty contractors. Preparation of cost estimates including planning of methods and program evaluation of labor, material equipment, subcontract, and indirect costs. Rational assessment of risk and profit margins. Value engineering. Mr. Hester (F)

269. Asphalt Paving Mixtures—Design, Construction and Performance. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Advanced course concerned with asphalt paving especially design of hot-mix asphalt pavements; emphasis is placed on physical properties of asphalts, aggregates and their combinations and the relationship of these properties to proper design and construction of hot-mix asphalt pavements. Mr. Monismith (Sp)

270A. Advanced Soil Mechanics and Foundation Engineering. (3) Three hours of lecture per week. Prerequisite: course 121 and 114, or equivalent. Advanced theories of soil mechanics including consolidation, settlement analysis, stress distribution, lateral pressures, bearing capacity, and their application in foundation engineering. Mr. Seed (F)

270B. Advanced Soil Mechanics and Foundation Engineering. (3) Three hours of lecture per week. Prerequisite: course 121 and 114, or equivalent. Detailed study of the shear strength of cohesionless and cohesive soils. Stress-strain relations, methods for strength measurement, slope stability and analysis techniques. Mr. Duncan (W)

270C. Advanced Soil Mechanics and Foundation Engineering. (3) Three hours of lecture per week. Prerequisite: course 121 and 114 or equivalent. Design and installation of pile and pier foundations; analysis and design of drilled and driven piles; battered bulkheads, excavation bracing, cofferdams; tie-back systems; mat foundations; site characterization by in-situ testing methods. Mr. Duncan (Sp)

270L. Advanced Soil Mechanics Laboratory. (3) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: CE 270A, CE 270B. Lectures and experimental work concern: soil stratigraphy; soil properties and their application to design and analysis. Consolidation, static and cyclic triaxial testing with pore water pressure measurement, pavement design procedures, undisturbed sampling, vane shear, pile load tests, advanced instrumentation and measurement techniques. Mr. Houston (Sp)

271. Seepage Through Soils. (2) Two 1-hour lectures per week. Principles governing the flow of water through soils and their applications in civil engineering.

272. Soil and Site Improvement. (4) Four hours of lecture per week. Prerequisite: graduate standing. Soil stabilization using compaction, lime, cement, asphalt, or other materials. Soil improvement by use of lifts, sand, or gravel to form subgrades, embankments, slopes, highways, and airports; and design and construction with stabilized soils; principles of pavement construction; inplace soil treatment methods; development of marginal lands; solid waste utilization. Mr. Mitchell (W)

273. Soil Behavior. (4) Three hours of lecture per week and 1 1/2 hours of laboratory per week. Prerequisite: course 121 or consent of instructor. Clay mineralogy, soil formation and composition, shrinkage, swelling, plasticity, strength, relative density, soil water—fabric—property relationships, analysis of mechanical behavior in terms of physicochemical principles, soil-water—strain relationships, strength and deformation under load. Mr. Mitchell (F) and Mr. Brekke (W)


275. Soil Dynamics—Earthquake Engineering. (3) Three 1-hour lectures and one 1 1/2-hour laboratory per week. Prerequisite: course 271 or consent of instructor. Principles of earthquake engineering; types of failures; and the design and construction. Mr. Seed (Sp)

277. Theoretical Soil Mechanics. (4) Hours of lecture per week. Prerequisite: knowledge of FORTRAN programming. Graduate standing in geotechnical engineering. Theories and numerical methods for consolidation, subgrade reaction, and laterally loaded piles. Stress analysis by the finite element method. Limit analysis of bearing capacity and stability problems. Mr. Lysmer (W)

280A. Principles of Rock Mechanics. (3) Three hours of lecture per week plus some laboratory demonstrations. Prerequisite: course 280A. Methods of analysis of Failure in rock structures. Characteristics of failure for brittle, discontinuous and anisotropic rocks. Determination of in-situ stresses; laboratory and field techniques. Mr. Goodman (Sp)

280B. Applied Rock Mechanics. (3) Three hours of lecture per week plus some laboratory demonstrations. Prerequisite: course 280A. Methods of analysis of rock structures. Characteristics of failure for brittle, discontinuous and anisotropic rocks. Determination of in-situ stresses; laboratory and field techniques. Mr. Goodman (Sp)

281. Engineering Geology. (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: course in geology. Lecture, laboratory, and field exercises. The engineering properties of rocks: subsurface exploration; geological factors bearing on construction. Mr. Goodman (F)

283. Geological Engineering of Underground Openings. (3) Three hours of lecture per week. Prerequisite: courses 280A and 280B or general geology. Theoretical principles of construction; field problems; construction; and instrumentation. Mr. Goodman (F)
of lecture and one 3-hour laboratory per week. Prerequisite: course 107 or equivalent. Design of components and circuits for analog and digital systems; operational amplifiers, feedback concepts; instability and frequency compensation. 2-ports.

200. Electronic Circuits l.ab. (1) One 3-hour laboratory per week. Prerequisite: course 104A, 104B, or consent of instructor. Theoretical and practical study of the physical/chemical dynamics of dielectric materials; applications of electromagnetic theory to insulators, capacitors, and dielectric loss. 105L.

201L. Electronic Circuits l.ab. (1) One 3-hour laboratory per week. Prerequisite: course 104A, 104B, or consent of instructor. Theoretical and practical study of the physical/chemical dynamics of dielectric materials; applications of electromagnetic theory to insulators, capacitors, and dielectric loss. 105L.

208. Electronic Circuit Interconnection. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: EECS 104A, 104B, or equivalent. Study of the problems associated with interconnecting electronic circuits, e.g., noise pick-up in low level circuits, degradation of high speed signals in high speed systems. Mr. Gray (F, W, Sp).

108. Electronic Circuit Interconnection. (3) Three hours per lecture week. Prerequisite: EECS 104B, 104C, 117A, or consent of instructor. Includes topics associated with interconnecting electronic circuits, e.g., noise pick-up in low level circuits, degradation of high speed signals in high speed systems. Mr. Gray (F, W, Sp).

117A-117B. Electronic Circuits and Instrumentation Systems Design Laboratory. (4-4) Four hours of lecture and one hour of discussion per week. Prerequisite: Physics 5C or equivalent. An introduction to electronics for nonmajors. Theory and applications of solid state and vacuum tubes. Mr. Singer (W, Sp).

111. Power Electronics Laboratory. (2) One 4-hour laboratory per week. Prerequisite: EECS 113. Thyristor characteristics; dc-dc converters. a.c./d-c ac convertors, transformerless inverters. Transistorized switching power supply. Computer simulations. One design oriented project of student's choosing.

112. Electric Power Devices. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104A (may be taken concurrently) and 112L. (Must be taken concurrently with 112, 114A, 114B, and 114C. Additional lecture hour on topics of particular interest or too recent to have been incorporated into other courses. Content will change from year to year and course can be repeated. Mr. Goodman, Mr. Brekke (W, Sp).

112L. Electric Power Devices Laboratory. (2) One lecture and one 3-hour laboratory per week. Prerequisite: course 104A (may be taken concurrently) and 112L. (Must be taken concurrently with 112, 114A, 114B, and 114C. Additional lecture hour on topics of particular interest or too recent to have been incorporated into other courses. Content will change from year to year and course can be repeated. Mr. Goodman, Mr. Brekke (W, Sp).

114A-114B. Power Systems Analysis. (4-4) Three hours of lecture and one hour of discussion per week. Prerequisite: 112L, 114A, 114B. Power systems analysis; fault analysis, stability, and load flow computation. Mr. Ng (W, Sp).

115. Semiconductor Circuits Laboratory. (2) Two hours of lecture per week. 117A. Systems concept, electromagnetic fields and waves, antennas, aerospace electronics, principles of solid state microwave devices, antennas, propagation of radio waves, noise and specific microwave communications systems. Mr. Angelakos (Sp).

117A-117B. Electronic Circuits and Instrumentation Systems Design Laboratory. (4-4) Four hours of lecture and one hour of discussion per week. Prerequisite: EECS 104A, 104B. Systems concept, electromagnetic fields and waves, antenna theory and design, principles of solid state microwave devices, antennas, propagation of radio waves, noise and specific microwave communications systems. Mr. Angelakos (Sp).

NOTE: For key to symbols, see page 36.
118. Linear Systems Analysis. (4) Two 1 1/2-hour lectures and one 1-hour recitation per week. Prerequisite: course 104B. Analysis of linear electrical, mechanical, and biological systems. Solution by differential equations and vector differential equations for homogeneous and anisotropic media. Mr. Whinnery, Mr. Hopkin, Mr. Poiak, Mr. Jury, Mr. Wu (Sp)

119. Circuit Theory and Design. (4) Three hours of lecture and two hours of discussion per week. Prerequisite: course 104B. Selected topics on network analysis, approximation, synthesis, and design. Passively and actively connected circuits, Continuous time and discrete time (active and filter) optimization. Mr. Meyer, Mr. Grady (F, W, Sp)

120. Spectral Analysis and Modulation. (4) Four 1-hour lectures and one 1-hour recitation per week. Prerequisite: Math 51A, 51C, Fourier analysis: Fourier series. The describing function and Poisson. Stability criterion. Time-optimal control systems. Mr. Olgun, Mr. Wong (W), Mr. Wu (F, Sp)

121. Introduction to Digital Signal Processing. (3) Three hours of lecture per week. Prerequisite: EECS 117A. Introduction to digital signal processing algorithms and digital filters. Fourier series and transform, sampling theorem, z-transform design, sign of recursive (IIR) and non-recursive (finite impulse response) digital filters, window and spectral analysis, fast Fourier transform, effect of quantization of coefficients and data. Mr. Jury, Mr. Messerschmitt (F, W)

122A-122B. Feedback Control, (4-4) Three 1-hour lectures and one 3-hour laboratory per week. 122A. Prerequisite: course 119. Analysis and synthesis of linear feedback control systems. Mr. Bergen, Mr. Hopkin, Mr. Polak, Mr. Jury, Mr. Wu (W, F)

123. Solid-State Devices. (3) Three hours of lecture per week. Prerequisite: course 120 or equivalent Physical properties of solid-state devices. Silicon surfaces, MOS transistors and charge-coupled elements. Schottky barrier and tunnel diode, breakdown voltages, varactors, memory elements, IMPATT devices and SCR. Gunn effect, lightning and laser diodes. Elastovance devices and Josephson junctions. Mr. Wagon (W)

131A. Integrated-Circuit Devices. (4) Three hours of lecture and one hour of recitation per week. Prerequisite: Physics 5E. Description of solids, the crystalline state, energy states, electron and hole production processes in semiconductors and metals, dielectric properties of insulators. Optical effects. Mr. Muller, Mr. Wang (Sp)

131B. Solid-State Devices. (3) Three hours of lecture per week. Prerequisite: course 130 or equivalent Physical properties of solid-state devices. Silicon surfaces, MOS transistors and charge-coupled elements. Schottky barrier and tunnel diode, breakdown voltages, varactors, memory elements, IMPATT devices and SCR. Gunn effect, lightning and laser diodes. Elastovance devices and Josephson junctions. Mr. Wagon (W)

132A–132B. Communications Systems Laboratory, (2–2) Formerly 132A. One 4-hour laboratory per week. Prerequisite: course 119. Measurement of frequency spectra. Time and frequency measurements of continuous-time, sinusoidal, and non-sinusoidal waveforms; AM, FM, and PCM systems; bandwidth expansion and threshold phenomena. Mr. Turin, Mr. Brodersen (Sp)

133A. Power System Laboratory. (2) One 4-hour laboratory per week. Prerequisite: course 114A. Synchronous generator modeling. Steady state and transient stability, governor and generator connected to infinite bus. Effect of voltage regulator. Mr. Bergen, Mr. Hu (W)

133B. Power Control Laboratory. (2) One 4-hour laboratory per week. Prerequisite: course 114B. Steady state and transient behavior during short circuits. Effect of power system stabilizers on system damping and stability. Mr. Hopkin, Mr. Wagon, Mr. Varava (F, W, Sp)

134. Solid-State Electronics Laboratory. (2) One 4-hour laboratory per week. Prerequisite: course 133A. Experiments for measuring physical parameters and observing and interpreting fundamental phenomena in solid-state materials and devices. Mr. Muller, Mr. Oldham, Mr. Van Duzer (Sp)

135. Microwave Laboratory. (2) One 4-hour laboratory per week. Prerequisite: course 117A. Experiments illustrating the operation of active and passive microwave devices. Particular consideration is given to the special methods of measurement and to the proper use of computer-aided equipment. Mr. Angelakos, Mr. Gustafson (W, Sp)

136. Introduction to Quantum Electronics. (3) Three hours of lecture per week. Prerequisite: Physics 5E. The laser principle and procedure: basic laser systems; optical resonators; interactions between atomic systems and resonators; modulation and detection of lasers. Mr. Hopkin, Mr. Poják, Mr. Jury, Mr. Wu (Sp)

140. Nonlinear Electronic Device Models and Circuits. (4) Four hours of lecture per week. Prerequisites: courses 104B, 110. Development of nonlinear circuit models relevant to classical diodes, bipolar junction transistors, field effect transistors; effects of modeling complexity and accuracy of performance prediction. Mr. Meyer, Mr. Hopkin, Mr. Poiak, Mr. Jury, Mr. Wu (Sp)

141. Linear Integrated Circuits. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 104B and 105. Integrated circuit elements and devices; operational amplifiers; computer-aided analysis for bias state and bandedge frequency response; feedback amplifier theory and design; and frequency selective circuits, potential and active instability. Mr. Meyer, Mr. Gray (F, W)

145. Digital Integrated Circuits. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: courses 104B, 105, 105L. The design of digital integrated circuit components with emphasis on speed, fan-in, fan-out, logic levels and power. Both bipolar and MOS integrated circuit families are treated. The organization of these circuits into MSI and LSI arrays for logic and memory applications. Mr. Hodges, Mr. Gray (F, W)

147. Processing and Design of Integrated Circuits. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: courses 104B, 105, 105L. Fabrication of integrated circuits, mask layout and circuit simulation. Integrated circuit components, devices and structures and their logic and practical effects. Design of integrated circuits with emphasis on device-circuit interaction. Bipolar and MOS transistors will be fabricated and evaluated in the laboratory. Mr. Neureuther, Mr. Hodges (F, W)

150. Noise Analysis of Communication Systems. (3) Three 1-hour lectures and one 1-hour recitation per week. Prerequisite: EECS 124, Statistics 134A. Review of probability theory. Random processes: covariance function, power spectrum; passage through linear systems; virtual-looker ratio in modules. Mr. Sheppard, Mr. Susskind (Sp)

151. Properties of Plasmas. (2) Two hours of lecture per week. Prerequisites: EECS 124, Statistics 134A. Review of probability theory. Random processes: covariance function, power spectrum; passage through linear systems; virtual-looker ratio in modules. Mr. Sheppard, Mr. Susskind (Sp)

157. Signals and Transducers in Biology and Medicine. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: courses 105 and 105L. Physiological parameters and variables, the fundamental principles of their sources and significance, and their detection and measurement. Passive measurement of physiological signals. Active measurement of physiological parameters. Theories of transducer operation. Applications to biologic, biomechanical, bioacoustic, and bio-optical phenomena. Mr. Lewis (F)

158. Electronic Signal Processing in Biology and Medicine. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: courses 104A, 104B, 105, 105L. Electronic fundamentals for biological and medical applications. Biomedical amplifiers, signal processing circuits, noise, and artifact considerations in the measurement of physiological signals from the cellular to the organism levels. Signal extraction and artifact reduction using signal and statistical methods. Mr. Graham (W)

159. Computer Applications in Biology and Medicine. (2) Three hours of lecture per week. Prerequisite: Computer Science 124, 125A, 125B, 125L. Uniform and unit specific computing and problem oriented programming. Mr. Susskind (Sp)

160. Directed Group Studies for Advanced Undergraduates. (1–5) Prerequisite: course 105. Group study of selected topics in electrical engineering, usually related to new developments. The Staff (F, W, Sp)
212. Microwave Antennas. (4) Three lecture hours per week. Prerequisite: courses 114A—114B or equivalent. Covers modeling and analysis of large interconnected power systems. Computer methods will be emphasized, with applications to systems planning, monitoring, and control. The large scale systems are treated. Mr. Wu (F) 213. Probability Methods in Power Systems. (3) Three lecture hours per week. Prerequisite: course 134 or equivalent. Probabilistic methodologies used in power system planning and studies. Load forecasting, reliability evaluations of generating systems, and reliability distribution systems based on load-shedding probability method and Markov process method. Probabilistic simulation of system operation for protection and control evaluation. Mr. Wu (F) 214. Power Systems. (3) Three lecture hours per week. Prerequisite: course 114A—114B or equivalent. Covers modeling and analysis of large interconnected power systems. Computer methods will be emphasized, with applications to systems planning, monitoring, and control. The large scale systems will be used. Mr. Wu (Sp) 215. Microwave and Optical Distributed Networks. (4) Three lecture hours per week. Prerequisite: course 117A—117B or equivalent. Relations between field theory and network theory; applications of network theorems and the measurement techniques to microwave guides, cavity resonators, filters and ferrite devices; optical waveguides, resonators and other circuit elements; important distributed systems. Mr. Neureuther, Mr. Mel (Sp) 216. Computer-Aided Circuit Analysis. (3) Three lecture hours of computer-assisted circuit analysis. Computer generation of topological and n-port matrices. Computer-aided design of two-dimensional digital filters. Applicability to the phenomena of superconductivity. Electronic, electro-optic and magneto-optic effects; energy-band matrices. Energy-band theory. Cyclotron resonance. Mr. Polak, Mr. White (Sp) 217. Nonlinear Analog Integrated Circuits. (3) Three lecture hours per week. Prerequisite: course 141. Analysis and design of oscillators, multipliers and large signal amplifiers, high frequency analog integrated amplifiers. Active networks. Mr. Pederson (F) 218. MOS Integrated Circuits. (3) Three lecture hours per week. Prerequisite: courses 130-132 and 137B or equivalent. Advanced study of integrated circuit technology. Design and layout of analog integrated circuits. Design and layout of digital integrated circuits. Mr. Pederson (W) 219. Solid-State Electronics. (3) Three lecture hours of full term. Prerequisite: course 145. Advanced studies of digital circuit design and performance with emphasis on integrated logic families and their characteristics. Noise, transmission delays, speed and reliability. The design of A/D and D/A conversion circuits and semiconductor memory cells. Mr. Pederson (Sp) 220. Introduction to the Theory of Signals and Noise. (4) Four lecture hours of full term. Prerequisite: course 141. Physical principles and operational characteristics of semiconductor devices. Mechanism of carrier transport in solids and at interfaces, high-field and high carrier density effects. Nonlinear characteristics of transistors with emphasis on the behavior dictated by present and probable future technologies. Mr. Muller (W) 221. Microwave Antennas. (4) Three lecture hours of full term. Prerequisite: courses 114A—114B or equivalent. Design and analysis of microwave antennas, arrays used in transmission and reception of radio waves. Classical technique and numerical methods are emphasized. Mr. Neureuther, Mr. Mel (Sp) 222. Techniques of Linear System Theory. (4) Four lecture hours of first term and two hours of recitation per week. Prerequisite: course 119. Mathematics 112 recommended. Elementary theory of linear systems: concepts: systems, models, representations; dynamical system representation; I/O representation; Linear system properties: linearity, causality, memory, state representation. State and output feedback. Observers, Lyapunov and I/O Stability. Examines from circuits, control theory and other fields. Mr. Diller (F, W) 223. Network Theory. (3) Three lecture hours of first term. Prerequisite: course 104B. Topological matrices, Tellelegen's Theorem. Classification and representation of nonlinear circuit elements. Existence and uniqueness of transfer characteristics. Nonlinear circuits. Study of transistors with emphasis on the behavior dictated by present and probable future technologies.

261. Statistical Communication Theory. (4) Four hours of lecture per week. Prerequisite: course 260A. Statistical formulation of digital and analog communication. Decision and estimation. Nonparametric and sequential decision rules. Digital communication over the gaussian channel with and without feedback. Modulation and coding. Gaussian communication over the gaussian channel. Rate distortion bounds. Mr. Sakrison, Mr. Turin, Mr. Messerschmitt (W).

265. Information Theory. (4) Four hours lecture per week. Prerequisites: Statistics 134B or 200A or 200F. Fundamental concepts and results in Shannon information theory as a discrete or continuous-time memoryless source and channels. Entropy of sources and channel capacities, proof of source-channel coding theorems. Extension to finite rate distortion function. Fidelity criterion. Mr. Messerschmitt (W).

270A–270B–270C. Plasmas. (3–3–3) Two 1/2–2–2 hours lecture per week. Prerequisite: course 117A–117B. Course 270A is prerequisite to 270B, and 270B to 270C. Theory and applications of plasmas including particle orbit theory, oscillations and waves, collision phenomena, and plasma diagnostics; analysis of controlled fusion experiments. Mr. Birdsall, Mr. Lieberman, Mr. McDaniel (F), Mr. Echenberg, Mr. Springer (W).

281. Dynamic Systems in Biology. (3) Three hours of lecture per week. Prerequisites: courses 115, 118. Advanced application of linear and nonlinear systems techniques to the analysis of biological phenomena. Frequency analysis, threshold, oscillations, and other stability considerations; spectral analysis and systems identification. Applications to biological feedback control systems. Mr. Keller (W).

282. Biomedical Instrumentation. (3) Two 1–2–2 hours lecture per week. Prerequisites: graduate standing; 188 or equivalent. Advanced design techniques in medical instrumentation to measure parameters of direct clinical significance, nuclear magnetic resonance and spectroscopy, x-ray, ultrasonic, optical and electrical measurements, etc. Transducers, amplifiers, and computers necessary for implementation of these techniques. The human body as a complex instrument feedback systems. Mr. Graham, Mr. Singer (F).


290G. Digital Image Conversion. (4) Three hours of lecture per week. Prerequisite: EECS 117A and EECS 130. Unconventional methods of generating electricity from the sun. Including solar cell and photovoltaic devices, photomagnetic, magnetohydrodynamic, and fuel cell. Schemes offering unusual research opportunities may be emphasized. Image and signal storage and processing, model generation of storage and processing methods, relevant semiconductor properties, selective surfaces for solar energy converters. Mr. Hu, Mr. White (Sp).

290H. The Computer-Aided Analysis and Design of Integrated Circuits. (3) Three hours of lecture per week. Prerequisite: course 141 or 145. The review and development of computer-aided circuit analysis programs; effective active device modeling; sparse matrix techniques; basic components and performance of automated high-speed digital integrated circuits. (W).

290. Topics in Communications. (3) Three hours lecture per week. Prerequisites: EECS 160 or 261. Selected topics in the study of communication systems, with emphasis on the role of information theory in the understanding of signal transmission problems. Course content changes yearly and depends on instructor. Mr. Messerschmitt, Mr. Turin (F).

290J. Image Processing. (3) Prerequisite: EE 124 or equivalent. The development of computer-aided methods for two and three dimensional photon and acoustic image processing. Course topics include: pattern recognition, region detection, image enhancement, noise filtering, Fourier and iterative image reconstruction, and aspects of crystallography. Applications are presented for biological, medical, and optical sciences. Mr. Budinger (W).

290K. Solar Thermal Electric Systems. (3) Three hours of lecture and one hour of laboratory per week. Prerequisites: EECS 160 or equivalent. Systems to collect, store, transmit, and deliver to consumers solar energy, and wind energy. The design, analysis, and operation of plants, engineering properties, and performance of solar receptors, heat transport and storage, thermodynamic systems, and heat rejection systems. Cost minimization programs. Hybrid bottoming cycles. Environmental impact. Mr. Smith (W).


290P. Topics in Solid State Electronics. (3) Three hours lecture per week. Prerequisites: courses 230 or 231, or consent of instructor. Advanced treatment of topics chosen from research areas such as: space charge effects in solids, high electric-field effects, quantum phenomena, elastic wave interactions, surface effects on semiconductors. Mr. Smith (Sp).

290Q. Plasma Computational Physics. (3) Three hours of lecture per week. Prerequisite: EECS 172 or Physics 142A. Theory and design of plasma simulation, using many particle and fluid models on computers. Applications to oscillations, waves, instabilities, heating, and diffusion in 1, 2, and 3 dimensions. Mr. Birdsell (W).

290S. Topics in Quantum Electronics. (4) Three hours of lecture per week. Prerequisite: course 260A or 117A and Physics 115, or the equivalent, and graduate standing. Topics in nuclear and electron magnetic spin resonance phenomena. Nuclear and electron spin resonance description, resonance instrumentation, spin echo, optical pumping, inversion, and detection of resonance phenomena in noise. Coherent detection, signal averaging, computer processing of data, applications to solid state chemistry. Mr. Lichtenberg. (Sp).

290V. Adaptive and Identification Systems. (3) Three hours of lecture per week. Prerequisite: Statistics 200A or equivalent. Adaptive, control and measurement systems; adaptive filters, regulators, decision directed parameters, and systems. Nonlinearity identification by adjustable decision functions. Convergence with noisy and noiseless state variables. Mr. Smith (Sp).

290X. Radio Telescopes. (4) Three hours lecture per week. Prerequisite: course 117A. Synthesis of celestial brightness distribution from measurements on the radio, optical, and ultraviolet spectrum. Antennas, feeds, and interferometry. Mr. Wong (Sp).

290Z. Topics in Optimization Based Computer-Aided Design of Electronic Circuits. (3) Three hours lecture per week. Prerequisites: EECS 221 or EECS 227A. Computer-aided design of electronic circuits and systems. Formulation of design problems as mathematical programming problems. Sensitivity analysis and optimal computer search for a continuous solution. Optimization design methods. The post manufacture tuning problem. Examples of application to electronic circuit design problems. Mr. Merz (Sp).

298. Group Studies, Seminars, or Group Research. (1/2–8) Advanced study in various subjects through special seminars on topics to be selected each year, informal group studies of special problems, exploratory techniques for problem situations, and seminar research. Upper division engineering students. May be repeated for credit. Current research topics in the areas of 1) biomedical engineering, 2) microelectronics, 3) computer science, 4) control theory, 5) space systems, and 6) electrical engineering. The Staff (F, W, Sp).

602. Individual Study for Doctoral Students. (1–9) Individual study in consultation with the major field advisor to provide opportunity for students to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees). May not be used for unit or research requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp).

IDS 1. Technology and Society. (4) See Interdepartmental Studies for the complete description of this course.

IDS 111. Introduction to Neurobiology. (3) See Interdepartmental Studies for a complete description of this course.

IDS 180. Economic and Biological Feedback Systems. (3) See Interdepartmental Studies for the complete description of this course.

IDS 201. Cellular Mechanisms Underlying Nervous Activity. (4) See Interdepartmental Studies for the complete description of this course.

IDS 201L. Laboratory in Cellular Mechanisms Underlying Nervous Activity. (4) See Interdepartmental Studies for the complete description of this course.

IDS 202. Neural Integration and Coordination. (4) See Interdepartmental Studies for the complete description of this course.

IDS 202L. Advanced Laboratory in Neural Integration and Coordination. (3) See Interdepartmental Studies for the complete description of this course.


Computer Science

Lower Division Courses

1. Introduction to Programming for Engineering and Physical Sciences. (4) Two hours of lecture and three hours of laboratory per week. Prerequisite: Mathematics 1A (can be taken concurrently). Only one of the courses Computer Science 11, 13, 3, 3S, 101, 101S, 103, 103S can be taken for credit. Introductory programming course for the freshman and sophomore curricula in physics and other physical sciences. Mr. Gill, Mr. Clancy (F, W, Sp).

1S. Self-Paced Introduction to Programming for Engineering and Physical Sciences. (1–4) Three to twelve hours of discussion per week. Prerequisites: Mathematics 1A (can be taken concurrently). Only one of the courses Computer Science 1, 1S, 3, 3S, 101, 101S, 103, 103S can be taken for credit. The same material as C S 1 but in a self-paced format. Three to twelve

Mr. Upshaw (F, W, Sp)

3. Introduction to Programming. (4) Two hours of lecture and one hour of discussion per week and scheduled consulting. Prerequisite: None. Only one of the courses 1, 15, 3, 35, 101, 101S, 103, 103S can be taken for credit. Not open to students in engineering. Introductory programming course for lower division non-engineering non-physical science students. Algorithms, programs, and computers. Extensive practice with one or more higher-level languages. Mostly non-numerical applications.

Mr. Gill, Mr. Clancy (F, W, Sp)

3S. Self-Paced Introduction to Programming. (1-4) Two hours of meetings with staff and two hours of programming laboratory per week. Prerequisite: none. Only one of the courses 1, 15, 3, 35, 101, 101S, 103, 103S can be taken for credit. Not open to students in engineering. The same material as course 3 but in a self-paced format. Units assigned depend on number of study units and program assignments completed. Algorithms, programs, and computers. Computer solution of problems drawn from various fields. May be repeated for a total of 4 units.

Mr. White, Mr. Clancy (F, W, Sp)

40. Programming Style. (3) Three 1-hour lectures per week and scheduled consulting. Prerequisites: CS 2 and either CS 1, CS 1S, CS 3, or CS 3S. A systematic approach to the design and construction of computer programs. Course objective: to teach the student to write clear, reliable, efficient and easily modifiable programs. Introduction to the PASCAL programming language. Programming exercises illustrating advanced programming techniques. Mr. Fateman, Mr. Rowe, Ms. S. Graham (F, W, Sp)

41. Machine Structures. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 1 or equivalent. Students who received credit for course 103, Electrical Engineering and Computer Science 106, Engineering 41, or Electrical Engineering and Computer Science 153 prior to September 1973 may not receive credit for this course. Characteristics of computer components, number representation, machine-oriented programming techniques, assembly languages, macro, loaders, use of operating systems.

Mr. Gill, Mr. Stonebraker (F, W, Sp)

*95. Topics in Computer Science. (1) One hour of lecture per week. Prerequisite: consent of instructor. Enrollment preference will be given to freshmen L & S Computer Science students in the "cluster" advising program. P/NP. May be repeated twice for credit. This is a seminar course in which computer scientists describe their professional activities and interests. The aim is to give entering undergraduate students a comprehensive view of the field. Students will be required to write a term paper, based on relevant literature, exploring in great depth one of the topics covered in the lectures.

Mr. Clancy (F, W, Sp)

99. Individual Study and Research for Undergraduates. (1-2) Prerequisite: course 1 or equivalent. A course for lower division students in good standing who wish to undertake a program of individual inquiry initiated jointly by the student and a professor. There are no formal prerequisites. The supervising professor must be convinced that the student is able to profit by the program. Must be taken on a pass/fail basis.

Mr. Berlekamp in charge (F, W, Sp)

Upper Division Courses

103. Introduction to Computing. (4) Two hours of lecture and one hour of discussion per week and scheduled consulting. Prerequisite: none. Only one of the courses 1, 15, 3, 35, 101, 101S, 103, 103S can be taken for credit. Not open to students in engineering. Introductory programming course for upper division non-engineering non-physical science students. Algorithms, programs and computers. Extensive practice with one or more higher-level languages. Applications geared towards students' specific interests. Mr. Gill, Mr. Clancy (F, W, Sp)

103S. Self-Paced Introduction to Computing. (1-4) Two hours of meeting with staff and two hours of programming laboratory per week. Prerequisite: none. Only one of the courses 1, 15, 3, 35, 101, 101S, 103, 103S can be taken for credit. Not open to students in engineering. The same material as course 103 but in a self-paced format. Units assigned depend on number of study units and program assignments completed. Algorithms, programs, and computers. Computer solution of problems drawn from various fields. May be repeated for a total of 4 units.

Mr. White, Mr. Clancy (F, W, Sp)

107. System Architecture. (3) Three hours of lecture per week. Prerequisite: course 41. Not open to Electrical Engineering and Computer Science students for engineering credit. Courses 107 and 152A may not both be taken for credit. Design, communication, and control of memory devices and input-output devices. Cost/performance considerations for system configuration. Design of large programs.

Mr. Kahan, Mr. Berlekamp (W, Sp)

111. System Simulation. (3) Three hours of lecture per week. Prerequisite: course 1 or equivalent, and course 40. An introduction to systems analysis by simulation. Nomenclature. Generation of pseudo-random numbers. Fortran as a simulation language. Study of one discrete (CPSS) and one continuous (CSMP) simulation language. Validation of simulation results. At least one extensive complex simulation example.

Mr. Stonebraker (W, Sp)

Three hours of lecture and one 1-hour problem session per week. Prerequisite: upper division standing or consent of instructor. Not acceptable as a technical elective in engineering. Introductory course for students in the humanities, with particular emphasis on natural language processing. There is sufficient instruction in a programming language to enable students to program basic text manipulations.


148. Introduction to Language Processing and Query Languages. (3) Three hours of lecture per week. An introduction to some of the basic aspects of information processing with emphasis on the fundamentals of languages and their applications. Markoff algorithms. Syntax and semantics of languages. Knuth semantics and attributed grammars. Query languages and relational models of data.

Mr. Zadeh (F, W)

149. Language Processing Techniques and Natural Language Understanding. (3) Three hours of lecture per week. Prerequisites: CS 148 or CS 154 or consent of instructor. Syntax and semantic analysis of natural languages. Parsing algorithms for context-free languages. Syntax and semantics of natural languages. Augmented transition network grammars, transformational grammars, Montague grammar, and meaning representation languages. PRUF and its application to approximate reasoning.

Mr. Zadeh (Sp)

150. Logical Design and Components of Digital Systems. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 1 and either Electronic Engineering 15 or Engineering 17. Characteristics of components for and methods of describing, analyzing, and designing digital systems; switching circuits, algebra, graphical methods and introduction to minimization; experiments with pulse trains, gating units, registers; assembly of systems from standard high-speed components; introduction to logic state analysis.

Mr. Sequin

150S. Electronic Logic Circuits. (1) One hour of lecture per week. Prerequisite: course 150 must be taken concurrently. A student may not receive credit for both 150S and Engineering 17. Supplementary study of electronic logic circuits for students unfamiliar with large-signal transistor techniques.

Mr. Sequin

Mr. Ramamoorthy (F, W, Sp)

151A. Computer Memory and Storage Devices. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: Electrical Engineering and Computer Sciences 145 and course 152A. Computer memory and storage systems, including integrated-circuits for random-access, tapes, drums, and disks for bulk storage. Additional topics from chapters 11-15 of "Computer Organization and Design." Ms. S. Graham (F, W, Sp)

NOTE: For key to symbols, see page 35.
151B. Input-Output Devices and Microprocessors. (4) Three hours of lecture and one three-hour laboratory per week. Prerequisites: Electrical Engineering and Computer Science 151A or course 118. Study of operation of input and output devices, design of interfaces and device controllers, design of micro-controllers, microprocessors, operating systems support for input/output, data communication and interactive systems, laboratory experience in the design and construction of interfaces and controllers. Mr. Despini, Mr. Sepehri (F, W, Sp).


153. Data Structures, Graphs, and Theories of Computation. (4) Three hours per week. Prerequisites: courses 40 and 41 and Math 55. Data packing and encoding. Lists, stacks, queues, and trees. Graphs and graph algorithms. Design and evaluation of algorithms for manipulating data structures (e.g., searching, sorting, hash addressing, etc.). Data structures for programming languages. Course work includes programming exercises using an AlgOL-like language. Mr. Despini, Mr. Fateman (W, Sp).

154. Programming Languages and Compilers. (4) Three hours of lecture and one hour problem session per week. Prerequisite: course 153 Programming language and compiler description; comparative study of several languages. Use of list-processing or string-processing language. Implementation of compilers, interpreters, assemblers. Mr. Fateman, Mr. Swart (F, W, Sp).

155. Operating Systems for Digital Computers. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 152A or course 125. Basic concepts of operating systems. The notion of a process, interprocess communication and synchronization, process allocation, scheduling, paging, loading and linking, scheduling, design and implementation of file systems, security and privacy, process allocation and scheduling, deadlock analysis. Mr. Kasdan, Mr. Ferrari (F, W, Sp).


164. Models of Computation. (3) Three hours of lecture per week. Prerequisite: Mathematics 110A or course 118. Basic concepts of operating systems. The notion of a process, interprocess communication and synchronization, process allocation, scheduling, paging, loading and linking, scheduling, design and implementation of file systems, security and privacy, process allocation and scheduling, deadlock analysis. Mr. Kasdan, Mr. Ferrari (F, W, Sp).

167. Graph Theory. (3) Three hours of lecture per week. Prerequisite: CS 118 or Math 113A. Graph theory and associated algorithmic problems. Elementary graph theory, Markov algorithms, register machines, and PSPACE equivalence to Turing machines. The halting problem and unsolvable problems. Computational complexity. Relevance of abstract models to digital computing. Mr. Grossman, Mr. Harrison (F, W, Sp).

189. Introduction to Combinatorics. (3) Three hours of lecture per week. Prerequisite: CS 118 or Math 113A. Combinatorial methods and their computer implementation. Permutations and combinations; generating functions; inclusion and exclusion; Polya’s theory of counting; Hall’s theorem; assignment problem; backtrack technique; error-correcting codes; combinations, the pigeonhole principle, and combinatorial problems. Mr. Berlekamp, Mr. Clancy (W).

174. Efficient and Optimal Algorithms. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 153 and Mathematics 103. Efficient algorithms for the solution of the systematic construction and analysis of algorithms; models of computation; complexity measures; computation on graphs; search through sets, strings and graphs; fast matrix multiplication; reducibility and NP-completeness; unsolvable and intractable problems. Mr. Karp (F). 

198. Directed Group Studies for Advanced Undergraduates. (2-5) Prerequisite: course 1 or equivalent. Group study of selected topics in Computer Science. The Staff (F, W). 

216. Special Topics in Computer Science for Honor Students. (3) One 3-hour meeting per week. Prerequisites: courses 154 and either 163 or 164. For honor students only. Study in depth of a selected topic in Computer Science chosen by instructor. Students will assess current literature in the topics and present current research to the class. Each student will carry out a project. Course may be repeated (once) for credit. Must be taken on a pass/no pass basis. 

219. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a pass/no pass basis. The Staff (F, W, Sp).

Graduate Courses

244. Techniques for Security and Privacy in Computer Systems. (3) Three hours of lecture per week. Prerequisite: course 153. Techniques for increasing security and protecting privacy of data in computer systems; tradeoffs; memory management, database decentralization; security and privacy methods; problems of statistical inference. Course work includes exercises and a term paper. The Staff (F, W).

246. System Support for Scientific Computation. (3) Three hours of lecture per week. Prerequisite: Mathematics 110A and course 102. Rules for floating point arithmetic and their cost, anomalies and their cost, library subroutines, interval arithmetic, base conversions, handling of over/underflow, error analysis. Mr. Kahan (F).

248. MOS-LSI Design. (3) Three hours lecture per week. Prerequisites: EECS 131B, 145, 147 or CS 135 and 153. Introduction to methodology and implementation of digital systems using microprocessors, memories and peripheral devices. Design, design, implementation and evaluation of individual projects. Use of logic state analyzers and microprocessor development stations. Mr. Claflin, Mr. Harrison (F, W). 

252. Computer Organization and Design. (4) Three hours of lecture per week. Prerequisites: CS 153 and 154. Studies in contemporary computer organization addressing functional properties of computer systems, design tools, and technology. CPU design, including instruction sets, buses, ALU and control. Memory and I/O system. A term project and a final examination is required. Mr. Despini, Mr. Patterson (F, Sp).

253. Programming and Problem-Solving WorkShop. (3) Three hours of lecture per week. Prerequisite: courses 153 and 154. Students will design and implement algorithms and implementing them efficiently. Solution of various problems selected from game-playing, number theory, systems programming, optimization, artificial intelligence, computer graphics, etc. Emphasis on problem-solving, development of efficient algorithms. Oral presentation of solutions by students. Mr. Mont-Reynaud (W).

254. Design of Programming Languages. (4) Three hours of lecture per week. Prerequisite: course 154. Selected topics from: analysis, comparison and design of programming languages; formal description of syntax and semantics; advanced programming techniques; language definitions and applications; specific programming languages, proofs of correctness, verifying compilers. 

255. Advanced Topics in Operating Systems. (4) Three hours lecture per week. Prerequisite: course 152B or equivalent. Topics may include: recent developments in operating systems including multiprocessing, time-sharing and real-time operation; deadlock and resource allocation, simulation, virtual memory, paging, and segmentation; protection and privacy; measurement and modeling; synchronization and input/output; related computer hardware management and design techniques. Mr. Fabry (F, Sp).

256. Computer Graphics. (3) Three hours of lecture per week. Prerequisite: course 152B. Basic concepts of polygon-based techniques. Use of computer graphics hardware, tablet techniques, display list manipulation, graphic order set, interrupt handling techniques. Study of hardware and software system organization concepts and their interactions with applications methodology. Laboratory term projects are required. Mr. Baskin (W).


259. Fault-Tolerance, Microprogramming and Software Architecture. (4) Three hours of lecture per week. Prerequisites: courses 154 or 163 or equivalent and either CS 152 or Math 113A. Advanced fault tolerant design technology. Fault detection and location. Static and dynamic redundancy techniques. Software and hardware design tradeoffs. Failure detection and reliability. Microprogrammable computer systems. Microprogrammable languages, and their compilers. Microdiagnostics and microprogram trade-off studies. Mr. Ramamoorthy (W).


265A. Fault-Tolerance, Microprogramming and Software Architecture. (4) Three hours of lecture per week. Prerequisites: courses 154 or Math 113A or equivalent. Fault-tolerant design technology. Techniques: simulation, analytic modeling of computer systems. Workload characterization and design, fault-tolerant computer systems: problem selection, program improvement and optimization. Performance evaluation of program performance. Course work includes a report and a term project or a term paper. Mr. Ferrai (W).

269. Combinatorial Computing. (3) Three hours of lecture per week. Prerequisite: Mathematics 113A-113B. The construction of BCH codes, RS codes and other codes based on the theory of finite fields. Topics such as algebraic decoding, Fire codes, weight enumerators, convolutional codes, applications to the design of disk memories and deep space probes. Mr. Berlekamp (Sp).

270. Theory of Formal Languages. (3) Three hours of lecture per week. Prerequisites: CS 154 or either Math 113A or 113B. Proves the existence of a fundamental distinction between different kinds of computer systems. Mr. Harrison (W).

280. Effective Computability. (3) Three hours of lecture per week. Prerequisites: CS 164 or Math 113A or equivalent. The theory of computation is used to study the limitations of computers. Machine-independent theorems on speed of computation. Recursion theory. Performance and limitations of the theory of computation. The limits of human calculation. Mr. Blum (W, Sp).

286. Combinatorial Computing. (3) Three hours of lecture per week. Prerequisites: courses 152 and 169. Formulation and solution of combinatorial problems, especially those arising in the analysis and design of algorithms, using principles of combinatorial optimiza-
271. Number Theory. (3) Three 1-hour lectures per week. Prerequisite: 174 and either Mathematics 131A or Mathematics 113A. Computing the greatest common divisor; irreducibility of polynomials; algorithms (some probabilistic and some deterministic, assuming the Extended Riemann Hypothesis) to discover factors of integers. Primality testing and primality proving. Substitution. Not so efficient factoring. Applications of number theory to cryptography. Mr. Blum (Sp)

272. Formal Models of Programs. (3) Three hours of lecture per week. Prerequisites: Mathematics 131A or 132A, or Computer Science 163 and Mathematics 125A. The predicate calculus; models, satisfiability, completeness, and compactness of systems of propositional and predicate equivalence. Canonical forms and universality. Decision problems. Recursion and functional schemes. Mr. DeLand (W)


274. Algorithmic Complexity. (3) Three hours of lecture per week. Prerequisite: 271. Analysis of the time and space complexity of various algorithms; the number of operations required to compute a function; and the size of the data set for which the algorithms can be considered efficient. Applications of the theory to such fields as biology, physics, psychology. Mr. Wilensky (F)

275. Advanced Computer Architecture. (3) Formerly 228T. Three hours of lecture per week. Prerequisite: Computer Science 152A-152B, 252. VonNeumann machines: data flow architecture, parallel and distributed processing, interconnected computer networks. Data base and chess machines. Signal processors including FFT, Vision and image processors. A term project or paper will be required. Mr. Despain (W)

276. Code Generation and Optimization. (3) Three hours of lecture per week. Prerequisite: CS 254 (which may be taken concurrently). Machine code generation. Information propagation algorithms. Optimizing transformations. Mr. Karp (Sp)

282. Advanced Graduate Study in Computer Science. (2-8) Lecture courses on advanced topics in computer science. Staff and quarter are variable.


282E. Correctness of Programs. (3) Three hours of lecture per week. Prerequisite: CS 254, Mathematics 125A. A research oriented course aimed at solving the general problem of obtaining correct computer programs. A variety of methods will be considered including: formal and informal correctness proofs, automatic verification and type-checking systems, program languages to facilitate correctness proofs. Students will be expected to do projects of their own devising. Ms. Graham, Mr. Rowe (F)

292F. Advanced Programming Languages Design and Implementation. (3) Two hours of lecture per week. Prerequisite: CS 254 and 257. Each time the course is offered, one topic pertaining to programming language design and implementation is considered in depth. The emphasis is on recent research results. Students are expected to carry a term project or write a paper. Ms. S. Graham, Mr. Rowe (F)


292J. The Art of Program Testing. (3) Three hours of lecture per week. Prerequisite: CS 254. Algorithms for solving sequencing and scheduling problems, including single processor, parallel processor, open shop, flow shop and job shop problems. NP-hardness results and complexity classification of problem types. Mr. Lawler (W)

292R. High Level Language Computer Architecture. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: CS 152A, 154; CS 252. Design and Analysis of Computer Architecture, intermediate languages, and directed execution. Examples covered are BS5000-BS7000, B1700, IBM 360-370, and CDC 6500. The logical architecture of a substantial project is required (design of a HLL computer and its implementation in microcode or logic). Mr. Lawler (F, Sp)

292T. Algebraic Algorithms. (3) Three hours of lecture per week. Prerequisites: Mathematics 131B, course 154, or permission of instructor. Theory and constructions of algorithms for polynomials, polynomial arithmetic, gcd, factorization. Integration of elementary functions. Analytic approximations of integrals. Design of computer algebra languages for symbolic mathematics. Programming exercises. Mr. Fateman (Sp)

292U. Group Studies, Seminars, or Group Research. (1-8) Advanced study in various subjects through special seminars on topics to be selected each year. Informal group studies of special problems, and individual research on such specific problems, or group research on complete problems for analysis and experimentation. Sections 1 through 10 are offered on a satisfactory/unsatisfactory basis and sections 11 through 15 are graded by letter grades.

The Staff (F, W, Sp)

292V. Individual Research. (1-12) Investigation of computer science or mathematics problems. Mr. Fateman (Sp)

602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the examinations required of candidates for the Ph.D. (and other doctoral degrees). May not be used for unit or residence credit requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

Industrial Engineering and Operations Research

Upper Division Courses

130. Modeling and Simulation of Dynamic Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Mathematics 113B. Formerly CS 285. Three hours of lecture and one hour of discussion per week. Prerequisites: course 255, Statistics 134A if taken concurrently. Concepts of dynamic feedback systems, including stability, and characteristics of linear vs. nonlinear systems. Practice in modeling and analysis of systems of moderate complexity; simulation of nonlinear and stochastic systems. Mr. Grassi (Sp)

154. Information and Data Systems. (4) Three hours of lecture and two hours of laboratory per week. Prerequisite: Engineering 120 and 162. Operations analysis of real systems using models and quantitative methods of operations research. Mr. Grassi (W)

155. Facilities Planning and Design. (4) Two 1 1/2-hour lectures and one 1 1/2-hour discussion per week. Prerequisite: course 150. Consideration of mathematical models for layout, line balancing and conveyor system analysis of industrial systems, including simulation modeling and analysis of systems of moderate complexity; simulation of nonlinear and stochastic systems. Mr. Grassi (Sp)

160. Production Systems Analysis. (4) Three hours of lecture and two hours of laboratory per week. Prerequisite: Engineering 120 and 162. Operations analysis of real systems using models and quantitative methods of operations research. Mr. Grassi (W)

NOTE: For key to symbols, see page 36.
16.1. Operations Research II. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Statistics 134A or 100A. Probabilistic methods and modeling of discrete and continuous random events. Markov chains, discrete optimization and decision theory, and solution of large problems using computer programs. The Staff (W)

160. Synthesis and Design of Industrial Systems. (4) Two 2-hour lectures per week. Prerequisite: course 150 and one of course 162, 167, or Mechanical Engineering 102A. Application of systems analysis and design to the synthesis and design of industrial or governmental systems. Consideration of technical and economic aspects of equipment and process design. Students work in teams under faculty supervision. Topics vary year to year. The Staff (Sp)

198. Directed Group Study for Advanced Undergraduates. (1-6) Prerequisite: senior standing in engineering. Group studies of selected topics in production management. The Staff (W, Sp)

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations. Students registered for independent study are expected to work under the direction of an instructor. The Staff (Sp)

150 and one of course 162, 167, or Mechanical Engineering 102A. Application of systems analysis and design to the synthesis and design of industrial or governmental systems. Consideration of technical and economic aspects of equipment and process design. Students work in teams under faculty supervision. Topics vary year to year. The Staff (Sp)

162. Linear Programming. (5) Two 1 1/2-hour lectures and one 2-hour problem session per week. Prerequisite: Mathematics 107. An introduction to linear programming with emphasis on formulation, the simplex method, duality theory, post-optimization problems, sensitivity analysis, and key network models and applications to transportation and flow systems. The Staff (W, Sp)

116. Introduction to Inventory Theory. (3) Two 1-hour lectures and one 1-hour problem section per week. Prerequisite: Statistics 134B (may be taken concurrently) or 100A or 133. An introduction to deterministic and stochastic models of inventory, with emphasis on prediction, interpretation, and application of steady-state results. (Sp)

165. Reliability and Quality Control. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: course 134B or Math 241 equivalent. Techniques and models useful in reliability, safety, and quality control developed by means of examples. Basic rules of probability; survival functions; life tables; continuous and discrete probability distributions; minimal and exponential acceptance sampling plans. Operating characteristic curve. Quality control charts and their uses. Economics of control charts. Mr. Grossman (W), Mr. Cowen (F), Mr. Ross (Sp)

166. Network Flow Models and Critical Path Scheduling. (4) Two 1/2-hour lectures and one hour of discussion per week. Prerequisite: Mathematics 51A or 135A, or Statistics 134B or 51C. Network optimization models, with emphasis on formulation and industrial application. Topics covered include shortest-route problems; network flows; transportation and dynamic flow networks; shortest and longest routes; formulations, time only and cost-time critical path scheduling; computer solution of network problems; and cost-time critical path scheduling. The Staff (Sp)

167. Introduction to Queueing Theory. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: One of Statistics 134B (may be taken concurrently) or 100A or 133. Definition and connection between individual, social, technological and environmental systems. The Staff (Sp)

169. Human Performance Mechanisms. (4) Three three-hour lectures and one 1 1/2-hour problem session per week. Prerequisite: course 170A. An introduction to the main anatomical, physiological, and psychological aspects of human performance mechanisms. Topics covered include the main analytic and measurement techniques. Mr. Grossman (W), Mr. Glasser (W)

170. Human Performance Mechanisms. (4) Three 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 170A. An introduction to the main anatomical, physiological, and psychological aspects of human performance mechanisms. Topics covered include the main analytic and measurement techniques. Mr. Grossman (Sp)

171. Work Systems and Organization. (4) Three 1 1/2-hour lectures and one 1-hour laboratory per week. Introduction to analysis and design of industrial work systems and organization, with review of relevant scientific models and data. Reciprocal influences between individual, social, technological and environmental factors affecting productivity and job-satisfaction. Pay and incentives; motivation and morale; social influences. Mr. Grossman (W)

172. Work Methods and Measurement. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisite: course 170, Statistics 134A, or permission of the instructor. The Staff (W)

173. Industrial Safety and Health. (3) One and one-half hours of lecture and 1 1/2 hours of project and discussion per week. Prerequisite: EIOE 170 or consent of the instructor. An engineering-oriented introduction to industrial hygiene, safety and health problems and solutions encountered in industry and commerce. Coverage includes OSHA, OSHA, ILO, ILO, and governmental regulations programs and equipment, analytical approaches using probability and fault-free methods, human reliability, cost-benefit analysis, and computer applications. Mr. Grossman (Sp)

174. Applied Statics and Health Laboratory. (1) Field project associated with EIOE 170. Mr. Grossman (Sp)

263A. Linear Programming. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: Mathematics 111. Basic graduate course in linear programming, theory and applications. Methods of algorithmic and randomized optimization. Convergence properties. Duality theory. Geometry of linear programs. Parametric programming. Special structures such as decomposition and assignment. Branch and bound method; algorithms for finding fixed points of mappings: convex analysis; duality and conjugate functional analysis. Mr. Adler, Mr. Gale, Mr. Glasser (F, W)

268. Advanced Mathematical Programming. (4) Requirements: Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: IEOR 260 & 262A. Selected topics in decomposition of linear programs, quadratic programs, integer programming, and dynamic programming. The Staff (F, W, Sp)

269. Integer Programming And Combinatorial Optimization. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: course 263A and Math 104A. Study of Markov renewal processes, continuous time Markov chains, and Markovian decision processes. Applications include networks with application to problems in replacement, queuing, and other stochastic systems. Emphasis in asymptotic behavior. Mr. Ross, Mr. Wolf (W)

263B. Applied Stochastic Processes II. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: Statistics 134B or Statistics 200F (may be taken concurrently). Methods of renewal theory and Markov chains applied to problems in replacement, queuing, and other stochastic systems. Emphasis in asymptotic behavior. Mr. Ross, Mr. Wolf (W)

264. Reliability Theory. (4) Two 1 1/2-hour lectures and one 1-hour problem session per week. Prerequisite: course 263A or may be taken concurrently). A study of failure rates, renewal theory, and Markov processes. Reliability; properties of distributions with monotone failure rate; extreme value distributions; coherent structures; multiple block-out systems; and optimal redundancy. Mr. Barlow, Mr. Ross, Mr. (Sp)

265. Advanced Stochastic Processes. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: course 263A—may be taken concurrently. A survey of solution of techniques and problems that have formulations in terms of flows in networks. Max-flow between two points and multicommodity flows. Relationship with linear programming, transportation problems, electrical networks and critical path scheduling. Mr. Grossman (W), Mr. Oliver, Mr. Karp (W, F)

266. Advanced Queueing Theory. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 263A. A study of Markovian and M/G/1 queues. "L = L + L" and other conservation laws. Fluctuation theory and GI/G/1 queues. Approximations. Branching processes for single and multiple channel queues. Priorities. Mr. Wolf (Sp)

267. Advanced Dynamic Programming. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 263A. Applications to manufacturing systems, Markovian and M/G/1 queues. "L = L + L" and other conservation laws. Fluctuation theory and GI/G/1 queues. Approximations. Branching processes for single and multiple channel queues. Priorities. Mr. Wolf (Sp)

268. Applied Dynamic Programming. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 263A. Applications to manufacturing systems, Markovian and M/G/1 queues. "L = L + L" and other conservation laws. Fluctuation theory and GI/G/1 queues. Approximations. Branching processes for single and multiple channel queues. Priorities. Mr. Wolf (Sp)

269. Integer Programming And Combinatorial Optimization. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 262A or may be taken concurrently. A study of integer programming is not a strict prerequisite for students who have taken course 262A. Typical applications of integer linear programming: convex and primal cutting-plane algorithms; group-theoretic methods: branch/bound methods: total unimodularity and the transportation problem; matching theory; linear programming; network flows. Applications of matroids to graph theory and mathematical programming. Mr. Adler (Sp)

270. Engineering Psychology. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 245 or course 130E. An engineering-oriented introduction to industrial hygiene, safety and health problems and solutions encountered in industry and commerce. Coverage includes OSHA, OSHA, ILO, ILO, and governmental regulations programs and equipment, analytical approaches using probability and fault-free methods, human reliability, cost-benefit analysis, and computer applications. Mr. Grossman (Sp)

271. Advanced Topics In Work Systems Design. (4) Two 1 1/2-hour lectures and one 1-hour laboratory per week. Prerequisite: course 171. Impact of technology on task performance, supervision, coor-
290A. Theory of Production. (3) Three hours of lecture per week. Prerequisite: Mathematics 104A. Review of Theory of Steady State Models of Production: Annual and period production functions. Dynamic control of production; stability, optimal control. Deterministic models; simulation, controlled experiments. Population growth; price theory. Introduction to linear programming. Mr. Grossman (W)

290B. Decision Analysis. (4) Three hours of lecture and one 1 1/2-hour discussion per week. Prerequisite: Economics 102 and 265 or consent of instructor. Study of decision analysis culminating in an application project. Discussion of behavioral validity of the methodology. Mr. Wolff (Sp)

290C. Statistical Aspects of Discrete Event Simulation. (3) Three hours of lecture per week. Prerequisite: course 267, Statistics 200G, and knowledge of a computer programming language. Statistical design and analysis of discrete event simulations of queues and other stochastic models. The initial translation of an operational setting into a stochastic simulation model. Variance estimation techniques including the replication, batch mean, and time series methods, and batch means. Variance reduction techniques. Mr. Pask (W)

290D. Qualitative Methods in Social Interaction. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 103L. This course is designed to provide the student with a working knowledge of the techniques of social interaction with ceramic and metallurgical engineers, and reports on industrial experiences to supplement lectures. Compounding and melting, softening points and annealing of glass. Strength of glass, glass-ceramics, and alumina ceramics. Electronic ceramics. Adherence of glass to metals. Mr. Pask (W)

121. Glass and Crystalline Ceramic Materials. (3) Three hours of lecture per week. Prerequisite: Engineering 45. Chemistry of glass with emphasis on structure, bonding, properties of glasses and ceramics: strengthening of glass; glass-coating of metals; and ceramic-metal joining. Properties of ceramic materials for structure application. Surface reactions, electromechanical, electronic, nuclear and aerospace applications.

122. Ceramic and Metal Powder Processing. (3) Three hours of lecture per week. Prerequisite: course 102 or Chem. 14. This course is designed to provide an introduction to powder processing methods and nature of materials responses in slip casting, extrusion, dry pressing, etc. Behavior of slurries and suspensions. Sintering and vitrification. Relation of processing steps to microstructure development.

102. Thermodynamics. (4) Four hours of lecture per week. Prerequisite: Chemistry 18. Chemical thermodynamics with emphasis in thermodynamic principles important in materials science. Mr. Seasy (Sp)


Mr. Thomas (Sp)

121L. Glass and Crystalline Ceramic Materials Laboratory. (1) One 3-hour laboratory per week. Prerequisite: course 121 is a prerequisite and can be taken concurrently. Laboratory exercises to supplement lectures. Compounding and melting, softening points and annealing of glass. Strength of glass, glass-ceramics, and alumina ceramics. Electronic ceramics. Adherence of glass to metals.

Mr. Pask (W)

130. Materials Engineering. (4) Three hours of lecture and three hours of laboratory per week. Preparation of special materials for those who have taken Engineering 45 may not receive credit for course 120. Structure and properties of metallic, ceramic and polymer systems. Introduction of materials to engineering problems. Topics covered include heat treatment of steel, design limitations of structures with respect to fatigue and fracture, and influence of chemical environment on mechanical properties of materials.

Mr. Zackay (F)

141. Particulate Materials. (3) Three 1-hour lectures and one 1-hour laboratory per week. Prerequisite: course 141 is a prerequisite and can be taken concurrently. Preparation of special materials for those who have taken Engineering 45 may not receive credit for course 120. Structure and properties of metallic, ceramic and polymer systems. Introduction of materials to engineering problems. Topics covered include heat treatment of steel, design limitations of structures with respect to fatigue and fracture, and influence of chemical environment on mechanical properties of materials.

Mr. Stryas (F)

141L. Particulate Materials Laboratory. (1) One 3-hour laboratory per week. Prerequisite: course 141 is a prerequisite and can be taken concurrently. Preparation of special materials for those who have taken Engineering 45 may not receive credit for course 120. Structure and properties of metallic, ceramic and polymer systems. Introduction of materials to engineering problems. Topics covered include heat treatment of steel, design limitations of structures with respect to fatigue and fracture, and influence of chemical environment on mechanical properties of materials.

Mr. Stryas (F)

142. Materials Processing Engineering. (4) Four hours of lecture per week. Prerequisite: Engineering 45. Preparation of special materials for those who have taken Engineering 45 may not receive credit for course 120. Structure and properties of metallic, ceramic and polymer systems. Introduction of materials to engineering problems. Topics covered include heat treatment of steel, design limitations of structures with respect to fatigue and fracture, and influence of chemical environment on mechanical properties of materials.

Mr. Evans (F)

NOTE: For key to symbols, see page 35.
**160. Materials Problems in Energy Systems. (3) Three hours of lecture per week. Prerequisite: E-45 and characterization of hostile operating environments including fluids, high temperature steam, hydrogen, and corrosive gases and liquids. Mr. Zackay (F, W, Sp)

**198. Directed Group Studios for Advanced Undergraduates. (1–5) Prerequisite: course 101 and 103. Group study of selected topics. The Studio director must be convinced that the student is able to proceed. Mr. Evans (F)

**199. Supervised Independent Study and Research. (1–6) Enrolment is restricted by regulations listed on page 36. For students in good standing who wish to pursue individual research supervised jointly by a student and a professor. There are no other formal prerequisites, but the supervising professor must be convinced that the student is able to profit by the program. Must be taken on a pass/no pass basis. Mr. Fuerstenau in charge (F, W, Sp)

Graduate Courses

200–200B. Principles of Materials Science and Engineering. (4–3) Three hours of lecture and one hour of discussion per week. Prerequisite: graduate standing. This course is in the departments of Civil, Chemical, and Materials Science Engineering. Crystallography, lattice defects, modern imaging and diffraction methods, solid state phase relations, thermodynamics of surfaces and interfaces, kinetics and phase transformations, alloy theory, mechanical behavior, fracture, technological materials, environmental effects, metallurgy. Mr. Thomas (W, Sp)

200L. Diffraction and Crystallography Laboratory. (2) One hour of lecture and three hours of laboratory per week. Prerequisite: graduate standing. Laboratory for the first 200 course to provide applications of x-ray and single crystal diffraction techniques. Debye-Scherrer, diffractometer, and Laue methods: x-ray qualitative and quantitative analysis, orientation of single crystals, electron diffraction, indexing of patterns, crystal size determinations. Mr. Bragg (F)

201. Applications of Chemical Thermodynamics. (4) Three hours of lecture per week. Prerequisite: course 102 or equivalent. Thermodynamics is used to predict reactions and phase transitions for inorganic materials; thermoelectric properties, non-stoichiometric solids, and aqueous and non-aqueous electrolytes; emission of missing data. Mr. Searcy (W)

**202. Bonding and Crystal Structures. (4) Four hours of lecture per week. Prerequisite: course 101 or equivalent. Bonding models and semi-empirical correlation schemes are applied to analyzing and predicting structural properties of inorganic and organic materials, compounds and alloys. Limitations of the models are discussed. Mr. Searcy (W)

203. Classical Thermodynamics. (4) Four hours of lecture per week. Prerequisite: calculus and partial differential equations. Principles of the thermodynamics of equilibrium, with emphasis on the statistical mechanics of condensed and disordered systems. Mr. Morris (Sp)

**204. Statistical Thermodynamics. (4) Four hours of lecture per week. Prerequisite: familiarity with vector calculus and partial differential equations: Principles of statistical thermodynamics, emphasizing principles and methods important in materials science: alloy theory, crystal imperfections, atom migration in crystals. Mr. Morris (Sp)

205. Diffusion in Solids. (4) Four hours of lecture per week. Prerequisite: vector analysis, partial differential equations. Kinetic theory of diffusion is presented. The mathematical development of the theory of diffusion in solids: mass balance equations; thermodynamics of diffusion; interdiffusion migration; and computer simulation of the molecular theory of diffusion. Mr. Morris (F)

207. Dislocation Theory. (3) Three hours of lecture per week. Concept and properties of perfect and imperfect dislocations, interaction of dislocations, theory of dislocation point defects and stacking faults, theories of glide and climb motion, dislocation multiplication, and cross-slip. Emphasis is placed on the development of dislocations in important crystal structures. Mr. Washburn (F)

208. Dislocation Mechanics. (3 or 4) Three hours of lecture and one hour of discussion per week. Prerequisite: students who have taken course 207 or equivalent should register for 4 units and will be given an intensive introduction to dislocation mechanics. Application of dislocation theory to provide a basic understanding of mechanical properties of crystalline solids: theories of yielding, strain hardening, mechanical twinning, creep, recovery, superplasticity, fracture, and effects of radiation damage. Mr. Washburn (Sp)

210. Surface Properties of Materials. (4) Four hours of lecture per week. Thermodynamics of surfaces and phase boundaries, surface tension of solids and liquids, surface activity, adsorption, phase equilibrium and the role of surface chemistry in heterogeneous catalysis. Sintering, wetting, attachment at interfaces, theory and applications. Mr. Fuerstenau (W)

**211. Thermal and Optical Properties of Materials. (4) Three hours of lecture per week. Prerequisite: any undergraduate course in solid-state physics or physics of materials, e.g., Physics 140, 141, Electrical Engineering and Computer Science 130 or course 108. This prerequisite will be waived for students with undergraduate degrees in physics or chemistry. Applied solid-state physics and optical properties of materials: phenomena of engineering importance, especially nonmetallic materials. Dielectrics, ferro and piezoelectrics, laser materials, electromagnetic radiation, acoustics, phonons, thermal conductivity and thermal expansion. Mr. Merriam (W)

212. Electrical and Magnetic Properties of Materials. (4) Three hours of lecture per week. Prerequisite: any undergraduate course in solid-state physics or physics of materials, e.g., Physics 140, 141, Electrical Engineering and Computer Science 130 or course 108. This prerequisite will be waived for students with undergraduate degrees in physics or chemistry. Applied solid-state physics and optical properties of materials: phenomena of engineering importance, especially nonmetallic materials. Dielectrics, ferro and piezoelectrics, laser materials, electromagnetic radiation, acoustics, phonons, thermal conductivity and thermal expansion. Mr. Merriam (W)

213A. Electron Diffraction and Microscopy. (3) Three hours of lecture per week. Prerequisite: course 101 or 200A or 214. Crystallography, reciprocal lattice, electron diffraction pattern, and micrography; contrast and imaging: contrast from perfect and imperfect crystals, Kikuchi diffraction high resolution; scanning electron microscopy: applications to modern research problems in Materials Science and Engineering. Mr. Thomas (W)

213B. Electron Diffraction and Microscopy. (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: 213A. 213A continued. Dynamical theory, absorption probability, contrast, strain analysis, e.g., small defects (radiation damage, precipitates); special topics; high voltage E.M., many beam effects. Mr. Thomas (Sp)

213E. Electron Microscopy and Diffraction Laboratory. (2) Six hours of laboratory per week. Prerequisite: course 213A: may be taken concurrently: limited to 12 students (W and Sp). Operation of Electron Microscopes, dark field, selected area diffraction techniques, specimen preparation, replicas, foils, photographic procedures, analytic exercises, identification of electron diffraction patterns, second phases, phase transformations, electron microscopy. Mr. Thomas (W, Sp)

214. X-Ray Diffraction. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: 213 or equivalent. Course is designed primarily for graduate students with emphasis on the quantitative treatment of dislocation theory during the first two weeks of the course. Study of many beam effects, non-conventional techniques; lattice imaging, microscopy. Laboratory: advanced research topics; analysis of defects. Mr. Thomas (Sp)

215. Electron Microscopy and Diffraction Lab. (3) Three hours of laboratory per week. Prerequisite: course 213E. Elements of X-ray microanalysis of lattice defects and thin films. Mr. Thomas (Sp)

216. Solid State Phase Transformations. (3) Three hours of lecture per week. Prerequisite: E-102 or equivalent. Theories of nucleation. Rate and morphology of precipitate growth. Metastability. Mr. Morris (W)

217. Optimal Design of Metallurgical and Mineral Processes. (3) Three hours of lecture per week. Prerequisite: at least one senior or graduate course in both Metallurgical and Materials Engineering, and course 108. Design of alloys based upon first principles of materials science and engineering manufacturing, engineering and economic constraints specific to the intended application will be emphasized in design efforts. Mr. Zackay (F)

**221. Applied Colloidal Phenomena. (3) Three hours of lecture per week. Prerequisite: 101L or equivalent. Colloid phenomena in aqueous environments; flocculation, coagulation, and dispersion phenomena; selective flocculation. Mr. Fuerstenau (Sp)

222. Metallurgical Transport and Rate Phenomena. (4) Four hours of lecture per week. Prerequisite: graduate standing in Engineering. Heat, mass and momentum transfer and reaction kinetics in extractive metallurgy and mineral process systems: emphasis on radiative heat transfer and heterogeneous liquid-solid and gas-solid reaction kinetics. Mr. Washburn (F)

223. Modeling of Metallurgical and Ceramic Processes. (3) Three hours of lecture per week. The steady- and unsteady-state behavior of metallurgical and ceramic processes. Selection and computer solution of physically meaningful models and their interpretation in terms of the interaction of transport and kinetic phenomena. Mr. 213A (Sp)

**224. Mineral Process Engineering—II. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: MSE 220 and MSE 223, or consent of the instructor. Process engineering analysis of size reduction, size enlargement and size separation; emphasis on the development of mathematical models, computer simulation, steady state and dynamic processes, process design and scale-up. Mr. Sastry (Sp)

225. Mineral Process Engineering—I. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: MSE 220 and MSE 223, or consent of the instructor. Process engineering analysis of size reduction, size enlargement and size separation; emphasis on the development of mathematical models, computer simulation, steady state and dynamic processes, process design and scale-up. Mr. Sastry (Sp)

226. Surface Chemistry of Flocculation. (3) Three one-hour lectures per week. Application of surface and crystal chemistry to the separation of minerals by flotation and the adhesion of metal salts to mineral surfaces and their flotation behavior: froth flotation and oil flotation. Mr. Fuerstenau (Sp, odd years)

**228. Advanced Extractive Metallurgy. (3) Three hours of lecture per week. Analysis of a single unit operations of extractive metallurgy. Emphasis on the description of the manner in which each unit operation is governed by fundamental rate phenomena. Mr. J. W. Evans (Sp)

229. Optimal Design of Metallurgical and Mineral Processes. (3) Three hours of lecture per week. Discussion of the procedures used in the design of metallurgical and mineral processes. Illustration of process alternatives; economic optimization of a design. Mr. J. W. Evans, Mr. Sastry (F)

241. Numerical Methods in Materials Science and Engineering. (3) Three hours of lecture per week. Prerequisite: graduate standing in engineering. Calculus through partial differential equations. Fourier programs and numerical solution of partial differential equations in materials science and engineering. Use of various numerical techniques is illustrated by examples from the fields of classical, non-linear, and applied mechanics. Mr. 213B (Sp)

243. Design of Alloys for Advanced Engineering Systems. (3) Three hours of lecture per week. Prerequisite: at least one senior or graduate course in both Metallurgical and Materials Engineering. Analysis of the behavior of materials and the effect of irradiation damage on the properties of high temperature or lightweight structural materials. Mr. Sastry (Sp)

245. Nuclear Materials. (4) Four hours of lecture per week. Emphasis on the behavior of structural materials in nuclear reactor environments with emphasis on the mechanism of irradiation damage and the effect of irradiation damage on the properties of materials. The Staff (W, odd years)

246. Sintering. (3) Formerly numbered 225. Three hours of lecture per week. Mechanisms and kinetics of the sintering process and the behavior of sintering heat treatment of metallic or nonmetallic inorganic powder compacts; evaluation of the influence of process variables such as externally applied pressure, liquid phase development, and secondary phases. Mr. A. G. Evans (F)

247. Chemistry of High-Temperature Materials. (3)
Three hours of lecture per week. Prerequisite: Chem 110A. Solutions of high molecular weight. Study materials are described (or predicted); kinetics of high-temperature reactions. Mr. Seary (W, odd years)

248. Ceramic Processing. (3) Formerly MSE 227. Three hours of lecture per week. Treatment of glass ceramics, mechanical behavior of solid-liquid systems in relation to ceramic forming processes; densification mechanisms. Control of process parameters to develop desired structures (characteristics) of material. Mr. Pask (W)

290. Advanced Graduate Study in Materials Science and Engineering. (9-9) Three 1-hour lectures and one hour of discussion per week. Prerequisite: graduate status in Engineering or consent of instructor. Limited to students who have demonstrated by achievement and performance the ability to profit by the program. Must be taken on a satisfactory/unsatisfactory basis. Mr. Searcy (F)

290D. Engineering Applications of Glass and Glass Ceramics. (2) Two hours of lecture per week. Compositional design, microstructural and physical properties of special glasses and glass ceramics for engineering applications. Properties of these glasses and glass ceramics. The Staff (Sp) 290E. Engineering Applications of Ceramics and Porous Decomposition. (2) Two hours of lecture per week. Prerequisite: graduate standing in Materials Science and Engineering or consent of instructor. Theory and practical experiments of the kinetics and mechanisms of congruent vaporization and condensation, incongruent vaporization, effusion through pores, adsorption and description controlled reactions and surface diffusion. Mr. Seary (F)

290G. Science and Technology of Carbon Materials. (2) Three one-hour lectures per week. Prerequisites: structure and properties of carbon and graphite. Mechanical, thermophysical, chemical and electrical properties, applications. Mr. Merriam (W)


290U. Radiation Effects in Metals. (3) Three 1-hour lectures per week. Prerequisite: graduate standing in engineering, physics, or chemistry. A discussion of the occurrence of damage in single crystals and polycrystals. Radiation-induced motion, ionization, and clustering of vacant lattice sites, interstitial atoms and solute atoms during irradiation, their interaction with dislocations and various kinetic surfaces, and the resulting effects on properties of the metal. The emphasis of the course will be on recent papers that have appeared in literature. Mr. Washburn (W)

297. Extractive Metallurgy Field Trip. (1) One hour of lecture per week. Prerequisite: graduate status in Department of Materials Science and Engineering. Approximately one week field trip to visit extractive metallurgy facilities in Western U.S. Field trip at end of quarter. Seminars on facilities to be given by students throughout quarter. Mr. J. R. Evans, Mr. Seary (Sp)

298. Group Studies, Seminars, or Group Research. (1-12) Advanced study in various subjects through special seminars. Special seminars scheduled by semester. Seminars on facilities to be given by students throughout quarter. Informal group studies or special problems, group interaction in comprehensive design problems, or group research on complete problems for analysis and experimentation. The Staff (F, W, Sp)

299. Individual Study or Research. (1-12) The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1-8) Individual study in consultation with the major field advisor. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field advisor. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for the Ph.D. (and other doctoral degrees). May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

605. Directed Group Studies for Advanced Undergraduates. (1-5) Prerequisite: consent of instructor. Group study of selected topics. The Staff (F, W, Sp)

608. Supervised Independent Study and Research. (1-6) Advanced study in various subjects. Enrollment limited to students who have demonstrated by achievement and performance the ability to profit by the program. Must be taken on a passed/not passed basis. Mr. Witherspoon (W)

609. Directed Group Studies for Advanced Undergraduates. (1-5) Group study of selected topics. The Staff (F, W, Sp)

610. Supervised Independent Study & Research. (1-5) Enrollment restricted by regulations listed on page 36. For students in good standing who wish to undertake individual study. Initiated jointly by the student and a professor. There are no formal prerequisites, but the supervising professor must be convinced that the student is able to profit by the program. Must be taken on a passed/not passed basis. Mr. Witherspoon (W)

612. Directed Studies in Materials Science and Engineering. (1-6) Advanced study in various subjects. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

615. Individual Study for the Comprehensive or Language Examination for Doctoral Degrees. (1-12) Advanced study in various subjects providing a conceptual framework central to the understanding of mining engineering. Prerequisite: Mr. Cook (F)

616. Fundamentals of Mining Engineering. (3) Three 1 1/2-hour lectures per week. Prerequisite: upper division standing. Characterization of the nature and grade of ore bodies and identification and analysis of different methods of mining. Providing a conceptual framework central to the understanding of mining engineering. Mr. Cook (F)

617. Fluid Flow in Rocks. (3) Two 1 1/2-hour lectures per week. Prerequisite: CE 165A or ME 1058 recommended. Theory of the basic properties of rocks that control the flow of fluids through porous media. Mr. Witherspoon (W)

618. Directed Group Studies for Advanced Undergraduates. (1-5) Group study of selected topics. The Staff (F, W, Sp)

619. Supervised Independent Study & Research. (1-5) Enrollment restricted by regulations listed on page 36. Additional limitations; enrollment is limited to students who have demonstrated by achievement and performance a B average in their major. Must be taken on a passed/not passed basis. Special prerequisites will be established by the instructor guiding the work. Must be taken on a passed/not passed basis. Mr. Morrison (F, W, Sp)

Graduate Courses


201A-201B. Potential Field Methods in Applied Geophysics. (4-4) Three hours of lecture and one hour of discussion per week. Prerequisites: Physics 110A-110B or equivalent and one year of calculus. The Staff (F, W, Sp) 202A-202B. Electromagnetic Methods in Applied Geophysics. (4-4) Three hours of lecture and one hour of discussion per week. Prerequisites: Physics 110A-110B, or equivalent and an upper division course in partial differential equations. Electromagnetic propagation in the earth with emphasis on the design and interpretation of electromagnetic surveys in mineral prospecting and geological mapping, and in finite source fields above and within layered earth models; fields scattered from inhomogeneities in dissipative half spaces. Mr. Morrison (F, W, Sp, odd years)

203A-203B. Electrical Methods in Applied Geophysics. (4-4) Three hours of lecture and one hour discussion per week. Prerequisites: Physics 110A-110B, or equivalent and an upper division course in partial differential equations. Electromagnetic propagation in the earth with emphasis on the design and interpretation of electromagnetic surveys in mineral prospecting and geological mapping, and finite source fields above and within layered earth models; fields scattered from inhomogeneities in dissipative half spaces. Mr. Morrison (F, W, Sp, even years)

204A-204B. Seismic Methods in Applied Geophysics. (4-4) Three hours of lecture and one hour of discussion per week. Prerequisites: Engineering 200, Theory of dc current flow in isotropic and anisotropic inhomogeneous earth models with emphasis on the design and interpretation of field measurement systems. Theory of electromagnetic and acoustic waves, reflection and refraction methods. The use of explosive and non-explosive sources in continuous reflection profiling is treated, as well as the processing methods used to elucidate geological structure from the seismic data. The Staff (W, Sp)

NOTE: For key to symbols, see page 36.
206. Engineering Mechanics - I. (3) Three hours of lecture per week. Prerequisite: ME 105B and 106A. Advanced topics in design of mechanical components including elevated temperature and cryogenic environments; strength analysis and dynamic behavior of high speed machines. Field trips for study of advanced design application. Mr. Frisch (Sp)

129. Applied Stress Analysis, (4) Four and one-half hours of lecture per week. Prerequisite: CE 130A, Math 5 IC. Solution of practical stress analysis problems relating to real structures using advanced treatment of elements. Classical theoretical elasticity solutions and various experimental techniques will be brought to bear on selected problems. Mr. Leitmann, Mr. Witiis, Mr. Goldsmith (F, W, Sp)

131. Kinematics of Mechanism, (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: course 103 or 104A. Advanced kinematic analysis of typical mechanisms. Velocity and acceleration analysis of linkages, gears, and cams. Mr. Radcliffe (F, W)

132. Dynamics of Machinery, (3) Three hours of lecture per week. Prerequisite: Math 5 ICA or equivalent. Kinematic and dynamic analysis of rigid body mechanism using graphical and analytical-computer methods. Mr. Grutzmacher (F, W)

133. Mechanical Vibrations, (3) Three hours of lecture per week. Prerequisite: course 103 or 104A. An introduction to the theory of mechanical vibrations including linear and non-linear systems and applications to real world problems. Mr. Stadleman, Mr. Tien (F, W, Sp)

142. Atmospheric and Thermal Environmental Control, (4) Four and one-half hours of lecture per week. Prerequisite: ME 105B; ME 106B may be taken concurrently. Thermo-physical principles of heat and mass transfer and control of the thermal environment. Topics covered include the structure, flame speed, flammability, ignition, stirred reaction, kinetics and non-equilibrium processes, pollutant formation. Ms. McCarthy (W)

145. Energy Conversion Principles, (4) Three and one-half hours of lecture per week. Prerequisite: course ME 105B; ME 106B may be taken concurrently. Thermodynamic principles of energy conversion systems. Emphasis on direct energy conversion including thermoelectric, photovoltaic, thermionic, magnetohydrodynamic and electrodynamic devices. Mr. Finch, Mr. Weisbach (W, Sp)

146. Combustion Processes, (4) Three 1-hour lectures per week. Prerequisite: course ME 105B; ME 106B may be taken concurrently. Technical advances in engineering systems by having students complete preliminary designs of a realistic mechanical engineering system and by design seminars and conferences. Mr. Austander, Mr. Mighesi, Mr. Cacciamali (F, W, Sp)

147. Combustion Engines, (4) Four and one-half hours of lecture per week. Prerequisite: course ME 105B; ME 106B may be taken concurrently. Design of mechanical components including elevated temperature and cryogenic environments; strength analysis and dynamic behavior of high speed machines. Field trips for study of advanced design application. Mr. Frisch (Sp)

148. Petroleum Reservoir Engineering, (4) Four and one-half hours of lecture per week. Prerequisite: senior standing in engineering. Flow through porous media (Darcy's law); capillary behavior; multiphase flow, displacement processes-miscible and immiscible; transient flow behavior. Mr. Somerton (F, W)

151. Heat Transfer, (4) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 102A, 102B. Advanced topics in design of mechanical components including elevated temperature and cryogenic environments; strength analysis and dynamic behavior of high speed machines. Field trips for study of advanced design application. Mr. Frisch (Sp)

152. Control Engineering. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Math 5IC. Advanced topics in control engineering for systems of high complexity. Applications to engineering systems by having students complete preliminary designs of a realistic mechanical engineering system and by design seminars and conferences. Mr. Tien (F, Sp)

153. Introduction to Bioengineering, (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Math 5 ICA. Basic objective is to show how the analytical techniques used by engineers can be applied to the modeling of biological systems.
155. Statistical Thermodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 105A. Classical and quantum mechanical descriptions of substances and evaluation of thermodynamic properties of gases, liquids and solids. Elementary kinetic theory of gases and evaluation of transport coefficients.

156. Fresh Water from the Sea. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: none; can be taken as technical elective by engineering students by arrangement with instructor. A one-quarter lecture and discussion series on the effects of water salinity on modern industrial processes, and on water desalination methods as influenced by their characteristics.

157. Viscous Flow. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 106A. Mathematics 5IC. Theoretical and empirical bases of laminar and turbulent flows. Mr. Berger.

158. Applied Fluid Mechanics. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: ME 105B, ME 106A. Analysis of fluid machinery performance with emphasis on application to fluid flow in pipes, channels, and mechanical apparatus. Multistage flow. Selected topics in environmental fluid mechanics. Mr. Talbot (Sp).


160. Elementary Hydrodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 105B, ME 106A. Introduction to course on application of analog computers to the simulation of systems described by ordinary differential equations. Applications in vibration studies, control systems, certain partial differential equations, biomedical studies. Use of electronic analog computer in computer laboratory. (F)


162. Applied Fluid Mechanics. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: ME 105B, ME 106A. Analysis of fluid machinery performance with emphasis on application to fluid flow in pipes, channels, and mechanical apparatus. Multistage flow. Selected topics in environmental fluid mechanics. Mr. Talbot (Sp).

163. Physiological Fluid Mechanics. (3) Three hours of lecture per week. Prerequisite: ME 159 or equivalent background. Investigation of fluid mechanical aspects of various life systems, including the circulatory, pulmonary, and renal systems. Motion in arteries and small blood vessels. Pulsatile and peristaltic flows. Analysis of prosthetic devices. Mr. Talbot (W).

164. Viscous Flow. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 106A. Mathematics 5IC. Theoretical and empirical bases of laminar and turbulent flows. Mr. Berger.

165. Viscous Flow. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 106A. Mathematics 5IC. Theoretical and empirical bases of laminar and turbulent flows. Mr. Berger.

166. Applied Fluid Mechanics. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: ME 105B, ME 106A. Analysis of fluid machinery performance with emphasis on application to fluid flow in pipes, channels, and mechanical apparatus. Multistage flow. Selected topics in environmental fluid mechanics. Mr. Talbot (Sp).

201. Biological Control Systems. (2) Two hours of lecture per week. Prerequisite: Graduate standing in engineering, plus particular courses to be specified by the instructor for each group. Group work on selected topics.

202. Supervised Independent Study and Research. (1-5) Enrollments are permitted to individuals who wish to undertake a program of individual inquiry initiated jointly by the student and a professor. There are no other prerequisites. The supervising professor must be convinced that the student is able to profit by the program. Must be taken on a passed/not passed basis.

The Staff (F, W, Sp). Graduate Courses

210. Biological Control Systems. (2) Two hours of lecture per week. Prerequisite: Graduate standing in engineering, plus particular courses to be specified by the instructor for each group. Group work on selected topics.

210L. Biological Control Laboratory. (2) Six hours of laboratory per week. Experimental methods of analysis of biological control systems. Application of special techniques to analysis of live laboratory animals, digital computers and display and recording equipment to black box "dry" experiments on human control systems. Mr. Talbot (Sp).

215. Intermediate Dynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 159 or equivalent background. Investigation of fluid mechanical aspects of various life systems, including the circulatory, pulmonary, and renal systems. Motion in arteries and small blood vessels. Pulsatile and peristaltic flows. Analysis of prosthetic devices. Mr. Talbot (W).

216. Transport Processes in Biological Systems. (4) Three hours of lecture per week. Prerequisite: course 105A or equivalent. Applications of transport processes to the mechanics of various types of living bodies moving either through the atmosphere, or under water, in order to be able to evaluate the power requirements, the viability, and the control forces for these maneuvers. Mr. LaIlone (Sp).

217. Laboratory in Analog Computation. (2) Two hours of lecture and three hours of laboratory per week. Prerequisite: Mathematics 5 IC. Introductory course on application of analog computers to the simulation of systems described by ordinary differential equations. Applications in vibration studies, control systems, certain partial differential equations, biomedical studies. Use of electronic analog computer in computer laboratory. (F)

218. Intermediate Dynamics. (4) Three hours of lecture per week. Prerequisite: course 105A or equivalent. Investigation of fluid mechanical aspects of various life systems, including the circulatory, pulmonary, and renal systems. Motion in arteries and small blood vessels. Pulsatile and peristaltic flows. Analysis of prosthetic devices. Mr. Talbot (W).


220. Case Studies in Mechanical Engineering. (2) Two hours of lecture per week. Prerequisite: course 225A or 225L, or consent of instructor. A one-quarter course on selected problems which illustrate various methods of the design process in advanced mechanical engineering systems. Mr. Steidel (W).

221. Machine Tool Design and Control. (4) Three hours of lecture and one hour of discussion per week. Fundamental aspects of machine tool control and computer-aided design. Machine tool dynamics and computer-aided design. Mr. Frisch (Sp).

222. Applications of Theory of Plasticity. (3) Three hours of lecture per week. Prerequisite: course 121 or 266. Application of the theory of plasticity to plastic deformation problems. Solutions by the method of characteristics, the bounding method, and the general approximation method. Numerical analyses of elastic-plastic and plastic-elastic deformation problems. Mr. Kobayashi (W).

223. Structure and Properties of Engineering Materials. (3) Three hours of lecture per week. Prerequisite: course 105A. Basic understanding of the behavior of engineering materials, with emphasis on mechanical properties and material selection. Mr. Somerton (Sp).

224. Applied Fluid Mechanics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Physics 5A, Mathematics 5IC. Kinematics and dynamics of fluids, Bernoulli's equation, eulerian and Lagrangian coordinate systems, waves, and elements of turbulence. Mr. Naghdi, Mr. Carroll (Sp).

225. Mechanical Behavior of Engineering Materials. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 149, or equivalent background. Applications of basic petroleum reservoir mechanics and recovery prediction techniques to the enhanced recovery of petroleum by thermal and chemical methods. To be offered 1979/80 only.

226. Advanced Reservoir Engineering. (4) Four and one-half hours of lecture per week. Prerequisite: ME 149, or consent of instructor. Treatment of elastic, plastic, and creep deformation under static and cyclic loads with emphasis on appropriate solution techniques and prediction of performance from simple tests. Failure due to fatigue, creep-rupture, and plastic instability will also be covered.

Mr. Finnie (F).

227. Viscous Flow. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 149, or consent of instructor. Treatment of fracture from engineering point of view. The topics covered will include elementary fracture mechanics, crack propagation in fatigue, transition temperature approaches, statistical aspects of the strength of brittle solids, fracture of composites, and ductile fracture.

Mr. Finnie (W).

228. Real-Time Applications of Mini and Micro Computers. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: graduate standing in engineering, or consent of instructor for advanced undergraduates. Mini and micro computers, operating in real time, have become ubiquitous components in engineering systems. The purpose of this course is to build competence in the engineering use of computer structure, programming and output/input operations, and through laboratory work with mini and micro computer systems.

229. Advanced Kinematics and Mechanics. (4) Three hours of lecture per week. Prerequisite: ME 104B. Kinematic analysis and synthesis of plane and spatial linkages. Design and analysis of computer-aided design using modern numerical and matrix methods. Synthesis of plane and spatial mechanisms to guide a rigid body through movement with the satisfaction of specified displacement constraints. Mr. Radcliffe (W).

230. Dynamic Systems in State Space and Transfer Domains. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 104B. Feedback control systems and state space and state space representations of linear dynamic systems. Dynamic behavior, controllability, observability, stability and controllable and observable linear systems. Design of dynamic systems based upon real casuality. Lumped and distributed parameter models. Examples from mechanical, electrical and chemical engineering.

Mr. Tomizuka (F).

231. Advanced Automatic Control Techniques. (4) Three hours of lecture and 3 hours of laboratory per week. Prerequisite: ME 104B. Feedback control systems and state space and state space representations of linear dynamic systems. Dynamic behavior, controllability, observability, stability and controllable and observable linear systems. Design of dynamic systems based upon real casuality. Lumped and distributed parameter models. Examples from mechanical, electrical and chemical engineering.

Mr. Tomizuka (W).

232. Optimal and Adaptive Control. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 232, or consent of instructor. Lyapunov stability and Popov hyperstability and their application to adaptive control and identification. Statistical treatment of dynamic systems and state estimation. Deterministic and stochastic optimal control. Applications to engineering systems.

Mr. Tomizuka (Sp).

233. Switching Control and Computer Interfacing. (4) Three hours of lecture and 3 hours of laboratory per week. Prerequisite: graduate standing in engineering, or consent of instructor for advanced undergraduates. Design and analysis of control systems utilizing switching elements. Computer control of switching electronic devices for sequential logic. Coding and counting. Analog to digital and digital to analog conversion. Applications to control systems and computer interfacing.

Mr. Tomizuka (W).

234.Value of Oil and Gas Producing Properties. (3) Three hours of lecture per week. Prerequisite: basic knowledge of economics. Physical and economic factors underlying the appraisal of oil and gas producing properties. Estimation and evaluation of oil and gas properties.

Mr. Somerton (F).

235. Rock Mechanics. (3) Three hours of lecture per week. Prerequisite: basic geology and a course in mechanics of materials. Theory of strength, failure theories, fracture; rock behavior under stress, strength, failure theories, fracture; rock behavior under stress.

Mr. Tomizuka (F).

236. Advanced Reservoir Engineering. (4) Four and one-half hours of lecture per week. Prerequisite:
course 105B or 149. 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.

240. Experimental Methods in Mechanical Engineering. (3) One and one-half hours of lecture and one and one-half hours of laboratory per week plus term project. Prerequisite: ME 151A. General techniques of physical measurement. Instrumentation response and character, errors sources and the design of laboratory experiments. Laboratory experience in the design and use of contemporary measurement systems. Mr. Hurbit (Sp)

251. Heat Conduction. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 117 and course 151. Analytical and numerical methods for the determination of the conduction of heat in solids.

252. Heat Convection. (4) Three hours of lecture, one hour discussion per week. Prerequisite: ME 117, ME 151, and 159. The transport of heat in fluids in motion; free and forced convection in laminar and turbulent flow over surfaces and within ducts. Mr. Grell (W)

253. Thermal Radiation. (4) Four and one-half hours of lecture per week. Prerequisite: ME 117. Radiation heat transfer. Measurement and radiation properties of gases, liquids and solids; the calculation of radiant energy exchange. Mr. Seban (Sp)

254. Equilibrium Thermodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 155. Canonical and noncanonical equilibria of classical thermodynamic systems. Statistical mechanics of pure substances and of mixtures. Mr. Daily (W)

255. High Temperature Thermodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 151. Thermodynamic properties of gaseous and liquid mixtures, radiation equilibrium, and oscillations in chemical systems. Mr. Daily (Sp)


**257. Introduction to Non-Equilibrium Thermodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 155 or equivalent. General formulation of coupled transport phenomena. Detailed application to diffusion processes, shock waves, and other nonequilibrium membrane processes, thermal diffusion, and others. (W)

258. Waves in Fluids. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 159 or 162. Propagation of linear and nonlinear waves in fluids; wave interaction in gases, including shock waves, hydrodynamic and hydraulic jumplas, Lamb waves in membranes, and transonic and supersonic flows. Mr. Talbot (F)

259. Theoretical Hydrodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 162 and Engineering 230A. Development of mathematical techniques to solve classical problems in hydrodynamics with emphasis on the applications to current research work in fluid mechanics. Mr. Talbot (W)

259A—259B. Viscous Flow Fluid. (4—4) Three hours of lecture and one hour of discussion per week. Prerequisite: Engineering 230A, course 159 or 162. An introduction to the viscous flow phenomena. Mr. Concors 263A (W); Mr. Sherman 263B (Sp)

260. Theory of Elasticity. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 233A or ME 273 or CE 252A. Prerequisite: ME 233 or ME 273. Theoretical and numerical techniques used for analysis of thin structures. Emphasis is on the application of digital computing techniques. Mr. Mote (F)

**261. General Theory of Elasticity. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 261 or consent of instructor. Application of finite difference and other numerical techniques to current problems of fluid dynamics, including high-speed flow, transonic flow, boundary layer and wake flows. Mr. Holt (Sp)

**267. Magnetohydrodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 261. The continuum theory of the interaction of conducting fluids and magnetic fields. Mr. Berger (Sp)

**268. Gasodynamics of Combustion and Explosions. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: background in gas dynamics. Gasdynamic phenomena caused by the interaction of chemical reactions with supersonic flow, with particular attention given to the effects of exothermic processes in combustion systems. Theory of shock, deflagration, detonation, and blast waves. Mr. Oppenheim (F)

271. Methods of the Calculus of Variations and Applications. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 115 or course 175. The calculus of variations to fixed, free and movable endpoint problems without and with side conditions. Applications to stationarity and minimum principles and to problems of optimal control and design of dynamical systems. Mr. Behera (W)

272. Oscillations in Linear Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104A and 133 or equivalent. Deterministic excitation and response of linear and nonlinear dynamical systems, damped and undamped, to harmonic and arbitrary time-dependent loads. Convolution integrals and the Laplace transform. Mr. Hsu (W)

274. Random Oscillations. (3) Three hours of lectures per week. Prerequisite: course 104A and 133 or equivalent. Nondeterministic excitation and response of linear and nonlinear systems. Probabilistic distributions of means. Square and circular, autocorrelation functions, power spectral densities. Stationary, nonstationary and ergodic processes. Applications to discrete and continuous dynamical systems, linear and nonlinear. Mr. Hsu (F)

275. Advanced Dynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 175. Oscillations in autonomous dynamical systems, damping and undamping, to harmonic and arbitrary time-dependent loads. Convolution integrals and the Laplace transform. Mr. Behera (W)

277. Oscillations in Nonlinear Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 175. Oscillations in nonlinear systems having one degree of freedom. Qualitative and quantitative methods: phase-plane, graphical, iterated perturbation and asymptotic methods; self-excited oscillations and limit cycles. Mr. Rosenberg (Sp)

278. The Theory of Rockets. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104B or 175. Topics in exterior ballistics, propulsion, atmospheric flight, aero-thermal effects, flight dynamics, solid propellant rocketry and satellite carriers, orbital trajectories, performance analysis. Mr. Mote (W)

279A. Analysis of Continuous Dynamic Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: second year graduate standing. Exploration of the approximate analysis of continuous systems. Emphasis on discretization methods which precede initial value, boundary value and stability analyses. Mr. Naghdi (Sp)

279A. Analysis of Continuous Dynamic Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: second year graduate standing. Exploration of the approximate analysis of continuous systems. Emphasis on discretization methods which precede initial value, boundary value and stability analyses. Mr. Naghdi (Sp)

280. Introduction to the Finite Element Method. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 277. Oscillations in nonlinear systems. Mr. Naghdi (W)

282A. Theory of Elasticity I. (3) Three hours of lectures per week. Prerequisite: course 280. Further development of the linear theory of elasticity (in three dimensions) and formulation of various types of boundary-value problems. Application to torsion, flexure, and two-dimensional problems of plane strain, plane stress, generalized plane stress, and bending of plates.

282B. Theory of Elasticity II. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 282A. General theories including variational, nonstationary, and ergodic processes. Applications to stationary and minimum principles and to problems of optimal control and design of dynamical systems. Mr. Behera (W)

282C. Theory of Elasticity III. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: ME 185 and 281. The general theory of bending of elastic shells with small transverse strains. Mr. Naghdi (W)

283. Wave Propagation in Elastic Media. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 155. Propagation of mechanical disturbances in bounded and unbounded media, including finite and infinite wave bands, wave reflection and transmission at interfaces. Stress waves due to periodic and transient sources. Mr. Bogy (F)

284. Random Oscillations. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104A and 133 or equivalent. Nondeterministic excitation and response of linear and nonlinear systems. Probabilistic distributions of means. Square and circular, autocorrelation functions, power spectral densities. Stationary, nonstationary and ergodic processes. Applications to discrete and continuous dynamical systems, linear and nonlinear. Mr. Hsu (F)

285. Oscillations inLinear Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 175. Oscillations in autonomous dynamical systems, damping and undamping, to harmonic and arbitrary time-dependent loads. Convolution integrals and the Laplace transform. Mr. Behera (W)

287. Impact. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 185. Fundamentals of the nonlinear theory of elasticity. Exact solution of special problems of equilibrium and deformation under impact loads; wave propagation in solids. Mr. Naghdi (W)

288. Random Oscillations. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 280. General theories including variational, nonstationary, and ergodic processes. Applications to stationary and minimum principles and to problems of optimal control and design of dynamical systems. Mr. Behera (W)

289. Theory of Elasticity. (3) Three hours of lecture per week. Prerequisite: course 285. Fundamentals of the nonlinear theory of elasticity. Exact solution of special problems of equilibrium and deformation under impact loads; wave propagation in solids. Mr. Naghdi (W)

290. Theory of Elasticity. (3) Three hours of lecture per week. Prerequisite: course 285. Fundamentals of the nonlinear theory of elasticity. Exact solution of special problems of equilibrium and deformation under impact loads; wave propagation in solids. Mr. Naghdi (W)

291. Analysis of Discrete Dynamic Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 282A. General concept of stability of elastic systems and its interaction with eigenvalue problems. Mr. Naghdi (W)

292A. Topics in Nonlinear Oscillations. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 277. Oscillations in nonlinear systems. Mr. Naghdi (W)
tems having many degrees of freedom. The geometrical methods of dynamics applied to nonlinear vibra-
tions and the determination of normal modes,
and of resonant oscillations in weakly and strongly linear continua. Definition and determination of normal modes,
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Nuclear Engineering

Upper Division Courses


101A–101B. Nuclear Reactions and Radiation, (4–4) Four hours of laboratory a week. Prerequisites: course 150A or upper division course in Nuclear Engineering 101A or upper division course in nuclear physics or nuclear chemistry. Passage of radiation through matter, dosimetry units and measurement, somatic and genetic effects of radiation on people, regulations, calculation of inhaled and ingested dose, atmospheric dispersion of radioactivity, attenuation and shielding. Mr. Kaplan (W)

108. Group Study for Advanced Undergraduates. (1-5) Prerequisite: upper division standing. Group studies of special topics. Mr. Cayzer (F), Mr. Sargent (Sp)

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. For students in good standing who wish to undertake a program of study jointly initiated jointly by the student and a professor. There are no formal prerequisites, but the supervising professor should feel that the program is likely to be profit by the program. Must be taken on a passed/not passed basis. The Staff (F, W)

Graduate Courses

201A–201B. Nuclear Reactions and Interactions of Radiation With Matter. (3–3) Three hours of lecture per week. Prerequisites: Physics 137A–137B–137C. Interaction of gamma rays, neutrons, and charged particles with matter; nuclear structure and radioactive decay; cross sections and energies of nuclear reactions; nuclear reactions in fission products; fission and fusion reactions as energy sources. Mr. Kaplan (F, W)

220A–220B. Irradiation Effects in Nuclear Materials. (4–4) Four hours of lecture per week. Prerequisite: course 122. Behavior of nuclear fuels and metals under irradiation; fuel and fission product transport through nuclear reactor fuel, fuel swelling and release of fission gas; hardening, embrittlement and fracture of neutron-irradiated metals; void swelling and irradiation creep; nuclear fuels and nuclear fuel reactors. (W)


250A–250B. Nuclear Reactor Theory. (4–4) Four lecture hours per week. Prerequisites: course 150A, one 3-hour lecture for NE 150B per week. Prerequisite: Math 51C, and either NE 101A or an upper division course in nuclear physics. Neutron interactions, nuclear reactions and nuclear cross sections, neutron transport in moderators, fission, transfer, and capture of neutrons in various media. Mr. Morris (F, W, W)

260A-260B. Thermal Aspects of Nuclear Reactor Safety. (3–3) Three hours of lecture per week. Prerequisite: course 150A–150B or 250A–250B. Math 120A–120B–120C recommended. Response of reactor systems to time-varying sources of reactivity. Neutron interactions, nuclear reactors from experiments employing neutron waves, pulses, and noise in both the frequency and time domains, pulsed reactors, xenon oscillations, reactor safety analysis of zero-power reactors and of reactors with temperature feedback, optimal control of nuclear reac- tor feedback and adjoint functions, heterogeneous reactors. Mr. Morlet, Mr. Ruby (F, W)

265. Design Analysis of Nuclear Reactors. (4) Four hours of lecture per week. Prerequisite: consent of instructor. Principles and techniques of economic analysis of nuclear systems, safety design and fuel cycle optimization; thermal limits on reactor performance, fuel converters and fast breeders; control and transients problems; reactor safety and licensing; release of radioactivity from reactors and fuel processing plants. Mr. Schrock (F)

266. Two Phase Flow and Heat Transfer. (4) Four hours of lecture per week. Prerequisite: Mechanical Engineering 105B and 151. Study of the hydrodynamics and heat transfer of two-phase fluids in turbulent and laminar flows in nuclear power and propulsion systems. Emphasis is on analysis of the single and two-component flow systems. Advective and diffusive solid systems are also treated. Mr. Schrock (Sp)


280A–280B. Fusion Reactor Engineering. (3–3) Two 1-1/2 hour lectures per week. Prerequisite: an upper division course in nuclear physics or nuclear chemistry. Engineering design and design fusion systems. Introduction to controlled thermonuclear fusion and its economy. Research in the field of thermonuclear physics and technology involved. Case studies of fusion reactor design. Engineering principles of support technology for fusion systems. Mr. Pyle (W, Sp)

288. Group Studies, Seminars, Group Research. (1-8) One to 8 hours of lecture per week. Advisories in various subjects through specialized studies. Decision on topics to be selected each semester and in consultation with a faculty advisor. Participation by faculty, visiting experts, and students in special problems. Research problems of new research areas, and significance of new technology. Section 1, offered on a satisfactory/unsatisfactory basis and 11 through 15 on a letter-graded basis.

299. Individual Research. (1-12) Prerequisite: graduate standing. Investigation of advanced nuclear engineering problems. To be graded on a satisfactory/unsatisfactory basis. The Staff (Mr. Pigford in charge) (F, W, Sp)
601. Individual Study for Master’s Candidates. (1–8) Individual study for the comprehensive or language examinations required of candidates for the Ph.D. May not be taken on a satisfactory/unsatisfactory basis. 

Mr. Pigford (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for the Ph.D. Must be taken on a satisfactory/unsatisfactory basis. 

The Staff (F, W, Sp)

IDS 124. Chemical Methods In Nuclear Technology. (3) See Interdepartmental Studies for the complete description of this course.

College of Environmental Design

Office of the Dean, 230 Wurster Hall

Dean:
Richard Bender, M.Arch.

Assistant Dean:
Susan Pressman, Ph.D.

The College of Environmental Design is comprised of the departments of Architecture, City and Regional Planning, and Landscape Architecture, and the Programs in Environmental Design and Visual Design. Courses offered by the respective departments and the Program in Visual Design are to be found immediately following the listing of Environmental Design courses. Courses whose content, philosophy, and method provide a common base of knowledge for the several disciplines within the College of Environmental Design are taught at the undergraduate level as Environmental Design (ED) Core courses.

Undergraduates entering the College will enroll in a four-year curriculum leading to the academic degree of Bachelor of Arts (A.B.) in Environmental Design with a major in architecture, landscape architecture, or environmental design. Individual majors and a limited program in visual design are available for continuing students. On the graduate level the College offers curricula leading to the Master of Architecture, Master of Landscape Architecture, Master of City Planning, and Master of Arts in Design; and the Doctor of Philosophy in Architecture, Landscape Architecture, and in City and Regional Planning. The Master of Architecture degree fulfills the first professional degree applicable to requirement for state licensing in architecture. The Master of Landscape Architecture degree is similarly applicable to the certification of landscape architects.

It is recommended that high school preparation for the College include four years of mathematics, one year of freehand drawing, and one year each in two of the physical or natural sciences.

The A.B. degree programs in the College require the completion of 180 units distributed according to regulations which are given in the Announcement of the College of Environmental Design. These requirements include completion of (1) a major requirement, (2) an Environmental Design core requirement, (3) a breadth requirement, (4) a senior residence requirement, (5) a scholarship requirement, as well as the general University requirements of Subject A, American History, and American Institutions.

The College has adopted new degree requirements, effective for freshmen admitted in the Fall quarter 1978 and later. Sophomores admitted Fall 1978 and later, must take the College of Environmental Design sections of this catalog, as well as in the Announcement of the College of Environmental Design.

Current Degree Requirements

The following students must complete the current requirements: freshmen admitted Fall 1978 and later, sophomores admitted Fall 1979 and later, and all new students starting Fall 1980.

Major Requirement. Requirements for the major are specified by the individual department or programs and may not be less than 40 units nor more than 60 upper division units.

ED Core Requirement. A minimum of 32 units as specified in the Announcement of the College of Environmental Design.

Breadth Requirement. A minimum of 60 units taken outside the College of Environmental Design taken from a list of acceptable courses published by the College, including study in the following areas: (1) reading and composition, (2) natural science and math, (3) social science, (4) humanities and arts. A more detailed distribution of these subject requirements may be found in the Announcement of the College of Environmental Design.

Former Degree Requirements

Former degree requirements apply to all students who were continuing in the College Fall 1978 and those not included under the “Current Degree Requirements” above. In general, students must meet the degree requirements in effect at the time of their admission to the program.

Major Requirement. Requirements for the major are specified by the individual department or program and may not be less than 40 units nor more than 60 upper division units.

College Requirement. A minimum of 24 units of ED courses or courses in departments in the College other than the major department as specified for the departmental major. At least 12 units must be in upper division courses.

Breadth Requirement. A minimum of 60 units taken outside the College of Environmental Design including the completion of two courses of four units each in Reading and Composition, or the equivalent.

Procedures for undergraduate admission, registration, and enrollment are identical to those of the University in general. Enrollment in the College beyond 195 quarter units is subject to approval of the Dean. Consequently, a transfer student who has credit for more than 120 quarter units, is not normally admitted to the undergraduate program. An undergraduate major in architecture or landscape architecture is not prerequisite for admission to graduate study in these fields. Students who are not architecture or landscape architecture majors may obtain a certificate in environmental design and testing of various methods, tools, and techniques available for environmental designers. Particular emphasis lies on the difficulties of environmental design and related fields.

130. Design Theories and Methods. (5) Formerly Architecture 130. Two 1 1/2-hour lectures and one 3-hour laboratory per week. Prerequisite: ED 4 or consent of instructor. ED 6A is prerequisite to ED 6B. 180 quarter units and six hours of lab per week. Prerequisites: ED 4 or consent of instructor. ED 6A is prerequisite to ED 6B. The first quarter deals with the design of the built environment: Assessment of present and future implications of resource use on environmental design. 6A-6B. Drawing and Graphic Communication for Environmental Design. Two 1 1/2-hour lectures and one 3-hour laboratory per week. An overview of interconnections among energy systems, social and technological variables, and their relation to the design of the built environment. Assessment of present and future implications of resource use on environmental design.

148. History of the Environment. (4) Three 1 1/2-hour lectures per week, and four 8-hour field trips per quarter. Prerequisite: sophomore standing. The study of the development and change in the natural and constructed environment of California from Spanish Colonial times to the present. Emphasis will be on existing architectural forms and urban patterns of the San Francisco Bay Region.

Upper Division Courses

130. Design Theories and Methods. (5) Formerly Architecture 130. Two 1 1/2-hour lectures and one 3-hour laboratory per week. Prerequisite: ED 4 or Geog 30. Two 1 1/2-hour lectures, or 1-2/2-hour lecture and two 2-hour workshops per week. Prerequisite: ED 4 or consent of instructor. ED 6A is prerequisite to ED 6B. The first quarter deals with the design of the built environment: Assessment of present and future implications of resource use on environmental design.

169A. History of the U.S. Cultural Environment, 1783–1970. (4) Three hours of lecture and 2–3 hours of discussion per week. The evolution and interpretation of American landscapes—our everyday homes, highways, farms, stores, and recreation areas—with an emphasis on how to read the landscape as a record of social and cultural patterns.

169B. History of the Man-Made Environment of the U.S.A. 1900–1970. (4) Four hours of lecture and discussion per week. Prerequisite: E.D. 169A or Geog 30. Two 1 1/2-hour lectures, or 1-2/2-hour lecture and two 2-hour workshops per week. Prerequisite: ED 4 or consent of instructor. Enrollment limited. A more detailed study of the American landscape, 1900–1970, with emphasis on urban and industrial applications.

170. Architecture and Urbanism of Antiquity and the Middle Ages. (4) Three hours of lecture and one 1-hour discussion per week. Ancient and medieval architecture studied in social and historical context. A selective survey of major building types and a few specific sites and monuments treated in detail.

171. Architecture and Urbanism of the Renaissance and Baroque. (4) Three hours of lecture and one 1-hour discussion per week. Architecture and urban design since 1400 considered in social and historical context.

NOTE: For key to symbols, see page 36.
172. History of the Environment. (4) Three 1-hour lectures per week. The theory and practice of design from preindustrial handcrafts to mechanical production and the evolution of a machine aesthetic.

175. Graduate Seminars. (2 to 4) Two 1 1/2-hour lecture-discussion per week. Prerequisite: courses 170 and 171 or consent of the instructor. A study of the major monuments of a great city and its changing character from its founding to the present. Course may be repeated for credit.

177. Survey of Urban Design. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: courses 170 and 171 or consent of instructor. The evolution of urban form, civic design, and planning theory with emphasis on the development of the modern city.

178. The Architecture of the Far East. (4) Two 1 1/2-hour lectures per week. Prerequisite: ED 170 or consent of instructor. Selected topics in the history of Far Eastern architecture including the building and landscape traditions of Japan, China, India, or Southeast Asia. Emphasis is on design as a product of environmental, societal, technological, and aesthetic constraints. Course may be repeated for credit.

Architecture

Department Office, 232 Wurster Hall


Claude Parent, M.Arch., F.A.I.A.

Sim H. Van der Ryn, B.Arch.


Class: Cooper Marcus, M.A., M.C.P.

Assistant Professors: Mary C. Comerio, M.Arch., Ph.D. Charles C. Stuchell, M.Arch., Ph.D.

Lecturer: Howard Friedman, A.B.

NOTE: As this catalog goes to press, a major curriculum revision is underway in the Department of Architecture. These changes will be in place at the beginning of the Spring term, 1979. Contact the Department office, 232 Wurster Hall, 642-4842, for the latest information on courses, after September 1, 1979.

Undergraduate Programs

The four-year program leading to the degree of Bachelor of Arts in Environmental Design with a major in architecture requires the completion of course work in study areas ranging over a diversity of subjects. These may include mathematics, physics, engineering, computer science, English, and the history of architecture, in aspects of architecture as a profession and finally, in the social sciences and humanities.

Graduate Programs

The Department offers the professional degree Master of Architecture and the academic degree Doctor of Philosophy.

100. The Timeloss Way of Building. (4) Two 1 1/2-hour lectures and one 2-hour discussion per week. Basic theory of environment: towns and buildings considered as systems which are self-organized between human and inhuman environments; pattern language as means of generating environments which live; shared pattern languages in society; sociopolitical implications of implementing human means of design.


102A. Structure and Production as Architectural Design Determinants. (6) One 1-hour lecture, one 2-hour and two 3-hour laboratories per week. Prerequisite: course 101. Introduction to the design of architectural forms as influenced by load bearing systems, structural mechanics, standardization of parts, materials, elements, and assemblies.

102B. The Physical Environment as an Architectural Design Determinant. (5) One 1-hour lecture, one 2-hour and two 3-hour laboratories per week. Prerequisite: course 102A. Physical problems emphasizing environmental factors, natural and man-made, as design determinants. Study of elements of building forms, building groups and neighborhoods.

102C–102D. Synthesis of Determinants of Architectural Design. (5–5) One 1-hour lecture, one 2-hour and two 3-hour laboratories per week. Prerequisite: course 102B. Introduction to architectural design synthesis. Architectural case studies will be selected which require the application of the design determinants introduced in 101, 102A and 102B. An introduction to aesthetics and style as design determinants will also be included.

120A. Introduction to Urban Design. (6) Three 1-hour lectures and one 1-1/2 hour discussion per week. Prerequisite: upper division standing. Concepts, methods, context of urban design practice, professional responsibilities, values, and implications of design, environmental, social and political trends, new towns, central development, city scale design, and defining and unifying principles. Problem sets, readings and final examination.

103A. Laboratory Programs in Urban Design. (6) Two 4-hour laboratories per week. Prerequisite: course 103A or consent of instructor. Application of urban design concepts and methods to the development of a professional perspective including surveys, analysis, graphic communication, spatial composition, environmental design, and urban design. Topics selected from real situations dealt with through field-trips, program development, and design.

104A–104B–104C. Community Design. (4–4–4) Two 4-hour laboratories per week. Prerequisite: consent of instructor. Projects dealing with community issues: the social, political, and technological determinants. Analysis, problem formulation, design, and implementation.

105A–105B. Theory and Application in Architectural Design. (5; 10) 105A: four hours of lecture and four hours of laboratory per week. Prerequisites: Environmental Design courses 3, 4, and 6. The evolution of urban form, civic design and planning theory with emphasis on the development of the modern city.

105B. The Physical Environment as an Architectural Design Determinant. (5) Three 1-hour lectures and one 1-1/2 hour discussion per week. Prerequisite: upper division standing. Concepts, methods, context of urban design practice, professional responsibilities, values, and implications of design, environmental, social and political trends, new towns, central development, city scale design, and defining and unifying principles. Problem sets, readings and final examination.

1019–191E. Field Studies in Community Design. (5–8) One 3-hour seminar per week plus 10–12 hours internship as field placement. Prerequisite: upper division standing and consent of instructor. Two quarters of the sequence must be taken for credit with an "In Progress" grading for 101D. 101D is to be repeated to 191E. Credit and grade to be awarded upon completion of the sequence. Combined field internship in Bay Area communities and seminar topics on housing issues. To be offered 1979/80 only.

200A–200B–200C. Graduate Introduction to the Field of Architecture. (8–8–8) Five 5-hour laboratory seminars per week. Prerequisite: course 104A, 104B, 104C. An integrated core including introductory study of social, technological and environmental factors relevant to architectural designs, current trends in architectural design theory and practice, methodologies of communication and architectural design, and study of role of the architect and the profession.

Course Titles: Design Group I—Architectural Design. Two 4-hour laboratory seminars per week. Prerequisite: courses 102A, 102B, 102C. Architectural design projects focusing on specific designs, problems and difficulties concerning typical cases. Courses shall be conducted as case studies and may be taken in any sequence.

201. Housing Facilities. (4)

202. Educational Facilities. (4)

203. Commercial Facilities. (4)

204. Civic Facilities. (4)
205. Multi-Level Real Estate. (4)

205A. Introduction to Urban Design. (4)

206. Topics in Urban Design. (4) Two 2-hour lectures per week. Prerequisite: Graduate standing, completion of two years of graduate design laboratory courses, or consent of instructor. Graduate introduction to the field, including reading program and short design project exercises.

207. Special problems. (4) Can be repeated for credit.

208. Combined Course. (4) Two 4-hour seminars per week. Prerequisite: three courses from Design Group I series, Architectural Design (Architecture 200 series), Architecture 211 and 212 (or equivalent), and Civil Engineering 128A, 128B, 128C. or consent of the instructor. Combined course 213 must be taken concurrently with course 213 and 222. Recommended as last course of Design Options Group I series.

209. Environmental Design. (4)

Course Content: Design Group II—Architectural Design and Research. Two 4-hour laboratory-seminars per week. Prerequisite: enrollment in Option I or completion of required courses in Design Group I and completion of all required courses and 6 units of professional electives in the particular study area of the combination. Design and research in special study areas. Students are expected to enroll in the individual laboratory-seminar for a minimum of two consecutive quarters. At the end of the second quarter, a letter grade will be given, and at the end of the second quarter, a letter grade will be assigned for the completion of the seminar quarter and at the option of the instructor, students may repeat for one additional quarter.

280. Study in Area A. Urban Design Problems. (6)

281. Study in Area B, Environmental Control Systems as Related to Design Problems. (6)

282. Study in Area C, Structure and Production as Related to Design Problems. (6)

283. Study in Area D, Design Theories and Methods as Related to Design Problems. (6)

284. Study in Area E, Social and Economic Factors as Related to Design Problems. (6)

288. Architectural Thesis and Comprehensive Seminar. (5) Two 3-hour seminars. Prerequisite: graduate standing. Recommended for two consecutive quarters. Open to students in Plan A and for one quarter for students in Plan B. Review of the development of the thesis contents. Assignments preparatory to comprehensive examination. At the option of the instructor, students may repeat the seminar up to a maximum of three quarters.

Study Area B—Environmental Control Systems

110. Introduction to Environmental Control Systems. (5) Two 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: consent of instructor. Lecture and laboratory study of the luminous and acoustic environments using qualitative and quantitative methods to relate design alternatives to human sensory responses.

211. Environmental Control Systems. (3) One 2-hour lecture and one 2-hour laboratory per week. Prerequisite: consent of instructor. Lecture, laboratory, and field study of environmental control systems in buildings and the interaction of these systems with human thermal comfort, building configuration, and energy consumption.

212. Design Problems in Environmental Control Systems. (2) Two 1/2-hour seminars per week. Prerequisite: course 212 or consent of instructor. Combined course 212 must be taken concurrently with 208 and 222.

213A. Design Problems in Mechanical Systems.

213B. Design Problems in Electrical Systems.

214. Laboratory Problems in Environmental Controls. (2) One 2-hour discussion and one 2-hour laboratory per week. Prerequisite: consent of instructor. Laboratory study of environmental control factors in the design of particular building types associated with the studio courses. Consideration of lighting, acoustics, and thermal environment and control through both nature and artificial measures. May be repeated twice for credit.

219. Seminar in Environmental Control Systems. Two 1-1/2 hour seminars per week. Prerequisite: course 212 or consent of instructor. Advanced study in environmental control systems.

219A. Lighting in Architectural Design. (4)

219B. Acoustics in Architectural Design. (4)

219C. Environmental Control Systems Related to Climatic Conditions. (4)

219D. Fire Safety in Buildings. (4)

*219E. Environmental Control Systems Related to Urban Design. (4)

219F. Energy Conservation as a Design Strategy. (4)

Study Area C—Structure and Production

120. Structural Systems for Buildings. (5) Two 1/2-hour lectures and one 3-hour discussion, laboratory, or field trip per week. Prerequisite: EDS, EDS, upper division standing or consent of the instructor. Introduction to the study of structure. Structural constraints and the forces which act on buildings.

121. Principles of Construction. (4) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisite: course 112 or consent of instructor. Study of basic architectural building subsystems: their requirements, construction, and interactions.


129. Undergraduate Seminars in Structure and Production. Two 1-1/2 hour seminars per week. Prerequisite: course 121 or consent of instructor. Study of typical building subsystems: their requirements, construction, and interaction.

129A. Special Problems in Structure (4) (May be repeated for credit)

129B. Introduction to Building Production. (4)

222. Design Problems in Structure and Production. (4) Two 2-hour laboratories and one 1-hour seminar per week. Prerequisite: course 121 or consent of instructor. Combined course must be taken concurrently with 208, 213A, 213B. Synthesis of structural considerations, seismic factors, and relation to architectural design.

223. Architectural Design for Seismic Forces. (4) Two 1/2-hour lectures per week. Prerequisite: Civil engineering 128A—128B—128C courses 120 and 121, or consent of instructor. Design and construction of earthquake resistant buildings.

224. Advanced Building Methods and Processes. (4) Two 2-hour seminars per week. Prerequisite: Architectural Design for Seismic Forces, course 121, or consent of instructor. Development of international methods of organizing two- and three-dimensional visualization for solution of problems of architectural and urban design projects. Emphasis on practical applications to problems of environmental design.

225. Seminar, Structure and Production in Architecture. Two 2-hour seminars per week. Prerequisite: Architectural Design for Seismic Forces. Architectural application of theoretical concepts to real-life problems. Emphasis on practical applications of theoretical concepts to real-life problems. Topics include engineering economy, fiscal and economic impact analysis, and methods for environmental design.

232. Seminar in Architectural Research. (4) Two 1/2-hour seminars per week. Prerequisite: graduate standing. Methods of research and the use of quantitative methods for environmental design. Every participant develops and carries out a small-scale research project.

233. Methods of Quantitative Analysis in Design. (4) Two 2-hour seminars per week. Prerequisite: Architectural Research Methods and Documentation. Workshop on operational methods for analysis of large-scale architectural and urban design projects. Emphasis on practical application of theoretical concepts to real-life problems. Topics include engineering economy, fiscal and economic impact analysis, and methods for environmental impact assessments.

237. Architectural Research Methods and Documentation. (3) One 2-hour lecture per week. Prerequisite: graduate standing. Methods of research and the use of quantitative methods for environmental design. Every participant develops and carries out a small-scale research project. Quality control over new publications. Histories that remain in the record.

239A. Rational Thought and the Design Process. (4) Formerly 239B.

Study Area E—Social and Behavioral Factors in Architectural and Urban Design

140. Social and Cultural Factors in Architectural and Urban Design. (3) Three 1-hour lectures and one 1-hour seminar per week. Prerequisite: consent of instructor. Consideration of social functions to architectural forms, with respect to individual, group, family, neighborhood and community. Emphasis on international urban and architectural design.

141. Form Determinants of the Dwelling. (3) Three 1-hour lectures per week. Interactions of technological and aesthetic innovations and their effects on the physical environment of the residential community.

143. Seminar in Architectural Problems and Issues. (3) One 2-hour seminar per week. Prerequisite: consent of instructor. Discussion of problems and issues of architecture. Development of proposals for solutions. Problems proposed by the instructor or the student. May be repeated for credit.

NOTE: For key to symbols, see page 38.
Communication as an architectural language related to economic analysis and decision making.

240. Advanced Study in Social and Cultural Factors in Architecture and Urban Design. (4) One 1 1/2-hour lecture and one 1 1/2-hour seminar per week. Prerequisite: consent of instructor. Study of social and institutional functions to environmental forms.

241. Major Problems of Architecture. (4) Two 3-hour lecture-discussions per week. Prerequisite: upper division standing or consent of the instructor. Intensive study of relationships of social and institutional forms to environmental forms.

242. Seminar in Architecture. (4) Two 2-hour seminars per week. Prerequisite: course 232 or consent of instructor. Relation of architectural research to the disciplines of architecture. Team investigation of topics related to theory and practice.

243. A Sociology of Space. (4) Two 1 1/2-hour seminars per week. Prerequisite: graduate standing or consent of instructor. Consideration of the role played by social structures in the design, allocation, and utilization of space.

244. Architectural and Environmental Programming and Evaluation. (4) One 1 1/2-hour lecture and one 1 1/2-hour seminar per week. Prerequisite: courses 130, 140 and 240 and/or consent of instructor. Formulation of pre-design decisions affecting architectural forms. Topics include the nature of institutions: issues of size, growth, and change; determination of diverse user needs; values and value systems. Specific program factors and aspects that will be diversified.

245. Group Relations and Environmental Design. (4) Two 1 1/2-hour seminars per week. Prerequisite: consent of instructor. Focused on the irrational group and non-human environment. Participants will study and experience their own covert group processes and apply what is learned to a variety of environmental design situations and products.

246. Seminar, Social and Behavioral Factors in Architectural and Urban Design. (4) Two 1 1/2-hour seminars per week. Prerequisite: course 140 or consent of the instructor. Advanced study in social and economic factors in architectural and urban design.

249A. Social and Cultural Factors.

249B. Behavioral Factors.

249C. Technological Factors.

IDS 235. Environmental Design: Stress and Health. (4) Two 1 1/2-hour seminars per week. Prerequisites: Environmental Design 170 and 171, plus an introduction to the history of man in the medical and environmental sciences. Specific topics and group discussions required of candidates for the Ph.D. This course may not be used for units or residence requirements for the Ph.D. Candidates for the master's program are limited to 4 units for the entire period.

260. Special Group Study. (1-4) Studies developed to meet needs. No more than 4 units are allowed in any one quarter.

261. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. Studies developed to meet individual needs.

262. Land Development and Real Estate Economics Seminar. (4) Three hours of seminar per week. Prerequisite: course 162 or consent of instructor. Detailed examination of the roles of various decision-makers in the land development process. Advancement study of the implications of market research and financial planning techniques for architectural administration. Included will be an introduction to a seminar building architecture, restoration, and rehabilitation.

267A. Architectural Preservation and Conservation: Methodology. (4) Two 2-hour seminars per week. Prerequisite: One course from ED 71, ED 169, ED 170, or ED 171, and one course from Area G, or consent of instructor. Preparation of a critical evaluation of methodology, survey methods, and techniques of recording historic structures, neighborhoods, and districts, with an introduction to seminars in building architecture, restoration, and rehabilitation.

267B. Architectural Preservation and Conservation: Implementation. (4) One 2-hour seminar and 4 hours of field work per week. Prerequisite: course 267A, or consent of instructor. Survey of existing laws and economic factors promoting or hindering architectural preservation, rehabilitation, or conservation of buildings, neighborhoods, or districts. Class members will be expected to work in the field on a group project involving preservation criteria and an oral presentation.

269. Seminar in Architectural Administration. Two 1 1/2-hour seminars per week. Prerequisite: course 160 or consent of the instructor.

269A. Construction Law. (4)

269B. Architectural Practice. (4)

269C. Architectural Administration. (4)

269D. Specifications. (4)

Study Area G—History of the Environment

See Environmental Design 169A through 177.

173. American Architecture. (4) Two 1 1/2-hour lectures per week and other meetings as scheduled. Prerequisite: Environmental Design 170 and 171 or consent of instructor. An examination of the history of architecture in America from Colonial times to the present.

174. Modern Architecture. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. The background and evolution of architecture in the nineteenth and twentieth centuries.

175. The Architecture of Islam. (4) Two 1 1/2-hour lecture-discussions per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. An examination of the history of Islamic architecture. Selected topics in Islamic architecture from the early period and on buildings in Spain and the Near East, focusing on the development of the Islamic world.

176. The Architecture of Islam. (4) Two 1 1/2-hour lecture-discussions per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the history of Islamic architecture from the early period and on buildings in Spain and the Near East, focusing on the development of the Islamic world.

176A. The Architecture of Islam. (4) Two 1 1/2-hour lecture-discussions per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the history of Islamic architecture from the early period and on buildings in Spain and the Near East, focusing on the development of the Islamic world.

176B. The Architecture of Islam. (4) Two 1 1/2-hour lecture-discussions per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the history of Islamic architecture from the early period and on buildings in Spain and the Near East, focusing on the development of the Islamic world.

176C. The Architecture of Islam. (4) Two 1 1/2-hour lecture-discussions per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the history of Islamic architecture from the early period and on buildings in Spain and the Near East, focusing on the development of the Islamic world.

176D. The Architecture of Islam. (4) Two 1 1/2-hour lecture-discussions per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the history of Islamic architecture from the early period and on buildings in Spain and the Near East, focusing on the development of the Islamic world.

176E. The Architecture of Islam. (4) Two 1 1/2-hour lecture-discussions per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the history of Islamic architecture from the early period and on buildings in Spain and the Near East, focusing on the development of the Islamic world.

176F. The Architecture of Islam. (4) Two 1 1/2-hour lecture-discussions per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the history of Islamic architecture from the early period and on buildings in Spain and the Near East, focusing on the development of the Islamic world.

177. The Architect and the Profession. (4) Formerly 1910. Two 1 1/2-hour lectures per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the history of the architectural profession dealing with the education and training of the architect through the ages, the structure and administration of the profession and the process of architectural practice.

271. History of Architecture Theory. (4) Two 1 1/2-hour seminars per week. Prerequisite: Environmental Design 173 to 178 or consent of instructor. Examination of theories of architecture from Vitruvius to the present.

272. Seminar in the Architecture of Antiquity. (4) Two 1 1/2-hour seminars per week. Prerequisite: Environmental Design 173 to 178 or consent of instructor. Special problems selected for concentrated study from the building history of the ancient world. May be repeated once for credit.

273. Seminar in American Architecture. (4) Two 1 1/2-hour seminars per week. Prerequisite: Environmental Design 173 to 178 or consent of instructor. Original research on selected problems in the history of American architecture, and especially in the physical environment of the West Coast.

274. Seminar in Modern Architecture. (4) Two 1 1/2-hour seminars per week. Prerequisite: Environmental Design 170 and 171 plus Environmental Design 173 or consent of instructor. Consideration of modern architecture in the physical environment of the West Coast.
The planning of cities is as old as urban civilization. The present-day planning profession has emerged in response to the rapid growth, changing character, and critical problems of twentieth-century urban development. Planning has become an accepted function of government, both in overall terms and in connection with particular programs, while planning techniques are likewise employed by large-scale private developers. Theorists and researchers in other disciplines have become increasingly interested in urban problems, and their work, often in partnership with urban planners, is contributing to greater knowledge and more sophisticated methods in planning practice. City and regional planning employs some 12,000 professionals in the United States, most of them members of the American Planning Association. Characteristics of city, county, and metropolitan regional planning agencies are responsible for recommending guidelines for channeling the urban physical development of their respective jurisdictions. City planners are also relied upon in other types of public agency—local, state and federal agencies dealing with highways, transportation, housing, urban renewal, community development, public works, economic development, human and natural resources development, education, and health. A significant fraction of the profession engages in consulting, to city planning and other governmental agencies, and to private firms doing urban planning through a series of problems or discussion sections per week; tutorial sessions or discussion sections per week; tutorial sessions, two half-day field trips; Prerequisite: open to majors in all fields. Development of the housing problem and government housing policy especially in the United States, selected aspects of design and planning, critical current issues and the future of housing. (F or W)

112. The Idea of Planning. (4) Three hours of lecture per week. Prerequisite: CP 110 or consent of instructor. Planning is often called for in response to societal crises. Thus, nature and criticism of the planning idea, appropriateness of planning, sources of legitimacy for and justification of planning, styles of planning, and future directions of the planning idea are examined. (F or W)

113. Urbanization and Community. (4) Three hours of class meetings per week. Prerequisite: Course CP 110 or permission of instructor. The process of urbanization and its social consequences. The search for community and participation. Prospects of urban and community organizing in the contemporary large American city. (F)

114. Minority Perspectives in Urban Structure. (4) Two 1 1/2-hour lectures per week. Prerequisite: consent of instructor. A survey of minorities and where they live in the metropolitan structure, focusing on housing, jobs, and transportation. It will also consider the problems of education, health, business and economic development within their socio-cultural patterns, and social, economic, and ideological elements of current thinking on these issues. 127. Urbanism and the Future of Cities. (3) Three 1-hour lectures-discussions per week. Prerequisite: Field Studies 196U or V, Laboratory in Urban Ecology recommended accompaniment. Structural change in contemporary urban ecosystems. Systematic exploration of feasible futures. Short problems for evaluating progress. (F, W, Sp)

196. Special Study for Advanced Undergraduates. (1–5) Prerequisite: consent of instructor. Must be taken on a pass-or-not-passed basis. (F, W, Sp) 200A–200B. The Evolution of Cities. (4) Three hours of meetings per week. The role of cities in civilization. The historical origins of their institutions and physical forms. The structures and functions of cities in developed and developing countries. A seminar course. (Mr. Gellen, Mr. Meier (Sp))
Impacts of transportation policies on land use and development. Pricing, investment, land use control, administrative decision-making practices, and elements of the planning process are addressed. (Sp)

216. Workshop-Studio In Metropolitan Planning. (5) Ten hours of studio per week. Field problem in major phases of city and metropolitan land use and development. A collaborative student-group effort in formulating policy recommendations specific within governmental frameworks.

217A. Community Development. (4) Three hours of lecture-discussions and two hours workshop per week. Prerequisite: consent of instructor. Description and analysis of problems in public planning and development action in housing, urban redevelopment and rehabilitation, particularly in older, central cities.

217B. Community Development. (4) One 1/2-hour lecture-discussion session and four hours workshop per week. Prerequisite: Course 217A or consent of instructor. Workshop on community development planning. This is to provide opportunity for field work in the spheres of public planning and community development covered in course 217A.

219. The Urban Economy. (4) Two 1/2-hour sections per week. Prerequisite: Economics 100A-100B or equivalent, or consent of instructor. Analysis of the urban economic system. Economic base and other urban economic models. Impact analysis and projection of changing labor force and industrial structure. Issues in growth, income distribution, and planning controls.

220. Comparative Urbanization. (4) Three hours of meetings per week. Prerequisite: consent of instructor. Problems of urbanization, migration, sprawl, and squatter settlements and marginal groups in the Third World, the United States, Latin America, and Europe. Historical, social, cultural, economic, and political dimensions of the problems are considered in relation to policy alternatives and outcomes.

224. Rural Poverty and the Urban Ghetto. (4) Two 1/2-hour seminars per week. Prerequisite: consent of instructor. Analysis of the linkages between rural and urban poverty. Appraisal of alternative development strategies and public policies for coping with geographically-clustered poverty.

226. The Metropolitan Region. (4) Three hours of meetings per week. Examination of the social, economic, and political implications of metropolitan region. Analysis of regional development forces and their impact on cities; governmental frameworks for urban planning; underlying concepts, current methods and future evolution of the field.

228. Seminar on Urban Planning In Latin America. (4) Two 2-hour lectures per week. Prerequisite: knowledge of city planning principles; background in Latin American development; a reading knowledge of Spanish is desirable. Problems of urban development in Latin America; policies and programs of different administrations, urbanization forces and their impact on cities; governmental frameworks for urban planning; underlying concepts, current methods and future evolution of the field.

230. Topics In City and Metropolitan Planning. (4) Three hours of meetings per week. Prerequisite: graduate standing in a social science department or professional school or consent of the instructor. History of American city planning; role of physical planning in local government; the urban general plan and its effective relations between city planners and other professionals.

232. Urban Politics and Planning. (4) Three hours of meetings per week. Prerequisite: consent of instructor. Basic concepts of urban politics essential to planners and policy makers. The role of religion, race, class, pluralism, conflict and coalition. Community mobilization and participation, urban political institutions, local and supra-local political systems and the role of politics in planning and the decision-making process.

233. Introduction to Regional Analysis and Planning. (2) One 2-hour lecture per week. The concept of region and methods of regionalization; survey of regional problems and objectives; general characteristics of Regional Models as planning tools. Inter- and intra-regional investment allocation during the development process. Review of current regional planning activities.

235. Political Economy and Planning. (4) One 3-hour seminar per week. A seminar for students in planning, investigating the interaction of political, social, economic, and political forces and of social outputs in the planning process. The French planning experience will be used as a base for examining the literatures from the various social sciences for their relevance to development planning.

236. Urban Problems and the Legal Process. (4) Two 2-hour meetings per week. Examining legal frameworks relevant to urban planning problems, stressing the law surrounding intergovernmental relations and regulatory structures. Include use of various techniques of intervention; and processes and procedures of "legitimate" character.

237. Citizen Involvement in the City Planning Process. (4) Two 1/2-hour seminars per week. Prerequisite: approval of the instructor. Examination of the roles of the citizen and citizen organizations in the city planning process. Models for citizen involvement and strategies for advancing community control. Examination of the effectiveness of different organizational models in different situations.

238. The Municipal Budget as an Instrument for Planning. (4) Formerly 239A. One 3-hour seminar per week. The fiscal and organizational framework as a planning tool. The budgeting process at the city level. Selective treatment of issues in projecting need, cost analysis, capital budgeting, policy, resource allocation across programs, spatial and individual equity and access to services. The use of the budget to implement urban plans.

244. Housing and Urban Development. (4) Two 1/2-hour lectures per week. Prerequisite: course 209. Housing and related development in urban fringe areas; social, economic and political consequences of public policies upon journey to work, social overhead investment requirements, regulatory policies. New towns, land assembly, open space, and other problems.

246. Planning Land-Use and Communications Systems. (4) Three hours of meetings per week. Preliminary review of land use planning, and use of survey and analysis techniques for physical planning. The social organization and spatial patterning of the large metropolitan area. Physical development problems and policies.

247. Methods of Program Planning. (4) Two 2-hour lectures per week. Prerequisite: CP 203 and 212, or consent of instructor. Techniques for simulating and evaluating alternative sequences of government actions. Designing community-development programs through the use of selected models and the use of benefit-costs analysis; cost effectiveness bases for budgeting and planning; the politics of program planning.

248. Planning for Change. (4) Two 1/2-hour lectures per week. Planning and implementation within the context of governmental institutions. Systems for community decision making; governmental structures, administered, bargaining and judicial approaches. Focus on organizational behavior and capacity for effective processes.

250. Theses of the Planning Process. (4) Three hours of meetings per week. Prerequisite: courses 203 and 212, or consent of instructor. Planning as a special mode of inquiry; introduction to application of operational models.

251. The Logics of Planning. (4) Two 1/2-hour lectures per week. Planning and implementation within the context of governmental institutions. Systems for community decision making; governmental structures, administered, bargaining and judicial approaches. Focus on organizational behavior and capacity for effective processes.

253. Research Seminar In Regional Development. (4) One 3-hour seminar per week. Prerequisite: consent of instructor. A close examination of selected issues in policy, methods and patterns of regional development, through student research. Field trips and tele-conferences. Research papers and class discussion.

256. Seminar on the Urban General Plan. (4) Three hours of meetings per week. Prerequisite: courses 203 and 212, or consent of instructor. Planning as a special operation; an introduction to the practical problems of urban spatial development.

257. Theories of the Planning Process. (4) Three hours of meetings per week. Prerequisite: course 203 or consent of the instructor. An advanced course, primarily for doctoral students, focusing upon the conceptual and methodological bases of contemporary planning; with an emphasis on theory, decision theory, and the new policy sciences.

259. Seminar on the Urban General Plan. (4) Three hours of meetings per week. Prerequisite: courses 203 and 212, or consent of instructor. Planning as a special operation; an introduction to the practical problems of urban spatial development.

261. Methods of Program Planning. (4) Two 2-hour seminars per week. Prerequisite: CP 203 and 212, or consent of instructor. Techniques for simulating and evaluating alternative sequences of government actions. Designing community-development programs through the use of selected models and the use of benefit-costs analysis; cost effectiveness bases for budgeting and planning; the politics of program planning.

262. Planning for Change. (4) Two 1/2-hour lectures per week. Planning and implementation within the context of governmental institutions. Systems for community decision making; governmental structures, administered, bargaining and judicial approaches. Focus on organizational behavior and capacity for effective processes.

265. Seminar on the Urban General Plan. (4) Three hours of meetings per week. Prerequisite: courses 203 and 212, or consent of instructor. Planning as a special operation; an introduction to the practical problems of urban spatial development.

266. Field Observation and Diagnosis of Urban Environments. (2) Six hours of field work per week. Prerequisite: Senior standing in Environmental Design. Course consists of five 4 to 5 hour field trips and five 2-hour field trips. Field trips on foot will look at, measure, record and learn from field activity of urban environments, including physical, social and economic conditions and trends. Seminars will review limitations and possibilities of observations for city planning.
Course to be given on a satisfactory/unsatisfactory basis. Mr. Jacobs (W)

*260. Urban Density: Measurement, Implications, and Uses in City Planning. (4) Two 1-1/2 hour seminars per week. Prerequisite: consent of instructor. Graduate students, discussions, lecture. Emphasis will be on the development of techniques and measurement related to city planning and qualitative analysis of data from residential and commercial building types, bases of standards, relationship to urban livability, service needs, costs and ideas of optimization. Mr. Duhl (W)

261. Introduction to Analytical Planning Methodology. (6) Six lecture hours per week. Context and role of planning analysis; the design of analytic studies; data sources and collection; methods of quantitative and qualitative analysis; data processing and computer packages. To be offered 1978-79 only. (F)

261H. Urban Land Economics. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: consent of instructor. Analytical microeconomic theory or a consent of instructor. The first half of the course analyzes the patterns of land utilization in urban and the planning settings. Primarily emphasis is placed upon the economic process of land use succession. The second portion presents various methods of public sector evaluation of land development. To be offered 1978-79 only. Mr. Dowall (Sp)

261J. Foundations of Planning Analysis. (4) Two 1-1/2 hour class meetings per week. Problem formulations, indicators, models, values and paradigms are examined critically as the prerequisites for quantitative and other analysis. Readings in measurement and epistemology combined with examples and exercises in evaluating and policy arguments and designing processes and indicators. (Sp)

Special Studies

268. Group Studies. (1-12) Consent of instructor. Topics to be announced at beginning of each quarter. No more than 5 units may be taken in one subject. Sections C through L are letter graded. Sections M through 2 are graded satisfactory/unsatisfactory. The Staff (F, W, Sp)

269. Individual Study or Research. (1-12) Consent of instructor. Individual study in consultation with the major field adviser. Must be taken on a satisfactory/unsatisfactory basis. Mr. Collignon (F)

269B. Workshop in Social Program Evaluation and Policy Analysis. (6) One 3-hour seminar and six hours of project work per week. Prerequisite: course 269A or equivalent; some defined core course work. Focus on the techniques of evaluation and analysis of social programs and policies. Course explores the use of analysis to assess and evaluate the impact of social policymaking. (W)

290. Professional Seminar. (1-4) Designed to give students skills in the development and execution of professional programs relevant to social and institutional change. A close examination of social policy issues and methodological approaches in analysis and evaluation through student and faculty research. (W)

NOTE: For key to symbols, see page 36.
111. Planting Design (4) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisite: Landscape Architecture 101. Application of aesthetic, functional, and design principles in the selection and arrangement of plants in landscape architecture. Mr. Beatty (W)

112. Landscape Horticulture (4) Two 1-hour lectures, two 2-hour workshops and one 3-hour laboratory per week. Prerequisite: Botany 10 or equivalent. Plant identification, propagation, and maintenance of plants. Mr. Newton (W)

120. Topographic Forms and Design (4) Two 1-hour lectures and two 3-hour studios per week. Prerequisite: Landscape Architecture 102 and 121. Comprehensive treatment of graphic and grading problems in landscape construction. Design and structural relationships; graphic and computational exercises; technical graphics. Mr. Tellow (F)

122. Landscape Site Engineering (4) Two 1-hour lectures and two 3-hour studios per week. Prerequisite: Landscape Architecture 101. Landscape design and development of site utilities. Engineering of irrigation, drainage, and soil structures used in the site development. Graphic exercises, technical drawings. Mr. Tellow (F)

131. Landscape Analysis and Problem Organization (3) Two 1 1/2-hour meetings per week. Theories and methods in landscape analysis, emphasizing natural factors and design problem organization. Mr. Laurie (W)

132. Recreation and Open Space Systems (4) Two 2-hour lecture and visitor-presentation sessions, plus one discussion meeting per week. Prerequisite: consent of instructor. Recreation as a socio-ecological system in time and space. Environmental systems. Planning issues and design criteria. Student-selected field studies. Mr. Laurie (W)

133. Design Implications in Forestry and Resource Management (3) Two 1 1/2-hour meetings per week. Prerequisite: upper division standing and consent of instructor. An exploration of wildlands as a landscape resource, stressing visual composition, the relation of forestry and resource management decisions may be given form and relationships through design. Mr. Linton (Sp)

134. Presentation Graphics for Landscape Architects (4) Two 4-hour laboratories per week. Prerequisite: Landscape Architecture 30 or Environmental Design 6. Freeshand and formal perspective approaches to graphic representation of design concepts. Pen, ink, and color media. Mr. Tellow (Sp)

140. Social and Psychological Factors in Open Space Design (4) Two 1 1/2-hour lectures and three 3-hour studios per week. Prerequisite: upper division standing and consent of instructor. The exploration of landscape site problems; grading, drainage, and planting. Mr. Dickert (Sp)

146. Directed Group Study (1-5) To be arranged. Prerequisite: consent of instructor. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1-5) Enrollment restricted by regulations in Schedule of Classes. Must be taken in apass/fail basis. The Staff (F, W, Sp)

See Environmental Design course listings for description of required environmental design courses for landscape architecture major.

200A. Landscape Design and Graphics. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 102 or equivalent. Survey of current design practices and techniques. Development of professional graphic skills. Mr. Beck (W)

200B. Site Planning and Topographic Form. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 102 or equivalent. Survey of current design practices and techniques. Development of professional graphic skills. Mr. Beck (W)

201. Problems in Environmental Planning. (4) Two 4-hour laboratories per week. Prerequisite: Landscape Architecture 103 or consent of instructor. Problems in planning and design of natural and physical landscape architecture. Mr. Leopold (Sp)

202A. Landscape Analysis for Site Planning. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 200A and 200B. The direct use of planning and design in the analysis of the program and the site. To be taken in conjunction with Landscape Architecture 202B. Mr. Beck (F)

202B. Landscape Design and Planning. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 202A and 202B. Advanced problems in design investigated in terms of plant selection, planning design and the approach taken in conjunction with Landscape Architecture 202A. Mr. Beck (F)

203A. Landscape Design and Construction. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 202A and 202B. Advanced problems in design investigated in terms of plant selection, planning design and the approach taken in conjunction with Landscape Architecture 203A. Mr. Beatty (W)

204. Advanced Problems in Landscape Design. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 202A and 202B. Preparation of design and working drawings for a project selected by the student and faculty approval. Mr. Beatty (F)

205. Environmental Simulation. (Variable 2-4) Six to nine hours of laboratory per week. Prerequisite: consent of instructor. An experimental workshop using the Environmental Simulator. Model-making for models and video presentation; assessment of alternative simulation techniques; comparative behavioral studies of simulations and the real world; new methods of urban and highway system design. Mr. Appleyard (F, W, Sp)

210. Vegetation Analysis for Environmental Planning. (3-4) Three to six hours of laboratory per week. Prerequisite: graduate standing in the College of Environmental Design or consent of instructor. Vegetation development is treated as a landscape ecosystem process. The steps required to control this process in order to achieve specific environmental objectives are examined. Mr. Linton (F)

220. Natural Factors in Planning and Design. (3-4) Three to six hours of laboratory per week. Prerequisite: graduate standing in the College of Environmental Design or consent of instructor. Vegetation development is treated as a landscape ecosystem process. The steps required to control this process in order to achieve specific environmental objectives are examined. Mr. Linton (F)

221. Quantitative Methods in Environmental Planning and Design. (4) Two 2-hour seminars per week. Prerequisite: consent of instructor. Discussion and critique of the application of quantitative methods to environmental assessment, analysis and evaluation in planning and design. Topics include multivariate analysis, optimization, simulation modeling, and oper-
222. Hydrology for Planners. (4) Three hours of lecture and two hours of laboratory per week. Prerequisite: consent of instructor. Discussion of the theory of hydrology and planning for flood control, water supply, and ecological and storm water management systems.

230. Communications in Landscape Architecture. (4) Two 4-hour studios per week. Prerequisite: consent of instructor. Discussion of the concept and practice of communication in landscape architecture with emphasis on written and oral presentations. (Chairman)

231. Principles of Site Planning. (4) Four hours of lecture and discussion per week, and field outings to be arranged. Prerequisite: consent of instructor. Discussion of the theory of site planning through case studies including site analysis and environmental factors, program formulation and design synthesis.

232. The Landscape as a Visual Resource. (4) Two hours of lecture and two 3-hour laboratories per week. Prerequisite: open to second year graduate students in Landscape Architecture, or consent of instructor. Visual analysis of public and private landscapes, and presentation skills.

233A-233B. Legislation, Administrative Regulation, and Land Planning. (4-4) See Interdepartmental Studies for the complete description of this course.

240. Advanced Seminar in Behavioral Factors in Environmental Design. (2) Two 1 1/2 hours of lecture per week. Prerequisite: consent of Instructor. Research and exercises using programs for symbolic two-dimensional computer graphic design, including the use of computer programs for modern graphic design, and graphic subroutines, with data from student's area of interest. Individual problem sessions to be included, as necessary. (Chairman)

234. Introduction to Computer Graphics and Mapping. (2) Two 1 1/2-hours lectures and one 1-hour discussion per week. Prerequisite: basic computer programming course may be taken concurrently. Introduction and exercises using programs for symbolic two-dimensional computer graphic design, including the use of computer programs for modern graphic design, and graphic subroutines, with data from student's area of interest. Individual problem sessions to be included, as necessary.

235. Introduction to Landscape Design and Environmental Planning. (1) One 1-1/2 hour seminar per week. Prerequisite: consent of instructor. Faculty presentations on principles of landscape design and environmental planning. Problem identification and solution, values, and the processes involved including design development, public participation, and field visits.

236. Thesuis and Comprehensive Examination Seminar. (2) One 2-hour seminar per week. Prerequisite: completion of the first year graduate course. Concluding seminar on advanced methods and strategies for written and design thesis research and for the comprehensive examination.

237. Seminar in Environmental Design. (2) Two hours of lecture and discussion per week. Prerequisite: consent of instructor. Exploration of environmental design process needs implied by the actual life-long continuity of environmental experience and the possibilities of a unified field.


239. The Interrelationship Between Landscape Design and Environmental Planning. (1) One 1-1/2 hour seminar per week. Prerequisite: consent of instructor. Discussion of landscape design and environmental planning projects in terms of the influence of planning goals and criteria and the life-long continuity of environmental experience.

240. Advanced Seminar in Behavioral Factors in Environmental Design. (2) Two 2-hour seminars per week. Prerequisite: Landscape Architecture 140. Advanced study of behavioral factors in open space design. Emphasis on either the personal environment or formal space systems. (Chairman)

245. Group Study. (1-6) To be arranged. (Chairman)

248. Individual Research. (1-6) To be arranged. (Chairman)

601. Individual Study for Master's Students. (1-6) Prerequisite: last quarter of residence in the MLA program. Individual study for the comprehensive requirements in consultation with the field adviser. Units may not be used to meet either unit or credit requirements for a Master's degree. Must be taken on a satisfactory/unsatisfactory basis. (Chairman)

602. Individual Study for Doctoral Students. (1-6) Individual study in consultation with the major field adviser. Intended to provide an opportunity for qualified students to prepare themselves for the various examination requirements of candidates for the Ph.D. May not be used for unit or resident requirements for the doctor's degree. Must be taken on a satisfactory/unsatisfactory basis.

611. Geological and Environmental Factors in Environmental Planning. (4) See Interdepartmental Studies for the complete description of this course.

620. Amenity Resources Planning. (4) See Interdepartmental Studies for the complete description of this course.

623A-623B. Legislation, Administrative Regulation, and Land Planning. (4-4) See Interdepartmental Studies for the complete description of this course.

624. Environmental Psychology. (4) See Interdepartmental Studies for the complete description of this course.

Program in Visual Design

Program Office, 235 Wurster Hall

Program Faculty

Mars Dhaemers, William A. Garnett

Program Associate Professor

Anthony Dubovsky, M.A.

(Chairman)

Undergraduate Program

For information about the undergraduate program, see the Announcement of the College of Environmental Design.

Graduate Program

The graduate program is organized to provide advanced study in visual design. The degree awarded is the Masters of Art in Design.

For detailed information about the graduate program consult the Announcement of the College of Environmental Design and the adviser for the Program in Visual Design.

Upper Division Courses

103A-103B-103C. Graphic Composition. (4-4-4) One hour of lecture and six hours of laboratory per week. Prerequisite: 103A: Environmental Design 6 or consent of instructor; 103B: course 103A or consent of instructor; 103C: course 103B or consent of instructor.

105B-105C. Typographic Design. (4-4) One hour of lecture and six hours of laboratory per week. Prerequisite: Visual Design 103A or consent of instructor. Theory and practice of typographic design.

127. Basic Techniques of Photography. (4) Six hours of laboratory per week. Prerequisite: preference will be given to students with a background in the College of Environmental Design. Assignments of standard material, equipment, and processes for optimum performance. Instruction on assignment and critical introduction of conditions of photo illustration in the field.

128. Documentary Photography. (4) Two 3-hour laboratories per week. Prerequisite: course 127 or consent of instructor. Photography as a working tool for various career disciplines. Advanced techniques, materials, and history of photography. (Chairman)

Research and planning photographic essays. Design 128 may be repeated once for credit.

129. Photography as an Art Form. (4) Two 3-hour laboratories per week. Prerequisite: course 127 or consent of instructor. Experimental approach to materials and processes. The viewfinder and design 129 may be repeated once for credit.

130. Introduction to Artifical Lighting Photography. (4) Two 3-hour laboratories per week. Prerequisite: course 127 or consent of instructor. Instruction in the use of artificial light. Design 130 may be repeated once for credit.

133. Experimental Approaches to Visual Communication. (4) One hour of lecture and six hours of laboratory per week. Prerequisite: consent of instructor. The use of light as a medium for human expression in photographic form, photographic images and graphics for programmatic contexts.

1160A-1160B. Design Survey. (4-4) Three 1-hour lectures per week. 1160A not prerequisite to 1160B. Historical survey of design in the modern arts from the ancient Near East to the present, with emphasis on the development of style and analysis and evaluation of form.

120A. The Ancient World and the Middle Ages.

120B. The Renaissance to the Present.

121A-121B. History of Furniture and Interior Design. (4) Three 1-hour lectures per week. The interior and its furnishings as an aesthetic composition and as an expression of domestic culture from the Middle Ages to the present.

128. Phases in Twentieth-Century Design. (4) Two 1 1/2 hours of lecture per week. Intensive study of significant phases of design developments and their relation to broader artistic movements in the twentieth century.

191C. Graphic Design in Architecture. (4) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: Visual Design 103A, or consent of instructor. Methods of identifying buildings and their sites, both real and extended, through appropriate and other graphic techniques; typography, symbols and color. To be offered 1979/80 only.

191D. Computer Graphics. (4) One hour of lecture and six hours of studio per week. This course is intended for students without programming experience. A limited number of more advanced students may apply. Introduction to computer technology, programming, and their application to visual design, communication and art. Development of computer programs according to the background of students. To be offered 1979/80 only.

191E. Information Graphics and Maps and Diagrams. (4) One 1-hour lecture and two 3-hour studios per week. Prerequisite: Visual Design 103A. Prerequisite of instructor. Design problems emphasizing the process through which abstract and factual information is given visual expression by graphic means. To be offered 1979/80 only.

Special Studies

197. Field Studies in Design. (1-5) Prerequisite: consent of instructor. Observations and exercises in specific areas of design in off-campus organization. Regular individual meetings with faculty sponsor and written report required. To be offered 1979/80 only.

198. Special Group Study. (1-5) To be arranged. Studies developed to meet needs. No more than 5 units are allowed in any one quarter. To be offered 1979/80 only.

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted to regulations. Prerequisite: permission of instructor. May be taken on a satisfactory/unsatisfactory basis. Studies developed to meet individual needs. To be offered 1979/80 only.

Graduate Courses

222. Seminar in Experimental Approaches to Media and Methods. (4) Three hours of seminar per week. Prerequisite: open to graduate students. Problem-solving, preparation, and presentation of various projects. May be repeated once for credit.

229. Photography as an Art Form. (4) Three hours of seminar per week. Prerequisite: course 129. Advanced work in the experimental approach to materials and processes. The visual realization of ideas.
232. Environmental Photography. (4) Three hours of lecture per week. Photography projects related to environmental design and documentation of current history. Mr. Garnett (Sp)

**233. Special Problems in Light, Motion, and Form.** (4) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: course 232 or consent of instructor. The application of light, motion, and form to TV and multimedia and their effect on spatial orientation and arrangement.

**234. Special Problems in Photography.** (4) Three hours of seminar per week. Prerequisite: course 233 or consent of instructor. Photography as a means to pursue special broadcast motion relationships in a separate context from content. Mrs. Daeheners (Sp)

**235. Seminar in Photography.** (3) Mrs. Daeheners

240. Seminar in Design Research. (3) One 3-hour meeting per week. Advanced study especially related to the study of other disciplines that constitute the subject matter of journalism. The program is based upon the supervision of a faculty adviser, designed to reinforce the student's background in areas related to his proposed thesis topic.

The Staff (F, W, Sp)

Environmental Design Course

**1172. History of the Environment.** (4) See Environmental Design for the complete description of this course.

### Graduate School of Journalism

#### Graduate School of Journalism Office, 607 Evans Hall

**Professors:**
- Ben H. Bagdikian, A.B.
- Edwin R. Bayley, B.A. (Dean)
- David Utttejohn, Ph.D.
- Robert W. Desmond, Ph.D.
- Bernard B. Taper, M.A.

**Assistant Professor:**
- Thomas C. Leonard, Ph.D.

**Senior Lecturers:**
- James C. Spaulding, B.A.
- Andrew A. Stero, B.A.

**Lecturers:**
- James Benet, B.A.
- Bruce Calvin, B.A.
- Daniel DeCosta, M.S.
- Lacey E. Fosburgh, B.A.
- Rassie Steiner, M.A.
- Michael Weiss, M.A.
- Richard Reinhardt, M.S.

**Graduate Advisers:**
- Mr. Spaulding
- Mr. Littlejohn
- Mr. Bagdikian
- Mr. Bayley
- Mr. Leonard

**Undergraduate Adviser:**
- Mr. Spaulding

The Graduate School of Journalism offers a program leading to the degree of Master of Journalism (M.J.). The program is designed to provide training in the skills and techniques of journalism and a foundation of the traditions and principles of the profession, combined with the study of other disciplines that constitute the subject matter of journalism. The program is based upon the idea that the best possible preparation for a career in journalism is a sound liberal arts education, with specialized training in journalism at the graduate level.

Candidates for the M.J. degree shall ordinarily have completed six quarters in graduate study in journalism and related disciplines. They shall have completed 48 units leading to the degree of Master of Journalism (M.J.).

An applicant for graduate study should hold a bachelor's degree comparable to that given by the University of California at Berkeley. Courses are outlined in the circular Admission to Graduate Study, available at the office of the Dean of the Graduate Division, and in the Announcement of the School of Journalism.

The Graduate School of Journalism offers a variety of courses for undergraduates, ranging from small writing and reporting courses and seminars to large lecture courses. Undergraduates with a special interest in journalism may also attend graduate seminars, with consent of the instructor, when there is room.

An undergraduate student interested in attaining proficiency in the skills of journalism can put together a program in journalism—a concentration in journalism and related disciplines. They shall have completed 48 units leading to the degree of Master of Journalism (M.J.).

Further information, application requirements, and copies of the Announcement of the School of Journalism 1978/79 are available from the Office of the School of Journalism, 607 Evans Hall.

### Upper Division Courses

**100. Introduction to News Writing.** (4) Three hours of lecture and discussion and eight hours of field work per week. Sections limited to fifteen students. Prerequisite: total grade-point average of not less than 2.0 on a 4.0 scale. An extension of course 100 for students who seek additional instruction and practice in the reporting of government function.

The Staff (F, W, Sp)

**110. Undergraduate Colloquium.** (1) One one-hour meeting per week. The course consists of a study and discussion of various branches of the journalistic profession, of weekly meetings and discussions with the faculty of the School of Journalism and visitors. Can be repeated for credit. Must be taken on a passed/not passed basis. Mr. Reinhart (Sp)

**140. History of the American Press.** (4) Four hours of lecture and discussion per week. Study of the development of the "news" as it has been defined, discovered, and communicated from Colonial times to the present. The course studies changing attitudes and practices, and study and practice of methods of gathering, writing, and editing news. The Staff (F, W, Sp)

**151. The Literature of Journalism.** (4) Three hours of lecture and discussion per week. Study of the select works of outstanding writers for the American and European press, from the eighteenth century to the present. Mr. Littlejohn

**161. Propaganda and the Mass Media.** (4) Three hours of lecture and discussion per week. The course will analyze local and network news flow in nations and regions, with attention to sources of information, media characteristics, and conditions of performance. Mr. Leonard

**165A. Legal Aspects of the News Media.** (4) Three hours of lecture and discussion per week. Examination of international news flow in nations and regions, with attention to sources of information, media characteristics, and conditions of performance. Mr. Littlejohn

**165B. Legal Aspects of the News Media.** (4) Three hours of lecture and discussion per week. Examination of international news flow in nations and regions, with attention to sources of information, media characteristics, and conditions of performance. Mr. Littlejohn

**175. The Critical Review.** (4) Three hours of seminar per week, plus several hours of field work and individual tutorial sessions. Prerequisite: consent of instructor. Limited to fifteen students. Weekly written assignments, readings, and discussion in the field of critical review of books, film, drama, music, art, and architecture.

The Staff (F, W, Sp)

**180. Issues in Television Journalism.** (4) Four hours of lecture and discussion per week. An evaluation of issues faced by television journalists and the techniques used to present the course will analyze local and network news programs, examine problems journalists face working within the broadcast industry, the role of the future of public television. Mr. Littlejohn

**181. Television News Research Seminar.** (4) Four hours of lecture and discussion per week. Sections limited to fifteen students. Study of television news programs, examine problems journalists face working within the broadcast industry, the role of the future of public television. Mr. Littlejohn

**184. Reporting of Public Affairs.** (4) Three hours of lecture and discussion and eight hours of field work per week. Prerequisite: course 100 or equivalent and consent of instructor. Prerequisite: total grade-point average of not less than 3.0 and consent of committee in charge. Mr. Stere (F, W, Sp)

**190. Comparative World Journalism.** (4) Three hours of lecture and discussion per week. Examination of international news flow in nations and regions, with attention to sources of information, media characteristics, and conditions of performance. Mr. Stere (F, W, Sp)

### Field Study in Journalism. (1–5) Supervised experience in the practice of journalism in off-campus organizations. Individual meetings with faculty sponsor and reports required. Pre-enrollment required. Registration limited to fifteen students. Mr. Reinhart (F, W, Sp)

**200. Directed Group Study in Journalism.** (1–5) Prerequisite: total grade-point average of not less than 3.0 and consent of committee in charge. Undergraduate credit limited to five hours. Limited to five hours. Mr. Stere (F, W, Sp)

**205A. News Editing.** (2) Two hours of lecture and laboratory per week, plus outside assignments and reading. Prerequisite: consent of instructor. Students will do research on the role of press in a campaign for political or social reform. Mrs. Benet, Mr. Colvin, Ms. Stemer (W, F, Sp)

**205B. Advanced Editing.** (2) Three hours of lecture and laboratory per week, plus outside assignments and reading. Prerequisite: course 205A or consent of instructor. Students will do research on the role of press in a campaign for political or social reform. Mrs. Benet, Mr. Colvin, Ms. Stemer (W, F, Sp)

**207. Magazine Editing.** (3) Four hours of seminar and four hours of laboratory per week. Study of critical review of books, film, drama, music, art, and architecture.

The Staff (W, F, Sp)

**210. News Photography.** (3) Two hours of lecture and discussion and four hours of laboratory per week. An extension of course 100 for students who seek additional instruction and practice in the reporting of government function.

### Graduate Courses

**200. Reporting the News.** (5) Five hours of lecture and discussion of newspaper principles, ethics, and practices; periodic and daily attitude at all day laboratory sessions. The Staff (F, W, Sp)

**205. News Writing.** (3) Three hours of seminar and eight hours of field work in news reporting per week. Periodic tutorial sessions. Prerequisite: consent of instructor. The Staff (W, F, Sp)

**206. Advanced News Writing.** (4) Three hours of seminar and eight hours of field work in news reporting per week. Periodic tutorial sessions. Prerequisite: consent of instructor. The Staff (W, F, Sp)

**207. Magazine Editing.** (3) Four hours of seminar and four hours of laboratory per week. Study and critique of magazine editing and practice in creative editing of manuscripts. Study and critique of magazine editing and practice in creative editing of manuscripts. The Staff (W, F, Sp)

**208. Advanced Editing.** (2) Three hours of lecture and laboratory per week, plus outside assignments and reading. Prerequisite: course 205A or consent of instructor. The Staff (W, F, Sp)

**209. News Photography.** (3) Two hours of lecture and discussion and four hours of laboratory per week. An extension of course 100 for students who seek additional instruction and practice in the reporting of government function.

The Staff (W, F, Sp)

**210. News Photography.** (3) Two hours of lecture and discussion and four hours of laboratory per week. An extension of course 100 for students who seek additional instruction and practice in the reporting of government function.

The Staff (W, F, Sp)
School of Law

School of Law Office, 225 Boalt Hall

Professors:
- Thomas G. Barnes, D.Phil.
- Shoshan H. Barnett, A.B., LL.B.
- Babcock Barton, B.S., LL.B.
- Richard M. Bassbaum, A.B., LL.B.
- Joseph W. Choper, B.S., LL.B., D.C.L.
- Robert Cole, A.B., LL.B.
- John E. Coons, A.B., J.D.
- David Duque, Dr. J.C., J.D.
- E. Oliver Draper, LL.D., J.D.
- Ronan E. Degnan, B.S.L., LL.M.
- Leonard M. Diamond, B.A., LL.B.
- Melvin A. Eisenberg, A.B., LL.B.
- David L. Feller, A.B., LL.B.
- (Elizabeth Josephyn Boyt Professor)
- John G. Fleming, D.Phil.
- D.C.L. (Shannon Cecil Professor)
- Cabot Fee, M.A., LL.B., J.D.
- Inez H. Fishel, A.B., J.D.
- Ira M. Heyman, B.A., LL.B.
- Richard W. Jennings, M.A., J.D. (James W. and Isabel Plumer Professor, Emeritus)
- Philip E. Johnson, A.B., J.D.
- D.C.L. (John G. Fleming Professor)
- Santil Haddad, B.S., A.B., J.D.
- Robert T. Thornton Professor (Dean)
- H. Kenneth Haste, C.A., J.D.
- Friedrich Kessler, M.A., Dr.
- Judith S. Kranek, B.A., J.D.
- (Shannon Cecil Turner Professor, Emeritus)
- Peter M. Kratzer, B.A., J.D.
- David E. Kratzke, B.A., J.D.
- Lawrence M. Stone, A.B., J.D.
- Jonathan T. Stewart, B.S.L., J.D.
- (James G. invariably Professor, Emeritus)
- Thomas L. Teube, A.B., LL.M.
- (Allied F. and May T. Morris Professor, Emeritus)
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The School of Law (Boalt Hall) has a three-year curricular leading to the Juris Doctor (J.D.) degree. In addition to preparing its students to practice law, the School attempts to develop the study of law and legal institutions and to foster legal research. The School is a member of the Association of American Law Schools and is approved by the American Bar Association. Its graduates are qualified to apply for admission to practice in any state of the United States.

No single "pre-law" major is required or even recommended. However, these suggestions are made: students should learn to write by taking courses in which their work is vigorously edited; enroll in courses demanding analytical skills; obtain some breadth in humanities and social sciences that will help in understanding the social context within which legal problems arise; and acquire a general understanding of the business world, since a significant portion of legal problems are related to the business community. However, prospective students should not be deterred from pursuing the study of law merely because their undergraduate emphasis has specialized all these areas. Diversity of background enhances and enriches the legal experiences of all students.

The School of Law has also instituted a Graduate Program in Jurisprudence and Social Policy, leading to M.A. and Ph.D. degrees. It is a multidisciplinary program, involving faculty from the humanities and social sciences as well as law. It is designed for students who are interested in careers in teaching, research, and policy analysis. No prior legal training is required for admission. A year-long orientation seminar, Jurisprudence and Social Policy, is required of all students in the program.

The School does not offer a part-time or evening program. Most work in the first year is prescribed; the second and third years' courses are elective.

The School also offers programs leading to the degree of Master of Laws (LL.M.) or the degree of Doctor of the Science of Law (Juris Scientiae Doctor, J.S.D.).

The following list indicates the courses usually offered each academic year, although changes in instructors and times of delivery are frequent. The title of each course is the credit value in semester units in parentheses, a brief description of the subject matter, and the names of the faculty who are currently teaching the course. Note: The term of instruction for the School of Law is fifteen weeks rather than ten weeks. Therefore, the units in the School of Law, only, are indicated as semester units.

### Explanation of Course Numbering System

1. Courses are listed alphabetically, with the exception that prescribed first-year courses are numbered 200 to 205, and special programs are numbered 235 to 299.

2. Courses that substantially are the same (although the emphasis or the number of units may differ) are given the same number, but a different identifying number following a hyphen.

3. Where no integral number is available at the place in the title of each course, the corresponding course number is assigned following by a decimal point and another number.

4. Two-semester courses are identified by letters (e.g., 202A-202B). Unless otherwise indicated, completion of the A part of the course is a prerequisite to taking the B part.

For further information and admission requirements of the School of Law, see the Announcement of the School of Law, available without charge from the Law School Admissions Office, 220 Boalt Hall, Berkeley, California 94720.

### Professional Curriculum

#### First Year

The first-semester program is composed of six prescribed courses. Four of these classes are in large sections, with approximately 110 students in each. The fifth and sixth are small sections of 25 to 30 students. In the second semester, five courses are prescribed, and the student chooses one elective course. There are large sections and small sections in both the first- and second-year courses except Law 205 which is all small sections.

- **200A-200B. Civil Procedure.** (3-3) The principles of pleading under the code system and the federal rules; multiple jurisdiction; venue; personal and real property litigation; the jury, sufficiency of evidence, instructions, verdicts, new trials, judgments; appellate procedure. Mr. Loomis
- **201A-201B. Contracts.** (3-3) The law of contracts, dealing with the problems of formation, operation, and termination. Mr. Coons, Mr. Crawford, Ms. Shultz.
- **202A-202B. Criminal Law.** (2-3 or 4) An introduction to criminal law and procedure. Mr. Foote, Mr. Hoeber, Mr. Johnson, Mr. Ramsey.
- **203A-203B. Property.** (3-3) An introduction to the law of real property including estates and other interests in land, real property marketing and conveyancing, land-use control, and landlord-tenant problems. Mr. Klopman, Mr. Vetter.
- **204A-204B. Torts.** (3-3 or 4) The law of civil injuries, including both intended and unintended interference with personal property including personal injury as well as liability without fault. Mr. Barnett, Mr. Fleming.
- **205. Introduction to Law.** (1-1) Introduction to legal research and method in the fall semester, and in the spring.

### Second and Third Year

#### 206. Administrative Law.** (3) A study of administrative procedure and of agency rules, orders, and discretion (federal and state). Emphasizes the problems that lawyers encounter when they deal with government agencies and their innumerable officers and employees. Mr. Shapiro.

206.2. Administrative Law.** (4) A study of the processes of law making between executive departments of the federal government and their control by legislation and constitutional status of administrative agencies, the procedures, and the availability and scope of judicial review. Emphasizes the particularity of the conflict between administrative law and selected substantive problems of regulation, and other rights of "public interest" law. Mr. Gordley, Mr. Sugarman.

206.2. Criminal Law and Justice.** (2) A research seminar exploring the historical and contemporary changes in sentencing laws, practices and patterns. The emphasis is on social, political, and administrative sources and consequences of discretion in sentences in sentences of imprisonment. The California experience from 1850 to date will provide the main example. Mr. Messinger.

206.8. Advanced International Business Problems. (1) An advanced course in the international business problems of foreign trade, including its public law as well as private law aspects. Mr. Buxbaum.

207. Advanced Business Taxation Planning Seminar.** (3) An in-depth and advanced study of income tax problems affecting corporations and partnerships. Mr. Smith.

208.8. Ancient Law.** (2) Discussion will focus on the ancient Orient (including the Bible) and Greece. It will deal with both black letter law and the use of theology, myths and narratives as well as legal materials. Source and form criticism, the nature of common law, and other methodological problems will receive attention. Mr. Daube.

209a-209b. Antitrust Law.** (3-3) This course is a two-semester introduction to antitrust law and economic theory. The course includes a comprehensive survey of the law governing horizontal restraints and will include such topics as monopoly, cartels, oligopolistic interdependence, miscellaneous cooperatives, activities among competitors, and horizontal mergers. The second semester will cover vertical restraints of trade between suppliers and customers (resale price maintenance, territorial and customer restraints, exclusive dealing, and requirements contracts), vertical mergers, conglomerate mergers, and current legislative and judicial problems pertinent to complex antitrust litigation. Mr. Jorde, Mr. Sullivan.

210. Appellate Advocacy.** (3) Open to second-year students only. Combines study of oral advocacy, fact finding, combined with participation in moot court roles and experience inappellate research and writing. Mr. Coons, Mr. Crawford, Ms. Shultz.

210.8. Biomedical Ethics, Legal Issues In.** (2) This course will be an introductory survey covering a number of medical ethics situations and the legal issues which have important legal dimensions. Some of the topics covered will be: definitions of death, informed consent, decisions about termination of life for competent patients and for incompetent patients, research on human subjects, genetic counselling, care of patients with AIDS, potential legal applications of new techniques, and perhaps FDA regulation of medical drugs and foods. Ms. Shultz.

211.2A-211.3B. Business Associations (Corporations I and II).** (4) A brief introduction to some of the most important legal forms of business organization is followed by a study of the basic materials on corporations in the federal and state laws, emphasizing the formation and legal rights and liabilities of shareholders and the operating problems of corporations. Mr. Buxbaum, Mr. Winship.

211.5A-211.5B. Business Associations (Corporations I and II).** (4) This course will serve as an introduction to a variety of family law issues by examining how law distributes power and responsibility for the child among the child, the family, and the community. Through a seminar format, particular emphasis on the special problems for a lawyer who is representing a juvenile client. Mr. Coons, Mr. Kirp.

215.1. Church and State Seminar.** (2) A research seminar. Introductory reading and discussion of articles, cases and other materials dealing with the constitutional issues. Mr. Kirp.

215.2. Church and State Seminar.** (2) A research seminar. Introductory reading and discussion of articles, cases and other materials dealing with the constitutional issues. Mr. Kirp.

218A. Commercial Law I (Sales).** (4) This course will examine the law dealing with the sale of goods, including contracts, delivery, possession, and remedies for breach of contract. Mr. Buxbaum.

218B. Commercial Law II (Secured Transactions, Documents of Title, Payment Transactions).** (4) This course will consider the law governing the Uniform Commercial Code outside the law of sales. Mr. Smith.
with personal property as collateral, commercial paper, documents of title and other aspects of payment security transactions. Mr. Winship

220. Comparative Law. (2) An introduction to modern comparative law, with a focus on the legal systems of France and Germany. The course contrasts the intellectual outlook and techniques of civil and common law approaches to the study of problems common to both, such as providing a fair trial, compensating accident victims, policing the fairness of contracts, and determining the obligations of contracting parties. Mr. Gordley

222. Computer Research and the Law. (2) A survey of the applications of computers to legal research, legal practice, and the legal professions, with emphasis on the legal issues surrounding the use of computers, e.g., privacy, evidence, electronic fund transfers, protection of information, court record management. An oral and written report on related or related topics is required. Technical background welcome but not essential. Mr. Mosteky

223. Conflict of Laws. (3) Jurisdiction, choice of law and recognition of judgments in cases involving state and state-federal conflicts, particularly in the law of procedure, torts, workers' compensation, contracts, domestic relations, estates, and business associations. Ms. Kay

224-1A. Constitutional Law. (2) Nature of judicial review; distribution of powers in the federal system; individual and economic rights. The presentation is partly historical. Mr. Smith

224-1B. Constitutional Law. (3) Analysis of the judicial process in constitutional cases; examination, manipulation, and resolution of dual problems: qualification of the Bill of Rights to the states; freedoms of expression, association, and religion; equal protection; right of privacy and other fundamental rights. Mr. Choper

224-2A-224-2B. Constitutional Law. (3-3) Analysis of the judicial process in constitutional cases, primarily in the Supreme Court of the United States, in the nature of judicial review and limitations thereon; the distribution of governmental power within the national government; and the role of state and local governments. Mr. Cole, Mr. Mishkin

224-4A-224-4B. Constitutional Law Seminar: Emerging Issues of Constitutional Litigation. (1-2) Prerequisite: Law 224-1 or 224-2A. B (Constitutional Law). Selected current problems. Emphasis placed on new and ongoing developments in doctrines affecting the powers and duties of courts, and in the institutional framework and remedies for the enforcement of such rights. Mr. Mishkin

224-8. Construction Law Seminar. (2) The seminar will cover the legal aspects of the design and construction process. Mr. Sweet

225. Contract Writing and Analysis. (2) Seminar designed to develop the student's skills in writing contracts. Skill will be examined through model contracts and will include the drafting of several agreements from simple employment agreements and leases through more complex provisions of partnership buy-sell agreements and real estate purchase documents. Ms. Noyola

227. Copyright and Unfair Competition. (2) Statutory law and case law governing the rights of authors and artists. Issues concerncopyright and trademark protection. Mr. Fleming

230. Creditors' Remedies and Debtors' Protection. (3) A legal approach to judgments, execution, attachment, fraudulent conveyances, general assignments, creditors' agreements, and bankruptcy arrangements and other claims against debtors. Mr. Noyola

231.3. Criminal Justice Research Seminar on. (2) Participants in the seminar will be expected to conduct empirical studies of the charging, screening, bargaining, and dispositions processes. To do so, they will first have to read and analyze relevant literature. Further selection of the seminar topics must be made by the seminar leader. Part of the seminar requirement will be a clinical placement in a relevant agency. Mr. Messinger

235-1. Criminal Procedure. (3) A survey of criminal trial and pretrial procedure. Topics include the law of arrest, search and seizure, electronic eavesdropping, interrogation, identification, entrapment, pretrial motion, and security. Mr. Ramsey

235-3A. Criminal Procedure, (3) A survey of criminal trial and pretrial procedure. Topics include right to counsel, plea bargaining, suppression, pretrial motions, jury trial, double jeopardy, appeals, and habeas corpus. Mr. Hoebel

235-2B. Criminal Procedure. (2) An examination of police practices and the scope and administration of the exclusionary rule. Topics include the law of arrest, search and seizure, electronic surveillance, entrapment, interrogation, and eyewitness identification. Mr. Hoebel

235.5. Criminal Trial Practice. (2) Students will participate in simulated criminal cases from arraignment through trial. In addition to an oral participation, motions, jury trial. Emphasis on bail, preliminary hearings, suppression, examination of witnesses, argument to court/jury, evidentiary and procedural objections. Mr. Portman, Mr. Simons, Ms. Wilke.

236. Dividends, Seminar on. (2) Prerequisite: Business Associations (Law 211). This seminar will consider the legal restrictions on dividends and other distributions. Mr. Epstein

236.8, Election Regulation Seminar. (2) This course is designed to provide a survey of the law of current and legal arrangements in the United States governing the conduct of elections. Mr. Epstein

237.5. Election Law and Policy. (2) An examination of the policy issues and current status of federal and state (particularly California) law pertaining to the electoral process and the role of the judiciary. Emphasis on the regulation of the conduct and financing of political campaigns will be emphasized. Mr. Epstein

237.8. English Legal History Seminar. (2) Prerequisite: Law 280 (Legal History of England). A research seminar intended to result in an original paper on a topic in English law (common law or equity) from 1100 to 1700. Substantive and procedural law, development of the profession, the nature of litigation, and judicial institutions and techniques for research. Mr. Barnes

238. Environmental Law. (2 or 3) Primary emphasis is on the regulation of air and water pollution at national, state, and local levels. The course will examine regulations and the results. Economic as well as legal concepts are studied. Mr. Ross, Mr. Stewart

239-2. Estate and Gift Taxation. (1 or 2) A study of the estate and gift tax laws with respect to the estate and gift taxes. Mr. Barton, Mr. McNulty

239-3. Estate Taxation and Planning. (3) Prerequisite: Taxation of Property (Law 224-2A). An examination of the federal estate and gift tax laws, and how they operate, and the impact of the estate and gift taxes, and of gifts and their tax results. Economic as well as legal concepts are studied. Mr. Ross, Mr. Stewart

241.1. Estates and Trusts. (3) The law of intestate succession and wills; the nature, creation and termina of trusts; problems of construction of trusts and decedents' estates. Mr. Smith

242.2. Evidence. (3) Concentration upon the fundamental questions of evidence and theory of proof with special emphasis on the judicial principle of relevancy. Includes hearsay, business records, documenta tion, role of evidence, communication. Mr. Crebbin

243. Family Law. (3) Marriage, annulment, dissolution, and separation; parent and child; adoption and guardianship and ward; the Juvenile Court. Ms. Kay

243-2A. Family Law: The Child, the Family, and the State. (3) This course will serve as an introduction to a variety of issues relating to how laws affect the distribution of power and responsibility for the child, among the child, the child's family, and the state. Mr. Kay

245-1. Federal Courts. (5) Prerequisite: Law 224-1 or 224-2A-224-2B. Constitutional Law. The constitutional and statutory role of courts in the federal system, themselves, and their relationship to the federal and state government; the federal court and the state; and the distribution of judicial power between federal and state courts. Mr. Fletcher

245-3. Federal Courts. (4) The course will cover the jurisdiction and functions of federal courts, the distribution of power between the federal and state systems, and the role of substantive and procedural law in the two systems. Mr. Fletcher

245.8. Foundations of Law and Adjudication. (2) A study of influential contemporary theories of law and adjudication, maintaining in part, through an examination of the nature and scope of a lawyer's responsibility, and the nature and grounds of the judicial role. Mr. Fisher

245.9 Freedom of Speech. (2) A research seminar on current free speech issues. Each student will present a paper in a section such as "absolute" approach, the public forum, right of access, libel, community ownership and control of libraries, privacy, free speech, fair trial, symbolic speech, or commercial speech. Mr. Shapiro

247.2. Federal Contracts. (2) Classification and characteristics of future interests; rules restricting the creation of future interest, including the rule against perpetuities, the power of appointment, and the remaindermen's interest. Mr. Smith

248.2. Federal Taxation. (3) Examination of the historical, social and political causes of urban housing and neighborhood deterioration and the remedies, with emphasis on certain public program approaches, including emerging landlord-tenant law, urban renewal, Model Cities, community development block funds, federal-level legislation, and housing subsidy programs, tax subsidies, and state housing programs, and a comparative analysis of urban and housing problems in developing countries. Mr. Phillips

248.8. Human Rights Protection Seminar. (2) A survey of the sources, procedures, and specific issues defining and elaborating on the concept of human rights as it evolved historically, through the United Nations, the European Commission and Court of Human Rights, and other international and regional organizations. The following is a partial listing of the topics covered by the course: civil and political rights, economic, social, and cultural rights, the right of genocide, status of women, racial discrimination, self-determination, and procedural issues. The course will be conducted in a seminar format. Students will be required to analyze both orally and in writing a specific issue of their choice. Mr. Mosteky

249. Immigration Law and Practice. (2) Prerequisite: Law 224-1 or 224-2A-224-2B. Constitutional Law. Immigration problems in practice, with emphasis on admissibility and determinations of past and present immigration. Mr. Ungar

250A. Income Taxation I. (4) A study of the statutory, judicial, and administrative material constituting the federal income tax. Mr. Smith, Mr. McNulty, Mr. Nooink

250B. Income Taxation II. (3) Prerequisite: Law 250A (Income Taxation I). Continuation of the study of the federal income tax, including the taxation of business enterprises, including partnerships and corporations, and other financial intermediaries. Mr. Smith, Mr. McNulty

251.1. International Business Transactions Semmartic-For key to symbols, see page 36.
25.1. International Law. (3) The course deals with the basic rules governing the international community. It includes the rules of customary law and rules of formation, recognition, and enforcement of Treaties. Special attention is given to modern developments such as the law of the sea, protection of the environment, and the use of force in international relations. In addition, the course will focus on the emerging role of the United Nations as a principal factor in the lawmaking process.


253.7. Judicial Protection of Collective Interests Seminar. (2) This seminar research seminar will study on a comparative basis the judicial response to three institutional settings in which collective interests are advanced. The seminar will begin with the mature phase of capitalism in the United States: the corporation, the labor union and the administrative agency. It will proceed to the modern phase of capitalism and the centrality of force and police discretion; police unions and the law enforcement role of the police, and consider the future of the police role in the post-industrial state. The seminar will examine the emerging literature that uses such concepts to analyze the relationship between the police and the community. The seminars will be held in the evenings.

257. Labor Law. (3) or (4) The law governing relations between employer and employee and the impact of state and federal legislation in the area of collective bargaining, including the law of the collective agreement, the strike, the boycott, and picketing.

258. Land Financing Transactions, Seminar on. (3) Prerequisite: Law 271.5 (Secured Land Transactions). Paper required. Advanced problems in financing and development of land and property. The seminar will consider practical problems and legal materials and will acquaint them with options for specialization. There will be two one-hour meetings per week. Enrollment will be limited to five students in the seminar.

258.3. Legal and Social Theory Seminar. (2) This seminar will consider topics involving institutional mechanisms for making rules and settling disputes in society. Among the issues considered will be the role of judges, the role of precedent, the technique of prospective overruling, alternation of theory and the role of empirical materials in legal and philosophical thought engaging upon that topic. Mr. Nonet

258.254.2A–254.2B. Jurisprudence and Social Policy Seminar. (2–2) A two-semester seminar required for all students in the Graduate Program in Jurisprudence and Social Policy. Through intensive reading and discussion this seminar will establish the scope of the field of jurisprudence and social policy for degree candidates. It will provide them with a common core of theoretical and empirical materials and will acquaint them with options for specialization. There will be two two-hour meetings per week. Enrollment will be limited to five students in the seminar. Mr. Stewart

259. Labor Law, Current Critical Issues In. (2) Pre-requisite: Law 258. A seminar for second and third year students Is an introduction to non-judicial law-making institutions, especially the legislature. One person, one vote, the right to vote, the function and regulation of lobbying, legislative organization and the budgetary process, public record and open meeting laws, conflict of interest restrictions, and executive and legislative control of administrative agencies. Mr. Vetter

260. Land Use and Development. (2–2) Land use planning and development control by local, state, and federal government. Students also study land development and investment, land use regulation, and control, real estate syndication and other matters bearing upon the practical aspects of urban and suburban planning, development, and control, and operation of development projects. Consideration given to title insurance matters, problems of low-cost housing, use of joint ventures and land development techniques, regulating land development and urban growth with an emphasis on practical considerations.

257.5. Law and Economics: Crime, Private Law and the Dispute Settlement Process. (2) This course will examine the emerging literature that uses economic concepts to analyze the law. Particular emphasis will be given to the economic consequences of various sorts of liability rules, alternative allocation mechanisms, and private and public law forms. A further objective of the seminar will be to examine the limits of economic analysis. Particular attention will be given to the analysis of the torts of negligence and the tort of intentional harm.

261. Legal History—Selected Issues. (2) A survey of the development of historical trends in American legal history. Attention is given to topics such as the history of the common law, the history of legal education, and the history of legal institutions. Mr. Eisenberg

262. Legal Process—Selected Aspects, Seminar. (2) Students will analyze several related problems in legal process by examining the nature of the judicial process, the role of the judge, the role of the lawyer, the role of the party, and the role of the public in the judicial system. Mr. Nonet

263. Legal Reasoning and Legal Theory Seminar. (2) Students will analyze related problems in legal reasoning by examining the nature of the legal reasoning process, the role of the judge, the role of the lawyer, the role of the party, and the role of the public in the judicial system. Mr. Eisenberg

264. Legislative and Administrative Process. (2) A study of the process of legislative and administrative decision-making. Topics include the characteristics of legislative bodies, the role of the legislator, the role of the bureaucratic body, and the role of the public in the legislative process. Mr. Daube

265. Law and Economics: The Public Sector. (3) The University of Chicago has given us (along with the atomic pile and the Syntropicon) a decade's agenda of reform schemes for the public sector: effluent charges, education vouchers, pay-as-you-eat college tuition, economic deregulation. The course will examine the uses and limits of economic analysis for understanding and changing the public sector. No technical economics is required.

266.6. Nuclear Non-proliferation. (2) Over a dozen nations will have the ability to build nuclear weapons within a decade; high school students can help with the design. Nuclear experts are working against time. Involving legal and economic institutions, advanced technology, old-fashioned diplomacy, and primit ve techniques and strategies of peaking, settlement, discovery, motion practice, witness examination and how to do all these things. Other classes will cover business development and client relations, public interest law, setting up an office, and the psychology of being a judge.

267. Police, Law and Society. (3) This seminar will review the major writings in the field. Topics will include: origins and development of police; police culture and personality; the realities of police work; the role of police in the law enforcement role; police and political professionalism; police and the urban community. The overriding theme will be the possibilities for increasing the legal and organizational control of police powers.

268. Professional Responsibility. (2) A study of the legal profession and of many of the ethical decision-making problems which the lawyer is likely to encounter. Topics include: the rules of professional ethics and the reasons for these rules; the role of the lawyer as counselor, negotiator, advocate, judge, and teacher.

269. Psychiatry and the Criminal Law. (2) Legal, ethical, and behavioral topics in the field of psychiatry. Special emphasis on the growth of legal institutions, the professions, the psychology of causation, and the role of empirical studies in litigation patterns, particularly in real property law.

270. Remedies. (2) The Remedies course will emphasize an understanding of the types of remedies that can be awarded and their usefulness, and the extent to which legal rules established by courts are adequate to serve their function. The types of remedies which will be discussed include money damage awards, including expectation and res remedy, and the types of remedies that can be awarded and their use in situations of specific performance and declaratory judgment. These remedies will be discussed in the context of the substantive areas of law: contract, tort, and property.

271. Roman Law. (2) Introductory course on Roman law. Survey of history and development of law, obligations succession, and a few general topics.

272. Securities Regulation. (2) Pre-requisite: Law 211-3A-211-3B, 211-5B, or 211-6 (Business Associations). This seminar will focus on the regulation of the distribution of securities under the Securities Act of 1933 and under state Blue Sky laws. Some attention also given to the development of international capital markets and the regulation of the distribution of new issues of securities in other countries.

273. Securities Regulation. (2) Pre-requisite: Law 211-3A-211-3B, 211-5B, or 211-6 (Business Associations). This seminar will focus on the regulation of the distribution of securities on stock exchanges and in over-the-counter markets, including the regulation of the distribution of new issues of securities in other countries.

274. Sex-Based Discrimination. (3) The course deals with the legal issues raised by legal and social discrimination based on sex. The seminar will examine a range of potential remedies including those drawn from state and federal constitutional law, statutory on acts, and common law developments. Subject matter areas include sex-based discrimination in family law, employment law (including Title VII, the Equal Pay Act...
Act, and Executive orders), educational opportunity, and criminal law.

273.6. Social Welfare Legislation. (23) The study of American income maintenance—social insurance (Social Security and unemployment compensation) and public assistance (welfare), public policy, statutory and constitutional analysis and legal problems must be covered.

Mr. Sugarman

273.8 Social and Legal Issues in Decriminalization. (3) After examining four social issues: the limits of criminal sanction; decriminalization models; problems of occupational entry, e.g., licensing, into health professions; and the limits of statutori


Mr. Sato

276. State and Local Taxation. (2) A study of sub-

278. Supreme Court Litigation, Seminar. (2) A seminar in Supreme Court litigation which will include a significant component of writing Supreme Court briefs on matters for Certiorari, as well as Mr. Barnett

285.7. Torts II (Advanced and Constitutional Torts). (2) Prerequisite: Law 204 Torts. Topics cov-

288. Trial Practice, Elements of. (1) A one-semester series of lectures and demonstrations providing a general introduction to trial practice, procedures, and strategies.

Mr. Barnett

287A–287B. Trial Practice. (1–2) Preparation and presentation of a civil case for jury trial, including discovery and depositions, law and motion, pre-trial conference and presiding judge, and the filing of all appropriate pleadings. A one-year course involving lectures in the fall and practice trials in the spring.

Mr. Minnrew

288. Water Resources Law. (2) Water taken as the resource to examine allocative regime for use and water and economic consequences; alternative methods of promoting efficiency; intergovernmental conflicts; and decision-making concepts for use in investment in resources and distribution.

Mr. Sato

295. Student-initiated Courses or Projects. (1 or 2) Open to students who have completed the first-year curriculum. Projects may include individual research and writing, writing or editing for professional journals, student-taught courses, or other legal projects of a serious, educational nature. Requires the approval of the Law 295 Administrator and the Dean.

Mr. Barnett

298. Group Research Projects. (1–2) Open to stu-

students who have completed the first-year curriculum. A program to enable groups of students to study or research special legal topics of common interests, primarily in subject matter areas not covered by the regular curriculum. Requires the consent of a member of the faculty to serve as supervisor and the approval of the Dean.

The Staff

299. Individual Research Projects. (1–2) Open to

students who have completed the first-year curriculum. A program to enable individual study and research in depth of selected topics under the supervision of a member of the faculty. Requires the approval of the Dean, original paper or report. Requires the consent of a member of the faculty to serve as supervisor and the approval of the Dean.

The Staff

College of Letters and Science (L&S)

The College of Letters and Science offers the undergraduate student a variety of programs leading to the Bachelor of Arts degree in four academic years of full-time study. The basic concern of the College is to instill a spirit of wholeness of knowledge, a theme which is present in all of our various programs. Although no single program can by itself introduce the undergraduate student to the entire range of human knowledge, each of the divisions of our many programs is designed to aid the student in establishing a structured awareness of the present condition of knowledge and how it has developed. Each program endeavors to cultivate an appreciation for past and present ideas and a capacity for generating new ones. Each strives to foster keen observation, critical analysis, and an awareness of the relation between perceived reality and theoretical abstractions derived from it.

For the student, the first two years are a time of exploration, experimentation, and decision. The last two years are a period of confirmation and of the acquisition and refinement of special knowledge, usually in connection with a department. The College's depart-

ments are devoted to instruction and research in the several academic subjects. Each department represents a style of study and communication and a refined development of a set of structured ideas. The subjects of the departments overlap and complement one another.

Requirements for Admission in Advanced Standing

Students applying for admission in the fall quarter 1975 or later are not considered if they have completed more than 120 quarter units. Only in unusual circumstances will admission be allowed if these units put them over the 120-unit limitation on admission or make it difficult for them to satisfy graduation requirements within the 180-unit maximum permitted.

In computing the number of units which they have completed, students should be aware that the College of Letters and Science does not grant unit credit for courses completed in a two-year college after a total of 105 quarter units has been completed in all institutions attended. Subject credit toward completion of College requirements is granted for these courses, however.

Students who have completed 84 to 105 quarter units are required to have satisfied the reading and composition requirement as well as the foreign language requirement of the College. Any student planning to declare a major in a biological science must in addition have completed the minimum subject preparation in the major with a grade-point average of C or higher. With the exception of the majors in physical education (see departmental listing) and paleontology, the subject preparation for majors in the biological sciences is as follows:

NOTE: For key to symbols, see page 36.
years of college attendance.

Major Programs. Each student must pursue and complete a major program, the object of which is to provide him or her with a limited experience in specialization. There are fifty-two departmental major programs ranging from zoology. In addition, there are group majors in Asian studies, development studies, Dutch studies, environmental studies, film, genetics, Latin American studies, mass communications, neurobiology, political economy of industrial societies, social welfare, and women's studies. There are also field majors in humanities, biological sciences, physical sciences, and social sciences. Moreover, a student in good academic standing may, with permission of the Dean and support and supervision of a College faculty member, pursue an individual major designed to satisfy special academic goals. The ninety-seven students currently enrolled in individual majors have developed major programs ranging from urban planning policy to the history of physics. Thus, the number of options available to students outside traditional disciplines is many and varied. At the present time, approximately fifteen percent of undergraduates in the College are enrolled in these general fields, and individual major programs.

Special Programs

The Division of Special Programs (formerly the Division of Interdisciplinary and General Studies or D.I.G.S.) was established in 1968. Its mission is to develop and administer innovative and interdisciplinary courses and programs in the College of Letters and Science that do not belong to a single department. At present it administers the field majors in the humanities and the social sciences and the group majors in environmental studies, mass communications, neurobiology, religious studies, and women's studies. In addition to these majors, it offers special interdisciplinary courses such as Human Sociobiology and Introduction to Western Civilization. It has also been charged with administering the Summer Threshold Program. For complete descriptions of the Special Programs majors and major courses, please see the entries listed alphabetically by major.

Letters and Science List of Courses

Of the 180 units required for graduation, 162 must be completed in courses on the Letters and Science List of Courses. The List is included in the Announcement of the College of Letters and Science, available by mail from 201 Campbell Hall or in person at 113 Campbell Hall.

Afro-American Studies

Department Office, 3335 Diehl Hall

Professor: Reginald Jones, Ph.D.

Associate Professors: William M. Banks, Ph.D. (Chairman) Albert Robinson, Ph.D.

Assistant Professors: Hong Jackson, Ph.D. Erskine Peters, Ph.D.

Michel S. Lagoune, Ph.D. Agbooye Yemane, Ph.D.

Lecturer: Margaret Wilkerson, Ph.D.

The Major

Students majoring in Afro-American Studies must declare an area of concentration in either the social sciences or the humanities. Within each area they are required to complete a sequence which provides academic depth as well as breadth, and they are expected to enroll in related offerings scheduled by other campus units.

Social Science Concentration

I. Lower Division

AAS 4A butterknife: History and Culture
AAS 5A-B: Black Life and Culture in the United States

II. Upper Division

B. AAS 120 Introduction to Black Social Institutions (formerly 115)
C. History 169A-169B History of Black People and Race Relations in the U.S.
D. Any one of the following two-quarter sequences: (1) AAS 110A-110B Afro-American Economic History (formerly 109A-109B); (2) AAS 111A-111B Race, Class and Gender; Comparative Social History in the U.S. (formerly 110A-110B); (3) AAS 112A-112B Political-Economic Development in the Third World (formerly 186A-186B)
E. Any two of the following area courses: (1) AAS 121A Black Political Life in the U.S.: 1800 to Civil Rights Movement (formerly 180); (2) AAS 122 The Black Family in American Society (formerly 175); (3) AAS 123A Psychology and Black People: 1870-1970 (formerly 117A); (4) AAS 130 Afro-American Anthropology; (5) AAS 144 Religion and Culture in Black America (formerly 188B)

Humanities Concentration

I. Lower Division

AAS 4A-4B Africa: History and Culture
AAS 5A-B: Black Life and Culture in the United States

II. Upper Division

A. History 169A-169B History of Black People and Race Relations in the U.S.
B. Any two of the following sequence including 150A: (1) AAS 150A Survey of Black American Literature, 1746-1900; (2) AAS 150B Survey of Black American Literature, 1900-1940; (3) AAS 150C Survey of Black American Literature, 1940-1980; (4) AAS 150D Survey of Black American Literature, 1980-1998
C. Any one of the following sequence: (1) AAS 152A Black American Essays: The Nature and Tradition (formerly 152C); (2) AAS 152B Black American Poetry: The Nature and Tradition; (3) AAS 152C Black American Drama: Literature: Forms and Styles; (4) AAS 152D Black American Short Stories; (5) AAS 152E Black American Novels and Narratives
D. Any one of the following area courses: (1) AAS 154A Survey of Black American History, 1490-1860; (2) AAS 154B Survey of Black American History, 1860-1918; 1108 to present. Mr. Yansane (F), Senior Thesis. Emphasis on bibliographical and archival research. (Bp)

Upper Division Courses

101A—101B. Research Methods in Afro-American Studies (formerly 109A—109B) Four hours of lecture and four hours of laboratory per week. Introduction to Afro-American historical, political, and economic change in the 20th century. Topics will vary.

108A—110B. Afro-American Economic History (formerly 108A—110B) Four hours of lecture per week. Prerequisite: course 1A and Subject A. Continued training in expository and argumentative writing, with more emphasis on modes of research and the use of research articles and primary sources. Emphasis on themes or issues in Afro-American life and culture.

Lower Division Courses

1A. Freshman Composition. (Formerly 1. Four hours of lecture per week. Prerequisite: Subject A. Training in expository, argumentative, and other styles of composition. The writing workshop will focus on themes or issues in Afro-American life and culture.

1B. Freshman Composition. (Formerly 2. Four hours of lecture per week. Prerequisite: course 1A and Subject A. Continued training in expository and argumentative writing, with more emphasis on modes of research and the use of research articles and primary sources. Emphasis on themes or issues in Afro-American life and culture.

4A—4B. Africa: History and Culture. (5—5) Four hours of lecture and one hour of discussion per week. Prerequisite: four hours of Afro-American Studies. Introduction to classic issues and the most important events and cultural forces which have shaped the character of contemporary Africa from pre-colonial times.

4A. Emphasis on pre-European social, cultural, political, and economic structures; Introduction to art, literature, oral traditions, mythology, and belief systems in Africa. The impact of colonialism and the rise of African nationalism to the turn of the 20th century will be examined.

Mr. Yansane (F)

4B. Social, political, and economic change in the 20th century Africa will be examined with emphasis on modern urban development, underdevelopment, and the emergence of contemporary African states.

Mr. Yansane (W)

5A—5B. Black Life and Culture in the United States. (5—5) Four hours of lecture plus required individual sessions per week. This course is a multi-disciplinary introduction to Afro-American Studies, from a humanities perspective (5A) and a social science perspective (5B).

5A. Introduction to Afro-American culture by means of audio-visual media, lectures, and discussion of selected forms, themes, and individuals with emphasis upon understanding cultural expression, in historical and social context.

5B. Emphasis on the social experience of Afro-Americans: an interdisciplinary approach, designed to help students understand the forces and ideas that have helped shape both the individual and collective experience of black Americans.

Mr. Banks (F)

Selected Topics in Methodology. (5) Four hours of lecture and 2 hours of field work per week. Introduction and critical examination of research methods in the study of Afro-American history. (Sp)

101A. Social Science Research Methods. Introduction to social science research methods with special application to the study of black Americans. (W)

108A—108B. Afro-American Introduction to Economic Change in the United States. Emphasis on bibliographical and archival resources for research in Afro-American Studies. Introduction to economic change in the field of Afro-American scholarship. (Sp)

109A—110B. Afro-American Economic History, (5—5) Formerly 109A—110B. Four hours of lecture per week. Prerequisite: Afro-American History Introductory Course. Afro-American economic change is strongly recommended for the black community's economic status in American society; the role of racism in the thwarting of minority group interests. 110B will cover the period from 1918 to 1980. Mr. Yansane (F), Mr. Jackson (W)

111A—111B. Race, Class and Gender: Comparative Analysis of Social Change. (Formerly 111A—111B) Four hours of lecture and one hour of discussion per week. Prerequisite: completion of research methods requirements and dual enrollment in the field of Afro-American Studies. The black community's economic status in American society; the role of racism in the thwarting of minority group interests. 110A will cover the period from 1619 to 1918; 110B to present. Mr. Yansane (F), Mr. Jackson (W)

112A. 1880—1920's. (W)

118. 1920's—Present. (Sp)

112A—112B. Political-Economic Development in the United States. (5—5) Formerly 112A—112B. Four hours of lecture and one hour of discussion per week. Prerequisite: Afro-American History Introductory Course. Afro-American economic change is strongly recommended for the black community's economic status in American society; the role of racism in the thwarting of minority group interests. 110A will cover the period from 1619 to 1918; 110B to present. Mr. Yansane (F), Mr. Jackson (W)

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.
112A. Historical Survey. Mr. Yansane (W)

112B. Selected Case Studies. Mr. Jackson (Sp)

113. Race, Ideology and Economics: A Comparative Approach. (6) Formerly 1872. Four hours of lecture and 2 hours of computer lab work per week. Prerequisite: AAS S. An examination of the political economy of the United States from slavery to the contemporary era. The relationship of the rise of racism as a systemic ideology to 18th and 19th century colonial and slave economies in America and the New World.

114. African Liberation Movements. (5) Formerly 183. Four hours of lecture per week. Prerequisite: AAS 3 or and either 115A or 115B. An overview of the social, political, and economic dimensions of black liberation movements in Africa and the United States. (W)

115. Pan Africanism: Past and Present. (5) Formerly 189. Four hours of lecture per week. Prerequisite: AAS S. An examination of Pan-Africanism and its historical and intellectual development. Special attention will be given to contemporary movements that incorporate the Pan-African perspective.

130. Afro-American Anthropology. (5) Formerly 172A. Four hours of lecture per week. Prerequisite: course 5B or 120 or introductory course in cultural anthropology. (5) Formerly 172A-172B. Four hours of lecture per week. Prerequisite: course 5B or 101A or upper division course in cultural anthropology. An examination of slave, maroon and contemporary rural and urban black communities in the New World. Also, a comparative analysis of African influence, economic systems, and political and religious institutions stressing adaptive strategies to cope with structural and environmental constraints.

131. Caribbean Societies and Cultures. (5) Formerly 182. Four hours of lecture per week. Prerequisite: course 120 or consent of instructor. Comparative study of Spanish, Dutch, English and French-speaking Caribbean societies. Analysis of Caribbean social structure, including the development of the plantation system, urban dynamics, ethnic politics, marketing system, family structures and ecology of Afro-Caribbean communities.

132A–132B. Psychology and Black People. (5) Formerly 117A–117B. Four hours of lecture per week. Prerequisite: course 5B or 101A or upper division course in psychology. A discussion of the psychological research and theory pertaining to black people. Emphasis on understanding the concepts, methods and conclusions regarding the psychology of black people. Prerequisite: consent of instructor.

132C. The Black Child: Psychological Development. (5) Formerly 178. Four hours of lecture per week. Prerequisite: course 120 or 101A or upper division course in psychology. A study of the psychological development of the black child through adolescence. A comparison with psychological issues within the Afro-American milieu.

134. Afro-American Language Patterns. (5) Formerly 138. Four hours of lecture per week. Prerequisite: course 5A or 5B or introductory course in linguistics. An examination of the historical, descriptive, and comparative dimensions of Afro-American linguistic forms. Involvement in local, state and federal political processes and activities as well as the development of black political ideologies and organizations.


142A. Third World Cinema. (5) Formerly 167A. Four hours of lecture and two hours of film discussion per week. Prerequisite: completion of reading and composition requirement. The use and misuse of Third World people and images in the film industry. Articles, lectures, and a survey of early and recent Third World film history through the 1950's.

142B. Black Americans in the World of Cinema. (5) Formerly 167B. Four hours of lecture and two hours of film discussion per week. Prerequisite: completion of reading and composition requirement. A study of the portrayal of black people in the film industry. Analysis and discussion through articles, lectures, and selective films.

144. Religion and Culture in Black America. (5) Formerly 168. Four hours of lecture per week. Prerequisite: AAS 5. Investigates the varied social and cultural forms of black religion in America. Approached and analyzed through the disciplines of sociology, folklore, music, liturgy, and theology.

150A. Black American Literature, 1746–1900. (5) Four hours of lecture per week. Prerequisite: reading and composition requirement. The literary works most important to contemporary society. Social and political themes. An analysis of the role of literature in shaping black American identity.

150B. Black American Literature, 1900–1940. (5) Four hours of lecture per week. Prerequisite: reading and composition requirement. The early and later literary creations and thought of black America from the turn of the century onward. Social, political and cultural themes. An analysis of the role of literature in shaping black American identity.

151A. Black American Plays: Historical Survey 19th–20th Century. (6) Formerly 164A. Four hours of lecture per week. Prerequisite: completion of reading and composition requirement. Covers plays by black writers which portray the experience of black people in America. Emphasis on the social assumptions that contribute to the various images of black women in American literature and black writers in the world of cinema.

151B. Black American Plays: Historical Survey mid–20th Century to Present. (5) Four hours of lecture per week. Prerequisite: reading and composition requirement. Covers plays by black writers which portray the experience of black people in America. Emphasis on the social assumptions that contribute to the various images of black women in American literature and black writers in the world of cinema.

152C. Black American Dramatic Literature: Forms and Styles. (5) Four hours of lecture per week. Prerequisite: reading and composition requirement, plus one other literature course. Analysis and discussion of themes and styles in poetry by black Americans.

152D. Black American Short Stories. (5) Four hours of lecture per week. Prerequisite: reading and composition requirement, plus one other literature course. Analysis and discussion of themes and of the historical involvement of the black American writer with the short form.

153A. Images of Black Women in Literature: Slavery to the 20th Century. (5) Formerly 155A. Four hours of lecture per week. Prerequisite: reading and composition requirement. A survey of the portrayal of black women in the literary works of black American women from the 18th century to the 20th century.

153B. Contemporary Images of Black Women in Literature. (5) Formerly 155B. Four hours of lecture per week. Prerequisite: reading and composition requirement. A survey of the portrayal of black women in the literary works of black American women from the 20th century to the present.

154. A History of Black People Around the World Through Literature. (5) Four hours of lecture per week. Prerequisite: reading and composition requirement. A survey of the literary works of black people throughout the world. The works surveyed are selected from almost all literary forms: epic, tale, poetry, novel, short story, essay, etc.

155. Literature of the Caribbean: Significant Themes. (5) Formerly 153. Four hours of lecture per week. Prerequisite: reading and composition requirement. A survey of the literary works produced by the West Indian authors. Attention will be given to their aesthetic aspirations and the role their works play in the American literary scene.

156. Literature of Black Africa: Significant Themes. (5) Formerly 158. Four hours of lecture per week. Prerequisite: reading and composition requirement. A survey of the literary works produced by authors of black Africa. Attention will be given to their aesthetic aspirations and the role their works play in the American literary scene.

NOTE: W key to symbols, see page 35.
157. Creative Writing, (5) Formerly 160. Four hours of lecture per week. Prerequisite: reading and composition requirement; consent of the instructor. Design, composition, and intensive study of craft in the various genres. Course changes frequently by focus upon a specific genre. May be repeated once for credit.

158. Special Topics In Black Literature. (5) Four hours of lecture per week. Prerequisite: course 160 or consent of instructor. Topics will vary.

160. Policy Evaluation and Research in the Black Community. (5) Four hours of lecture per week. Prerequisite: two quarters of course 160 or consent of instructor. A comprehensive introduction to social science research methods. Introduction to the methods of evaluating social policies and programs that affect African Americans; include basic evaluation research design; relationships among advocacy, policy and evaluation on the federal, state and local levels; program funding; and action-oriented research.

161. Health Status and Health Delivery Systems and the Minority Community. (5) Formerly 181. Four hours of lecture per week. Prerequisite: course 160 or consent of instructor. For students concerned with the health care status of poor and minority people. The relationship between health delivery system and the health status of black Americans. Introduction to federal, state and local health care policy; womanpower/ manpower and local health care organization.

162. Mental Health in the Black Community. (5) Formerly 120. Four hours of lecture per week. Prerequisite: course 160 or consent of instructor. A comprehensive analysis of the concept of "mental health" as it relates to black Americans. Emphasis on mental health programs and practices that specifically affect black Americans. Topics will include research, available services, resources, and social policy.

Thesis and Independent Study

H185A-H185B. Honors Thesis. (4-4) Four hours of lecture per week. Open only to students admitted to the Honors Program in Afro-American Studies. Students must enroll for both quarters of the sequence. Credit and grade will be assigned upon completion of the full sequence. The Staff (F, W, Sp)

197. Field Study in Afro-American Life. (1-5) Supervised field work in off-campus organizations. Regular seminar meetings with faculty sponsor or written reports required. The Staff (W, Sp)

**197B-197C. Oral History in the Black Community.** (5-5) Two hours of seminar and 10-12 hours of field work per week. Prerequisite: the permission of the instructor. An oral reconstruction of the history of African American communities. Interdisciplinary approach to the course will explore the relationship between oral history, history, anthropology and folklore. The Staff (W, Sp)

198. Directed Group Studies for Undergraduates. (1-5) The Staff (F, W, Sp)

199. Supervised Independent Research and Research. (1-6) Enrollment is restricted by regulations listed on page 36. Must be taken on a pass/not passed basis. The Staff (F, W, Sp)

Ancient History and Mediterranean Archaeology

Group Major Office, 5303 Dwinelle Hall

Professors:

- David M. A. Evans, Ph.D. (History of Art and Art History)
- John K. Anderson, M.A., P.S.A. (Graduate Adviser) (Classical Archaeology)
- William H. Geoghegan, Ph.D. (Greek and Latin Literatures)
- George F. Dales, Ph.D. (Eastern Art History)
- Peter A. B. Byzantine Studies (Classical Archaeology)
- Elizabeth Ellen Anderson, Ph.D. (Egyptian Archaeology)
- George Wright Tatum, Ph.D. (Classical Archaeology)
- Martha C. Sliepene, Ph.D. (Classical Archaeology)
- Arnold S. Brown, Ph.D. (Classical Archaeology)

Associate Professors:

- Wolfgang J. Hoppel, Ph.D. (Greek and Latin Literatures)
- Stephen G. Miller, Ph.D. (Classical Archaeology)
- Robert H. Rodgers, Ph.D. (Greek and Latin Literatures)
- Martin Schwartz, Ph.D. (Roman Studies)

Associate Professors:

- James N. Anderson, Ph.D. (Greek and Latin Literatures)
- Stanley Brendes, Ph.D. (Greek and Latin Literatures)
- Leslie L. Throatle, Ph.D. (Greek and Latin Literatures)
- Baruch M. Bokser, Ph.D. (Justice Studies)
- Stanley H. Brandon, Ph.D. (Anthropology)
- Robert C. Knapp, Ph.D. (Latin)

The Major

There is no undergraduate major.

The Graduate Program

The program is interdisciplinary in nature, administered by a faculty group drawn from several departments. Both M.A. and Ph.D. degrees are offered. Fields of emphasis include Near Eastern History, Greek History, Roman History, Ancient Art and Architecture, Near Eastern Art and Archaeology, Ancient Law, Epigraphy, and Papyrology. Candidates for degrees will offer a combination of three of these fields, or related fields, one as a major subject, two as minor subjects. The program is open to students with the B.A. in a relevant area who have completed at least one year of undergraduate study in Ancient History or Archaeology. Applicants must have had sufficient training to undertake advanced work in at least one ancient language.

M.A. Requirements. The M.A. in the area of archaearchaeological and art specializations requires 30 quar- ter units and a thesis. The M.A. in the purely historical area requires 36 quarter units, to be followed by a written examination, in the major subject. All M.A. can- didates are expected to pass at least one modern lan- guage examination before the degree is awarded.

Ph.D. Requirements. There are no specific course requirements. Students are expected to take consid- erable seminar work in at least two of the three departments represented in the program. Candidates must pass ex- aminations in two modern languages and two ancient languages appropriate to the fields of study. They are then eligible for the Ph.D. qualifying examinations, both written and oral. Students may take one major and two minor subjects. Upon successful completion of these requirements, the student proceeds to research and writing of a dissertation under the guidance of a three-person committee. The dissertation must be ap- proved by the committee and be in a final form before the student is recommended for the Ph.D. degree.

For further information, inquiries should be addressed to the Graduate Group in Ancient History and Medi- terranean Archaeology.

Anthropology

Department Office, 233 Kroeber Hall

Professors:

- Burton Benedict, Ph.D.
- Brent Berlin, Ph.D.
- Gerald Domur, Ph.D.
- J. Desmond Clark, Ph.D.
- Elizabeth Colson, Ph.D.
- James Deetz, Ph.D.
- George A. Dorsey, Ph.D.
- Phyllis Doherty, Ph.D.
- Jon Durand, Ph.D.
- Nelson H. Grubbs, Ph.D.
- John A. Graham, Ph.D.
- John J. Gumpper, Ph.D.
- Eugene A. Hamel, Ph.D.
- C. Clark Howell, Ph.D.
- Glynn L. Isac, Ph.D.
- William K. Freedman, Ph.D.
- Laura Nader, Ph.D.
- Herbert P. Phillips, Ph.D.
- Jack M. Potter, Ph.D.
- John H. Rowe, Ph.D.
- William A. Sack, Ph.D.
- Jean A. Seaman, Ph.D.
- George M. Friger, Ph.D.
- Ronald F. Heizer, Ph.D.
- Sc. D. (Emetitus)
- David G. Mandelbaum, Ph.D.
- Ronald L. Olsen, Ph.D. (Emetitus)
- Sherwood L. Washburn, Ph.D. (Emetitus)
- William S. Simmons, Ph.D.
- Richard Tringham, Ph.D.
- Phyllis D. Robinow, Ph.D.
- Timothy D. White, Ph.D.

The Department of Anthropology offers students the opportunity to study mankind from the broadest histori- cal and geographical perspective. Courses in the De- partment offer knowledge of the physical nature of mankind as well as the social and cultural aspects of behavior. Lower division courses are intended to give a general understanding of human evolution, prehistory, and the nature of human cultures, while upper divi- sion courses elaborate particular themes.

The anthropological major is designed to serve two pur- poses: to provide a general education in anthropology for students who are pursuing a liberal education, and to provide preparation for graduate work for students who wish to become professional anthropologists. Stu- dents who do not intend to do graduate work in anthro- pology may plan their program with considerable free- dom, taking care only to fulfill the requirements listed below. Students who plan to go on to graduate study, either at Berkeley or at another institution, should plan their undergraduate program to meet graduate admis- sion requirements. Students should select a combina- tion of courses to form a unified plan of study that matches their individual interests.

Undergraduate students, both majors and nonmajors, seeking information or advice about their programs or about courses should inquire in Room 213 Kroeber Hall.

The collections and research facilities of the Robert H. Lowie Museum of Anthropology are available for study in the course of the student's major, minor, or other coursework, and related subjects by graduate and undergraduate students and by visiting scholars; the museum's exhibi- tion hall is used for instructional and educational pur- poses only. In connection with class work. Those interested may address the Director, 103 Kroeber Hall. For further information on the Lowie Mu- seum, see Index.

The Department maintains a laboratory for quantitative analysis in all branches of the discipline. The laborato- ry is centered on a sophisticated minicomputer system used in teaching as well as in undergraduate and gradu- ate research. It functions both independently and as a link to the Campus Computer Center. Courses 100A-100F, 125A-125F and 190A-190F use these facilities intensively. Package programs for statistical analysis, mapping, and computer graphics are avail- able for use by students and faculty of the Department.

The Major

Anthropology 1, 2, 3, 4; and one course from three of the following five groups: Group I—all courses in Physi- cal Anthropology; Group II—all courses in Archaeol- ogy; Group III— all courses in Social and Cultural An- thropology; Group IV—all courses in Language, Cul- ture and Society; Group V—all Area Courses. Also required are 25 elective upper division units to total 40 units of upper division courses in anthropology. These elective units may be taken from any of the groups I-IV; however, no more than 12 of courses 191, 196, 197, and 199 combined will be accepted toward fulfilling major requirements.

Substitutions may be permitted among these additional elective courses of not more than 10 units in allied subjects approved by the Department.

Students applying for admission to the major are re- quired to have completed their lower division divi- sion course requirements (Anthropology 1, 2, 3, 4).

In planning their workload students should be aware that the Department adheres to Academic Senate Reg- ulation 760. "The value of a course in units shall be reckoned at the rate of one unit for three hours' work per week per term on the part of a student, or the equivalent."

Honors Program. The Department of Anthropology provides several specialized programs leading to the A.B. degree with honors. Students with an overall grade-point average of 3.3 or higher and a grade-point
average of 3.3 or higher in courses in the major, upon approval of the major adviser, enroll in one of these honors programs. The program will include a junior seminar, 193A-193B, and the writing of a thesis supervised under the H194A-H194B-H194C series of courses.

Letters and Science List of Courses: 182 units from the list must be included in the 190 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Preparation for Graduate Study

Admission to graduate studies at Berkeley does not presuppose an A.B. in anthropology. The graduate program is oriented toward the doctorate, and only candidates for the Ph.D. will be accepted. The M.A. degree is awarded in the course of study leading to the doctorate.

Because of the number of students who wish advanced training, only a small percentage of applicants can be accepted. Applications are considered only once a year for the following fall quarter. The deadline for application is December 1.

The Graduate Major

The program for the Ph.D. degree normally takes six years and is divided into three steps, as follows:

Step I. This segment normally takes one year, during which students begin to narrow down their interests to particular topical and geographical fields of specialization.

Step II. During this period, which normally lasts from one to two years, students attend seminars, carry out individual research projects related to their fields of specialization, and prepare for the Ph.D. oral qualifying examination. With the successful passing of this examination, students are advanced to candidacy for the Ph.D. degree in the University.

Step III. Students undertake research for the Ph.D. dissertation under supervision of a three-person committee in charge of research and dissertation. With some exceptions, the dissertation is based on the results of original field research, which normally requires a minimum of one year. The writing of the dissertation customarily requires an additional year. On completion of the research and approval of the dissertation by the committee, the student is awarded the Ph.D. degree.

For further information, please address correspondence to: Mr. White, Department of Anthropology, University of California, Berkeley, California 94720.

Courses and Seminars

Courses and seminars are listed below. Instructor listings, quarterly offerings, course descriptions, and schedule changes are available in 213 Kroon Hall.

Lower Division Courses

1. Introduction to Physical Anthropology. (5) Three 1-hour lectures and one 1-hour section meeting per week. Facts and problems of human evolution, human fossils, race, and race differences. Mr. White (Sp), Mr. White (F).

2. Introduction to Archaeology. (5) Three 1-hour lectures and one 1-hour section meeting per week. Prehistory and cultural growth. Mr. Deetz, Mr. Clark, Ms. Tringham (W).

3. Introduction to Social and Cultural Anthropology. (6) Three 1-hour lectures and one 1-hour section meeting per week. Structure and dynamics of culture. The Staff (F), Mr. Potter (Sp).

4. Introduction to Linguistic Anthropology. (6) Two and a half hours of lecture and two and a half hours of sections per week. Language in its interrelationships with archaeology, its culture and his society. Mr. Gumperz (W).

5. Human Evolution. (5) Three hours of lecture and one hour of discussion per week. Limited to freshmen. Reading and papers on the problems and meaning of human evolution. Why the understanding of evolution should be a part of every person's education.

**145. Freshman Seminars. (2) One 2-hour meeting per week. Prerequisite: lower division lecture course in Antropology 1, 2, or 3 completed or being taken concurrently. Limited to 12 freshmen students per section. Additional reading and written papers developing the salient problems which guide anthropological work.

Upper Division Courses

General prerequisite: junior standing or courses 1, 2, 3, 4.

Undergraduate seminars: Certain upper division lecture courses are followed in the next quarter by an undergraduate seminar which provides an opportunity for more intensive study of the material covered in the lecture course. Enrollment in these seminars is restricted to students who have received a grade of B or better in the antecedent lecture course and/or who have the instructor's permission. The undergraduate seminars are given as sections of Anthropology 195.

Class meetings: Unless otherwise noted, lecture courses meet for three lecture hours and one consultation hour per week. Enrollment may be limited.

Group I. Physical Anthropology and Primatology

100. Fossil Man. (5) Three hours of lecture and one hour of discussion per week. Prerequisite: Anthropology 1 or equivalent. Origin and relationships of the extinct forms of mankind. Mr. White (W).

*101. Human Adaptations. (4) Three hours of lecture per semester. Prerequisite: Anthropology 1 or equivalent. Homo sapiens as a biological organism: evolutionary history. An appreciation of the modern human condition in terms of its anatomical, behavioral, physiological, ecological, and biochemical dimensions.

102. Human Variation in an Evolutionary Perspec-
tive. (5) Three hours of lecture and one hour of labora-
tory per week. Prerequisite: course 101 or equivalent. Human variation in both a racial and a nonracial context; basic genetics (both molecular and populational); the status of racial origins; selective bases of human variation. Mr. Sarich (Sp).

104L. Physical Anthropology Laboratory. (2) Two 2-hour meetings per week. Prerequisite: course 100, or 102, or 108 (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 inter-group resemblances and differences. Mr. Sarich (W).

105. Introduction to Human Osteology. (5) Three 2-hour meetings per week. Prerequisite: course 1 or consent of instructor. An intensive study of the human skeleton. Reconstruction of individuals and population characteristics emphasizing methodology and analysis of human populations from archaeological contexts; introduction to use of statistics in osteological analysis. Enrollment limited to 16 students. Mr. White (W).

106. Advanced Human Osteology. (4) Two hours of lecture and three hours of laboratory plus one hour of consultation per week. Prerequisite: course 106 or consent of instructor. Theories and methods in advanced human osteology. Variable topics include paleoanthropology, paleodemography, forensic anthropology, metric and nonmetric analysis, dental anthropology, computer use and statistical applications. May be repeated with consent of instructor. Enrollment limited to 12 students. Mr. White (Sp).

108. Primate Evolution. (5) Prerequisite: course 1 or equivalent. A consideration of the major groups of primates with emphasis on the evolution of behavior. Mr. Howell (W).

108L. Primate Evolution Laboratory. (2) Four hours of lecture per week. Prerequisite: course 108 (preferably taken concurrently). Enrollment limited to twelve students; primarily for majors in anthropology. Mr. Howell (F).

*109. Experimental Anthropology. (5) Prerequisite: two lower division anthropology courses from the group 1, 2, 3. This course will illustrate the use of theoretical and experimental approaches in understanding problems such as adaptation, learning, and social life. Emphasis will change from year to year.

110. Primate Social Behavior. (5) Three hours of lecture per week. Prerequisite: course 1 or equivalent. Survey of the social behavior and organization of monkeys and apes; their relevance to the evolution of human society and social structure. Mr. Clark (F).

110L. Primate Social Behavior Laboratory. (2) Four hours of lecture and laboratory sessions per week. Prerequisite: course 110. Enrollment limited to twelve students; primarily for majors in anthropology and the life sciences. Ms. Dohinow (Sp).

111. Problems in Primate Social Behavior. (4) Prerequisite: course 110. Special topics of social behavior ranging from social aggregation, communication, and learning, and their biological bases. Ms. Dohinow (W).

117. Theory and Method In Physical Anthropology. (4) Three hours lecture per week. Prerequisite: course 2 or consent of instructor. Theories and methods in physical anthropology with emphasis on important figures in the field and schools of thought. Contributions of related fields will be stressed and computer science emphasized.

Group II. Archaeology, Prehistory, and Culture History

120. Culture Growth. (5) Three hours of lecture per week. Prerequisite: course 2 or consent of instructor. Archaeological theory and cultural process, illustrated by the origin and development of civilization in the Old World and the New. Mr. Rowe (F).

121. American Material Culturo. (4) Three hours lecture per week. Prerequisite: course 2 or consent of instructor. Patterns in material culture as it reflects behavior and psychological cultural life since the 17th Century. Topics include architecture, domestic artifacts, mortuary art, foodways, and trash disposal. Euro-American, Afro-American, and Native American examples are considered. Mr. Deetz (F).

122. Archaeology of North America. (5) Three hours lecture per week. Prerequisite: course 2 or consent of instructor. Prehistory of North American Indians, prehistoric culture areas; relations with historic Indians. Mr. Deetz (Sp).

124. Ancient Civilization of Mexico and Central America. (4) Three hours of lecture per week. A study of the development, form, and history of prehistoric Indian civilization, surveying the achievements of the Maya, the Aztec, and their neighbors. Mr. Graham (F).

125. The World of the Ancient Maya. (4) Three hours of lecture per week. A comprehensive study of the development and culture history of the longest sustained tradition of aboriginal New World civilization. Mr. Deetz (Sp).

126. Peoples of the Andes. (5) Three hours of lecture per week. Prerequisite: course 2 or consent of instructor. Inca culture and its antecedents; a survey of the Inca civilization. Prerequisite: course 2 or consent of instructor. Mr. Clark (W).

*127. The Olmec World. (5) Three hours of lecture per week. Prerequisite: course 2 or consent of the instructor. Intensive study of the culture, sites, and chronology of the Preclassic Olmec civilization. Mr. Clark (F).

128A. Africa. (5) Three hours of lecture per week. Prerequisite: consent of instructor. Historical and prehistoric cultures of Africa. Ms. Shady (F).

128B. Asia and the Pacific. (5) Three hours of lecture per week. Prerequisite: consent of instructor. Historical and prehistoric cultures of Asia and the Pacific. Ms. Shady (F).

128C. Post-Prehistoric cultural phenomena of Europe and Asia. Mr. Clark (F).

128D. Special Topics in Old World Prehistory. (5) Three hours of lecture and one hour of discussion per week. Prerequisite: upper division standing or consent of instructor. Prehistory of Africa, Iron Age Cultures of Asia, Population Growth, and the study of the Protohistoric and Historic cultures of the Old World. Mr. Clark (F).

129. Contemporary Methods in Prehistoric Archaeology. (5) Three hours of lecture per week. Prerequisite: upper division standing or consent of instructor. May be repeated without duplication of credit. Methods used in classification and discussion of prehistoric cultures of the Old World. Mr. Clark (F).

130. Invention and Technology. (5) Three hours of lecture per week. Prerequisite: upper division standing or consent of instructor. Origin, history, and spread of fundamental inventions; illustrative material from the Lowie Museum of Anthropology. Mr. Clark (Sp).

NOTE: For key to symbols, see page 36.
131. Science In Archaeology. (5) Prerequisite: course 2 or consent of instructor. Archaeological research methods and their uses in development of our knowledge of the past. Mr. Tringham (W)

132. Archaeology and Society. (5) Three hours of lecture per week. Prerequisite: course 2 or consent of instructor. Anthropological treatment of archaeology, deriving from the physical and life sciences to the interpretation of archaeological materials. Mr. Anderson (W)

133. Field Course In Archaeological Method. (5) One hour of lecture and one 8-hour (Saturday) field course meeting per week. Prerequisite: course 2 or the consent of instructor. Emphasis limited to nineteen students, admitted by consent of the instructor; may be repeated without duplication of credit. Advanced field investigation, and guidance in preparation of materials for publication.

134. Archaeological Method. (5) One 3-hour laboratory meeting with three hours of independent laboratory work. Prerequisite: course 2 or the consent of instructor. Emphasis limited to nineteen students, admitted by consent of the instructor; may be repeated without duplication of credit. Advanced field investigation, and guidance in preparation of materials for publication.

135. Field Practice In Archaeology. (15) Forty hours of lab per week. Prerequisite: consent of instructor. Practical experience in the field study of archaeological sites and materials. Depending upon study area selected, coverage may include reconnaissance, mapping, recording, and excavation. May be repeated for credit. Limited enrollment.

136. History and Theory of Archaeology. (5) Three hours of seminar and one hour of tutorial per week. Prerequisite: Consent of instructor. Advanced field investigation, and guidance in preparation of materials for publication. Mr. Devos (W)

140. The Nature of Culture: An Introduction to Cultural Anthropology. (5) Not open for credit to students who have taken course 3. Advanced level introduction to cultural anthropology for nonmajors. Mr. Rabinow (F)

141. Comparative Society. (5) Prerequisite: course 3 or consent of the instructor. Theories of social structure, functional interrelationships of social institutions. Primary emphasis on non-Western societies. Mr. Colson (F)

142. Kinship and Social Structure. (5) Prerequisite: course 141. Comparison of kinship and family types throughout the world; techniques of kinship and structural analysis. Mr. Gough (W)

143. Plurality Societies. (5) Three hours of lecture per week. Prerequisite: course 3. A critical examination of the theories of plural societies with ethnographic examples from New Guinea, Africa, and South America.

144. Social and Cultural Change. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Theories of social and cultural change: social evolution, diffusion, acculturation, pattern dynamics, innovation, structural-function approach to change. Illustrative materials from anthropological sources.

145. Urban Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. A consideration of anthropological concepts and methods in the study of urban societies and cities.

146. Comparative Peasant Society. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. A comparative examination of peasant societies as a social type contrasted with primitive and industrial society.

147. Anthropology and Development. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Survey of theories, methods, and applications of the ecological perspective to cultural and physical attributes of human populations. Mr. Anderson (W)

148. Culture and Personality. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Relationships of culture, social, and personality factors in human behavior; personality in rep- resentative societies; techniques for studying culture- personality relations. Mr. Tringham (W)

150. Social Problems In Changing Cultures. (5) Three hours of lecture and two hours of tutorial and special seminars per week. Prerequisite: course 3 or consent of instructor. Cross-cultural approach to conflict in society, culture, and personality. Topics covered: basic sociological, psychological, and biological concepts of personality; socialization; social structures; religious behavior; political and economic systems; cultural change.

151. Anthropology of Tourism. (4) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Anthropological theory and data applied to problems in such fields as medicine, agriculture, education, and international-technical programs.

152. Anthropology In Modern Life. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Anthropological theory and data applied to problems in such fields as medicine, agriculture, education, and international-technical aid programs. Mr. Berreman (W)

153. Introduction to Medical Anthropology. (4) Three hours of lecture per week. Prerequisite: two courses in anthropology or consent of instructor. Medical anthropology; anthropological requirements for students in disciplines related to medicine and health. Social and cultural aspects of the United States and overseas, of definitions, causes, symptoms, and treatments of illnesses; of selections of types of medical care available; of the social and economic implications of health services; and interactions among practitioners and with patients.

154. Social Inequality. (4) Three hours of lecture per week. Prerequisite: Anthropology 3 or the consent of instructor. Comparative examination of theories and systems of social inequality by reference to societies ranging from band to state, from foraging to industrial, from egalitarian to stratified, with attention to inequality defined by kinship, gender, age, service, class, caste, ethnicity, colonial status, etc.

155. Economic Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Economic behavior in nonindustrial societies; its social and cultural setting, and its modern changes.

156. Politics and Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Examination of political organization and institutions relevant to the comparative analysis of political ethnicity.

157. Law and Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. A sociocultural approach to the anthropological treatment of law; methods and concepts relevant to the comparative analysis of legal systems.

158. Religion and Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. A consideration of the interplay between religious beliefs and institutions and other aspects of culture.

159. The Forms of Folklore. (5) Three hours of lecture per week. Prerequisite: upper division standing. A worldwide survey of the major and minor forms of folklore with special emphasis upon proverbs, riddles, superstitions, games, songs, and narratives. Mr. Dunudes (W)

160. Narrative Folklore. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. A comparative study of oral narratives with special emphasis upon oral literature and folklore from the Lowie Museum of Anthropology.

161. Education and Culture. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. A comparison of education in traditional and modern cultures.

162. Art and Culture. (5) Three hours of lecture per week. Prerequisite: course 3 or the consent of instructor. A comparative study of art and its relations to culture in nonindustrial societies: illustrative material from the Lowie Museum of Anthropology.

163. Education and Culture. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Anthropological theory and data applied to problems in such fields as medicine, agriculture, education, and international-technical aid programs.

164. Man's View of Nature. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Comparative study of man's conceptual organization of his natural universe, especially his views of the biological environment. Implications of folk classification in pre-industrial societies for general principles of language, thought, and culture.

165. Advance Survey of Social and Cultural Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 or senior standing or consent of the instructor. Intended primarily for major students. Historical survey of anthropological theories, methods, and findings. Mr. Phillips (F)

167A. Research Theory and Methods in Ethnology. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. An introduction to definition of research problems and design techniques for collection, analysis, and presentation of data.

Group IV. Language, Culture and Society

165A-165B. Language, Culture, Society, and the Individual. (5-5) Three hours of lecture per week. Prerequisite: course 4 or equivalent. Limited enrollment.

165A: Language in society; the design of language, language and cognition, language and evolution, linguistic change and cultural change.

165B: Language in society; social and linguistic aspects of verbal behavior, speech communities, language and social stratification, language, nation, and state.


Group V. Area Courses

170A—170B. China. (5) Chinese culture and society with emphasis on the village level.

170A. Pre-Communist China.

170B. Communist China.

171. Japan. (5) Three hours of lecture per week. Ethnological treatment of historic and modern Japanese culture. Mr. Devos (F)

172. United States Culture and Society. (4) Three hours of lecture per week. The relationship between anthropological theory and research and the study of United States culture and society. Mr. Devos (F)

173. Korean Culture. (4) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. This course presents a review of the historical development of Korean culture. Emphasis will be placed on the social traditions developed under Confucianist and Buddhist as well as indigenous religious influences. Focus will be on the nature of community and family interaction patterns. To be offered 1979/80 only.

175. North American Indians. (5) Historical survey of the cultures of the native peoples of the United States and Canada. Mr. Simmons (Sp)

176. Indians of California. (5) Survey of the cultures of the native people of California. Tribal divisions, arts, architecture, and technology. Mr. Slocum (Sp)

178. Native Peoples of South America. (5) Archaeological, ethnographic and ethnohistorical study of the cultures of the native peoples of South America. Mr. Phillips (Sp)

180. Mexico and Central America. (5) Ethnology of Indian and mestizo cultures with special emphasis on comparative organizational, beliefs, systems, law, economics, kinship, language and communication.

181. General Anthropology of Oceania. (4) Three hours of lecture per week. Theoretical issues, some of which were formulated for the first time in anthropological studies, arising from field studies of Oceania, and monographs about Pacific peoples, with varying emphases from year to year on Polynesia, Micronesia, Melanesia, New Guinea, and Australia.

182. Circumpolar Regions. (5) A survey of Arctic cultures. Mr. Graburn (F)
183. European Peasant Societies. (5) Representative groups considered in modern and historical perspective, stressing especially rural-urban relations and the dynamics of change. Mr. Brandes (F)

*184. Afro-American Ethnography. (5) A comparative survey of societal structuring and cultural dynamics of Afro-American peoples living in the Caribbean, North, Central and South America; considered in both historical and contemporary perspective.

185. The Near East. (5) Cultures of the contemporary Near East, with special emphasis upon Arab populations.

186. Africa South of the Sahara. (5) Traditional cultures and social institutions of Sub-Saharan Africa.


188B: Social organization and social trends.

Mr. Berreman (W)

189A–189B. Southeast Asia. (5–5) 189A is not prerequisite to 189B. Peoples and cultures of Southeast Asia.

198A. Mainland: emphasis on Burma, Thailand, and Viet Nam.

Mr. Phillips (W)

*198B: Insular: emphasis on Indonesia, Malaysia, and the Philippines.

Mr. Anderson (Sp)

Group VI. General Courses

190A–190B. Analytic Methods in Anthropology. (6–5) Four hours of lecture per week. Prerequisite: course 167A or 167B or consent of instructor. Must be taken concurrently with 160L–160M. Techniques of analysis appropriate to anthropological data, including archaeology, physical, social, cultural, and linguistic anthropology. Emphasis on practical work, handling anthropological data and computer usage. P/NP. Entire sequence must be completed to receive credit.

Mr. Geoghegan/Mr. Hammel (F, W)

190C. Practical Computer Use. (1) One hour of lecture per week. Prerequisite: Not open to students who have received credit for 190A–190B. May be repeated for credit. Must take 190E or 252 concurrently to receive credit. What computers can do; how computers work; setting up data for computer-assisted analysis; data entry; editing data; sorting and categorizing data; exploratory data analysis; frequency distributions, statistical summaries; exploratory data analysis; graphic displays. Must be taken on a satisfactory/unsatisfactory/passed/not passed basis.

Mr. Geoghegan/Mr. Hammel (F, W)

190D. Practical Computer Use Laboratory. (1–5) Self-paced: unlimited hours per week. Prerequisite: courses 190A–190B, or concurrent enrollment in 190C. Must be taken on a passed/not passed basis.

Mr. Hammel (Sp)

190L–190M. Laboratory in Analytic Methods. (1–1) Three hours of laboratory per week. Prerequisite: must be taken concurrently with 190A–190B. Entire sequence must be completed to receive credit. P/NP.

Mr. Geoghegan/Mr. Hammel (F, W)

191. Experimental Courses.

193A–193B. Junior Honors Seminar. (3–3) Two hours of lecture and 1 hour of discussion per week. Prerequisite: for Anthropology majors enrolled in or intending to enroll in the Senior Honors Program. The purpose of this seminar will be to integrate the several approaches to the study of culture, i.e., social anthropology, linguistics, archaeological and physical anthropology. Focus on synthesis of the major.

H194A–H194B–H194C. Senior Honors. (5–5–5) Formerly H198A–H198B–H198C. Prerequisite: open only to seniors in Anthropology who are seeking an A.B. degree with Honors. Systematic readings in the history of anthropology and in significant modern developments within the field, collection and analysis of research materials, and the preparation of an honors thesis, in close consultation with individual members of the staff. Group and individual tutorials. Credit and grade will be awarded upon completion of full sequence.

The Staff (F, W, Sp)

195. Undergraduate Seminars. (5) One 2-hour meeting and two consultation hours per week. Prerequisite: grade of B or better in an upper division course for which an associated seminar is scheduled, and/or consent of instructor. Enrollment limited. May be repeated without duplication of credit. Some, but not all, lecture courses will be followed, usually in the next quarter, by a seminar providing an opportunity for advanced study of the subject matter, emphasizing reading and discussion.

Mr. Howell (F)

196. Fieldwork. (3–15) Prerequisite: consent of instructor. Individual field experience in anthropological research under the sponsorship of a faculty member with conferences to be arranged and written reports required. May be repeated up to a maximum of 15 units only.

The Staff (F, W, Sp)

*197A–197B. Field Studies in Rural Societies. (5–5) Two hours of lecture per week. Prerequisite: Course 3, Junior or Senior standing, or consent of instructor. Each student will spend at least ten hours each week in a volunteer work situation in a community organization which focuses on the needs of an ethnic segment of the population. Two hours weekly must be spent in seminar. Credit and grade to be awarded upon completion of the sequence.

197C. Field Study in Anthropology. (1–5) Individual conferences to be arranged. Prerequisite: consent of instructor. Supervised experience relevant to specific aspects of anthropology in off-campus organizations. Regular individual conferences with faculty sponsor and written reports required.

The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (2–5) Individual conferences to be arranged. Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (F, W, Sp)

Graduate Seminars

Seminars normally entail at least 8–10 hours per week of library, museum, or laboratory work.

200. Physical Anthropology Seminars. (4) Two hours of lecture per week. Prerequisite: consent of instructor.

200A. Human Evolution.

200B. Genetic Anthropology.

200C. Primate Behavior.

200D. Primate Socialization.

200E. Primate Evolution.

200F. Comparative Anatomy.

200G. Fossil Man.

200H. Molecular Anthropology.

200I. Biochemical Anthropology.

200J. Human Variation.

200K. Human Adaptation.

200L. Primate Ecology.

200M. Osteology.

All seminars may be repeated for credit with consent of instructor. Mr. Howell, Mr. Washburn, Visitor (F); Visitor (W); Mr. Sarich, _ (Sp)

220. Archaeology Seminars. (4) Two hours of lecture per week. Prerequisite: consent of instructor.

220A. Western North America.

220B. Mesoamerica.

220C. Archaeology and Ethnology of South America.

220D. African Prehistory.

220E. African Protohistoric Archaeology.

220F. European and Near Eastern Prehistory.

220G. Method. Mr. Graham, Mr. Rowe, _____ (F); Mr. Graham, Mr. Deetz (W); Mr. Clark, Mr. Graham, Mr. Isaacs (Sp)

220H. Special Topic. Ms. Tringham (F)

220I. Historical Archaeology Research. (5) Four hours of field instruction per week. Prerequisite: students be of graduate standing with some background in archaeology or undergraduates having taken Anthropology 2 or with consent of instructor. This course will cover instruction in and practical application of field methods in historical archaeology. Most, if not all, class participation will be conducted at various local archaeological sites.

Mr. Deetz

240A–240B–240C. Fundamentals of Anthropological Theory. (6–5–5) One 2-hour lecture and two 2-hour section meetings per week. Required of all graduate students doing their principal work in social/cultural anthropology. Advanced survey of the major theoretical and empirical areas of social/cultural anthropology. Sequence beginning (F).

Ms. Colson/Mr. Shack; Mr. Benedict/Mr. Phillips

250. Seminars in Social and Cultural Anthropology. (4) Two hours of lecture per week. Prerequisite: consent of the instructor. May be repeated for credit

NOTE: For key to symbols, see page 36.
with consent of instructor. Several one-quarter semi-
nars will be offered; following list; consult de-
partmental listings for accurate course information.

250A. Culture and Personality.
250B. Deviancy.
250C. Applied Anthropology.
250D. Economic Anthropology.
250E. Politics.
250F. Religion.
250G. Social Issues.
250H. Art and Culture.
250J. Ethnological Field Method.
250L. Social Stratification.
250M. Urban Anthropology.
250N. Ecological Anthropology.
250P. Social Anthropology.
250Q. Kinship.
250R. Education.
250S. Special Topics to be announced. Mr. Graburn, Mr. Shack (F).
251S-251T. Education and Culture.
251A-251B. Comparative Social Institutions.
251C-251D. Social Interaction.
251E-251F. Social Change.
251G-251H. Acculturation.
251I-251J. Peasant Societies.
251K-251L. Urban Anthropology.
251M-251N. Cultural Structure.
251O-251P. Law.
251Q-251R. Analysis of Field Data. Section 2 must be taken satisfactory/unsatisfactory.
251S-251T. Education and Culture. Section 2 must be taken satisfactory/unsatisfactory.
251U-251W. Research Design. Section 2 must be taken satisfactory/unsatisfactory.
251X-251Y. Culture and Personality.
251Z-251AA. Special Topic to be announced. Section 2 must be taken satisfactory/unsatisfactory.
Sequence beginning (W): Mr. Hammel (W, Sp).

252. Practical Computer Use Laboratory. (1-5) Self-paced: unlimited hours per week. Prerequisite: courses 290A-190S, or concurrent enrollment in 190D. Must be taken on a satisfactory/unsatisfactory basis.

258A-258B-258C. Medical Anthropology. (4-4-4) Three hours of lecture per week. Prerequisite: background in behavioral or health science. Credit and grade awarded upon completion of full sequence. Anthropological theory, data, and methodology and its relationship to the study of health sciences. Lectures, readings, and supervised field research.

260. Folklore Seminars. (4) Two hours of lecture per week. Prerequisite: consent of instructor.

260A. Problems of Folklore.
260B. Psychology and Folklore.
260C. North American Indian Folklore.
260D. Additional Seminars on Special Topics to be announced. Mr. Bascom (W).

270. Seminars in Linguistic Anthropology. (4) Two hours of lecture per week. Prerequisite: consent of instructor. May be repeated for credit with consent of instructor. Consult departmental listings for accurate course information.

270A. Semantics.
270C. Interactional Sociolinguistics.
270E. Language Variation.
270G. Information Processing.
270H. Formal Ethnography.
270K. Ethnobiology.
270M. Color Categorization.
270Q. Ethnolinguistics.
270G. Decision Making.
270L. Recent Developments.

271. Two-Quarter Seminars in Linguistic Anthropology. (4-4) Two hours of lecture per week. Prerequisite: consent of instructor. May be repeated for credit with consent of instructor. The following seminars extend over two consecutive quarters. Credit and grade will be assigned upon completion of the full sequence. Consult departmental listings for accurate course information.
271A-271B. Semantics.
271C-271D. Interactional Sociolinguistics.
271E-271F. Language Variation.
271G-271H. Information Processing.
271K-271L. Ethnobiology.
271M-271N. Color Categorization.
271O-271P. Ethnolinguistics.
271S-271T. Recent Developments.

275A-275B-275C. Proseminar in Linguistic Anthropology. (4-4-4) Three hours of seminar per week. Prerequisite: graduate standing or consent of instructor. Required of all first-year graduate students, concentrating in linguistic anthropology. Advanced survey of current theory and research in linguistic anthropology. Topics in ethnographic semantics, language development, natural communication, folk biological nomenclature, formal rule systems.

280. Area Studies Seminars. (4) Two hours of lecture per week. Prerequisite: consent of instructor.

280A. Contemporary Latin American.
280B. Africa South of the Sahara.
280C. South Asia.
280D. China.
280E. Japan.
280F. Southeast Asia.
280G. Oceania.

280H. Additional Seminars on Special Topics to be announced. Ms. Nader (W), Mr. Brindley (Sp).

281A-281B-281C. United States Culture and Society. (4-4-4) Three hours of lecture per week. Prerequisite: consent of instructor. Anthropological theory, data, and methodology and its relationship to the study of United States society and its problems. Lectures, readings, and supervised field research.

285. History and Theory of Anthropology. (4) Two hours of lecture per week. Prerequisite: consent of instructor.

296A. Practice in Original Field Research Under Staff Supervision. Mr. Rowe (W).

296B. Supervised Research. (4-9, 4) Two hours of lecture per week. Prerequisite: consent of instructor.

296A. Practice in Original Field Research Under Staff Supervision. Mr. Graham (W).

296B. Analysis and Write-up of Field Materials.

298. Directed Reading. (2-12) Prerequisite: consent of instructor. Intended to provide directed reading in subject matter not covered in available seminar offerings. Two or more sections may be taken concurrently.

299. Directed Research. (4-9) Prerequisite: consent of instructor. Individual conferences to be arranged. Intended to provide supervision in the preparation of an original research paper or dissertation.


602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with Adviser. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for units to meet residence requirements for the degree. Must be taken on a satisfactory/unsatisfactory basis.


604. Individual Study for Doctoral Students. (1-8) Individual study in consultation with Adviser. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for units to meet residence requirements for the degree. Must be taken on a satisfactory/unsatisfactory basis.
Introduction to the elements of form and their relationship to the human figure. The Staff (F, W, Sp)

4. Materials and Processes of Painting. (4) Three 3-hour studio classes per week. Prerequisite: course 2A-2B. An exploration of the techniques and methods of painting. Mr. Allen, Mr. Ballaine, Mr. Kasten (F, W, Sp)

14A. Introduction to Sculpture. (4) Three 3-hour studio classes per week. The Staff (F, W, Sp)

14B. Materials and Processes of Sculpture. (4) Three 3-hour studio classes per week. Prerequisite: course 14A.

Upper Division Courses

The various courses in Art differ in content, use of materials, and type of subject matter, depending upon the individual aims of the artist in charge. All but Art 120 and Art 121 may be repeated for credit.

It is a requirement for the major in Art that the student complete at least 12 units of upper division courses under three instructors of the regular staff.

Students must have completed 20 units of lower division studio courses to enter upper division courses.

102. Advanced Drawing And Painting. (3) Three 3-hour studio classes per week. Group Prerequisite. The Staff (F, W, Sp)

102A. Ms. Brown
102B. Ms. Lark
102C. Mr. McCray
*C102D.
102E. Mr. Kasten
102F. Mr. Hartman
102G. Mr. Bischoff
102H. Mr. Allen
102I. Mr. Miyasaki
102K. Mr. Simpson
102M. Mr. Ballaine
102N. Visitors

103A. Advanced Drawing and Composition. (Formerly 100) Three 3-hour studio classes per week. Prerequisite: group prerequisites. Principles of two-dimensional composition, emphasis on drawing media. Recommended for upper division transfer students in Practice of Art who have not taken a course equivalent to course 2A. Should be taken during the first quarter in residence. The Staff (F, W, Sp)

103B. Human Figure Drawing. (Formerly 103) Three 3-hour studio classes per week. Prerequisite: group prerequisites. Principles of space drawing and composition using recognizable form. The Staff (F, W, Sp)

105. Mural Painting. (4) Nine hours of laboratory per week. Prerequisite: courses 2A, 2B, 3, 4, and upper division standing. Emphasis on wall painting offering work in a variety of media on an individual basis. Mr. McCray (F, W, Sp)

110. Practice In The Graphic Arts: Emphasis on Etching. (4) Three 3-hour studio classes per week. Mr. Kasten, Mr. Miyasaki, Ms. Lark, visitors (F, W, Sp)

110. Practice In The Graphic Arts: Emphasis on Lithography. (4) Three 3-hour studio classes per week. Mr. Miyasaki (F, W, Sp)

114. Advanced Sculpture. (4) Three 3-hour studio periods per week. Prerequisite: group prerequisites. The Staff (F, W, Sp)

114B. Mr. Gordin
114C. Mr. Paris
114D. Mr. Voulkos
114E. Mr. Melchert
114G. Mr. Wall
114V. Visitors

*120. Art Analysis (Emphasis on Painting). (4) Three hours of lecture per week. Prerequisite course 2A, 2B, and ten units of Art History. A survey course analyzing ideas in art. Primarily for art majors. Mr. Simpson (Sp)

121. Art Analysis. (4) Three hours of lecture per week. Prerequisite: course 2A, 14A, and ten units of Art History. A survey course analyzing ideas in art, including sculpture, painting, graphics, photography and architecture. Primarily for art majors. Mr. Gordin (Sp)

146. Ceramic Sculpture. (4) Nine hours of laboratory per week. Prerequisite: general group prerequisites; 20 units of lower division studio courses. Emphasis on the unique aesthetic possibilities of clay and ceramic material as sculpture. Mr. Voukolos (F, W, Sp)

Special Study Courses

H195A-H195B-H195C. Special Study for Honors Candidates. (4) The Practice of Art (4) The individual student must arrange his hours to be arranged. Prerequisite: eligibility for admission to the honors program. Credit and grade will be awarded on completion of two or three quarters of the sequence with the same instructor. May be applied to upper division studio art requirement for major.

The Staff (F, W, Sp)

199Y. Supervised Independent Study and Research in Practice of Art. (1-5) Enrollment is restricted by regulations listed on page 36. Staff approval required. Must be taken on a passed/not passed basis, therefore does not apply to Art major requirements.

The Staff (F, W, Sp)

Graduate Courses

General prerequisite for graduate courses in the Practice of Art is at least a B average in the undergraduate major in Art. Students may not enroll in more than two sections of the following courses per quarter: 202, 212.

202. Graduate Seminar In Art Emphasis on Two-Dimensional Media. (4) Three hours of seminar per week. Emphasis on original works; group discussion and criticism. Ancillary topics of a contemporary and historical nature will be introduced. May be repeated for credit.

The Staff (F, W, Sp)

212. Graduate Seminar In Art: Emphasis on Three-Dimensional Media. (4) Three hours of seminar per week. Emphasis on original works; group discussion and criticism. Ancillary topics of a contemporary and historical nature will be introduced. May be repeated for credit:

The Staff (F, W, Sp)

294. M.F.A. Seminar. (4) Three hours of seminar per week. Studio work emphasizing various aspects of form. Group criticism. Intended for specially qualified M.F.A. candidates. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

295. Individual Study for Graduate Students. (1-12) Individual study intended to provide opportunity for qualified students to prepare themselves for the M.F.A. Comprehensive Project.

The Staff (F, W, Sp)

298. Special Study for Graduate Students. (1-4) Staff approval required.

The Staff (F, W, Sp)

History of Art

112. History of Art Office, 405 Doe Library

Professors:

Svetlana Alpers, Ph.D.
James Cahill, Ph.D.
Herschel B. Chipp, Ph.D.
L. D. Ettlinger, D.Phil.
Linda Gochnour, Ph.D.
Peter M. Selz, Ph.D., D.F.A.
Joanna Williams, Ph.D.
Daniel A. Amyx, Ph.D.
Jim Elkins, A.A., Agrégé
Walter W. Harn, Ph.D.

Associate Professors:

Jacques de Casser, Ph.D.
Loren Partridge, Ph.D.

Assistant Professor:

Andrew F. Stewart, Ph.D.

Lecturer:

Alfred Frankenstein, Ph.B., D.F.A. (hon.) (Emeritus)

History of Art

History of Art Office, 405 Doe Library

Preparation for Graduate Study. Students planning graduate study in History of Art are urged to develop a reading knowledge of German and French or Italian as early as possible.

Graduate Programs

The Department of Art and History of Art offers programs of graduate study leading to the M.A. and Ph.D. degrees in the History of Art. It also offers an M.A. only program and a combined program with the School of Librarianship leading to an M.A. degree in History of Art and Library Science.

Further information concerning these programs may be obtained from the History of Art Office, 405 Library.

Lower Division Courses

30. The Art of India and Southeast Asia. (5) Four hours of lecture and one hour of discussion per week.

31. The Art of China and Japan. (4) Four hours of lecture and one hour of discussion per week.

40. History of Ancient Mediterranean Art. (5) Four hours of lecture and one hour of discussion per week. AEgean, Greek, Etruscan, and Roman Art.

60. Introduction to European Painting. (5) Four hours of lecture and one hour of discussion per week, and additional directed study. Medieval, Renaissance, and Modern.

61. Introduction to the History of Art: Sculpture. (5) Four hours of lecture and one hour of discussion per week. Selected examples of sculpture emphasizing the human figure, including portraits and narrative relief, from the Pyramid Temples to Picasso.

Upper Division Courses

Open to nonmajors. General prerequisite: upper division standing or consent of the Instructor. Unless otherwise stated, the "A" part of a sequence is not prerequisite to the "B" part. No part A, B, or C is prerequisite to another.

Note: For key to symbols, see page 36.
102 / L&S: Art and History of Art

104. Undergraduate Seminar—Special Topics. (5) Four hours of lecture per week. Prerequisite: open to non-majors with consent of instructor. Topics of special concern to the instructor, usually related to current research. Limited to 20. Special study and research. Open to all students with the consent of the individual instructor. Restricted Courses

130A–130B. Early Chinese Art. (5–5) Four hours of lecture per week and additional directed study. Mr. Cahill

130C–131A–131B. Later Chinese Art. (5–5) Four hours of lecture per week and additional directed study. Mr. Cahill

131A. Chinese art of the Sung and Yuan dynasties. Mr. Cahill

131B. Chinese art of the Ming and Ch'ing dynasties. Mr. Cahill

134A–134B. The Art of Japan. (5–5) Four hours of lecture and one additional hour of discussion per week. Mr. Williams

134B. Japanese art through the late 13th century. Mr. Williams

136A–136B–136C. The Art of India. (5–5–5) Four hours of lecture per week. Prerequisite: a knowledge of at least one useful language. Mr. de Case

134A. The Art of Cambodia, Thailand, Burma, and Indonesia focusing on the period from 400 to 1500 A.D. Sculpture and architecture will be considered as a balance of Indian and indigenous influences. Mr. Williams

137A. Art of Southeast Asia. (5) Four hours of lecture per week. Prerequisite: course 180A or 180E and permission of the instructor. Mr. Williams

135A–135B. The Art of Greece in the Bronze Age, with attention to connections with neighboring cultures. Mr. Stewart

135C. 1350 A.D. to the present, primarily Muslim and Rajput miniature painting. Ms. Williams

135D. Development of sculpture in western Europe between c. 1250 and mid-14th century, and its influence in Western Europe. Mr. Wright

150A–150B–150C. The Art and History of Art. (5–5–5) Four hours of lecture per week and additional directed study. Mr. Stewart

150A. c. 300 to 750 A.D. Mr. Stewart

150B. c. 750 to 1150 A.D. Mr. Stewart

150C. The Art of the Hellenistic Period. 323-30 B.C. Mr. Stewart

160A–160B. Italian Renaissance Art. (5–5) Four hours of lecture per week and additional directed study. Mr. Ettlinger

161. The Trecento. (5) Four hours of lecture per week and additional directed study. Italian painting and sculpture, 1260-1400. Mr. Selz

161A–161B. Italian Renaissance Architecture. (5) Four hours of lecture per week and additional directed study. Mr. Partridge

162. Michelangelo and Raphael. (5) Four hours of lecture per week and additional directed study. The art of these two artists and their milieu. Mr. Partridge

163. The Eighteenth and Nineteenth Centuries. (5) Four hours of lecture per week and additional directed study. Mr. Selz

164. Contemporary Art. (5) Four hours of lecture per week. Painting and sculpture in America and Europe from World War II to the present. Mr. Seitz

165. Picasso and Cubism. (5) Four hours of lecture per week and additional directed study. Prerequisite: course 180B and consent of instructor. Limited to 25 students. Mr. Chipp

166. Twentieth-Century Sculpture. (5) Four hours of lecture per week and additional directed study. Sculpture from Rodin to the present. Mr. Selz

167. Photography as a Visual Art. (5) Four hours of lecture per week, and additional time for viewing movies. The development of photography, both still and motion picture, from 1839 to the present. Emphasis on how photography works. Mr. Wright

180A–180B. American Art. (5–5) Four hours of lecture per week and additional directed study. Mr. Partridge

180A. Early Netherlandish Painting. (5) Four hours of lecture per week. A general survey of the history of art in the Netherlands from van Eyck to Bruegel and on the Germanic lands from Durer to Holbein. Mr. Stewart

180C. Medieval. Mr. Stewart

181. The Eighteenth Century. Mr. Seitz

182. The Nineteenth Century. Mr. Seitz

183. American and Bay Area Architecture. (5) Four hours of lecture per week and one 2-hour field trip (not including travel time) per week. The two lectures will trace the major trends in the history of American architecture from the colonial period to the present. In the field trips, individual buildings and the urban development of the bay area will be studied and related to the nationwide developments. Mr. Partridge

101. Undergraduate Seminar: Problems in the Research and Interpretation in the Several Areas of the History of Art. (6) Four hours per week. Restricted courses designed primarily for Juniors and Seniors whose major is History of Art, but it is also open to other students with the consent of the individual instructor. Enrollment limited to 25. Course may be repeated for credit. Mr. Parsons

102. Special Study Courses

H195. Special Study for Honors Candidates in the...
History of Art (1-5) Prerequisite: senior standing and qualifying scholarship record (minimum grade-point average of 3.3 overall and 3.3 in courses completed in the major). The Staff

1982. Supervised Independent Study and Research in History of Art. (0-6) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff

Graduate Courses

General Prerequisite: graduate standing and consent of the instructor, including courses in the history of art and reading knowledge of languages as may be required.

Graduate seminars in the History of Art are normally extended through two successive quarters, meeting for three hours each week, counted as a work load of 4 units each quarter. Credit and grade will be given only upon completion of the full sequence. On rare occasions a seminar may meet intensively, for six hours extended through two successive quarters, meeting for a passed/not passed basis. The Staff

The History of Art (1-5) Prerequisite: senior standing and average of 3.3 overall and 3.3 in courses completed qualifying scholarship record (minimum grade-point average). Mr. Cahill

The History and Theory of Art-Historical Writing. (4) Three hours per week. Prerequisite: a reading knowledge of two of the following languages: Italian, German, French, or Spanish. Mr. Carver will arrange a reading course. Selected passages from art-historical writings from Vasari to the present will be studied and related to the student's own writing. The relevance of the work of recent art historians to current research will receive special attention. Must be taken on a satisfactory/unsatisfactory basis.

The History of Art (1-5) Individual study in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for a master's degree. Enrollment is on a satisfactory/unsatisfactory basis.

Three hours per week. Prerequisite: graduate standing and consent of instructor. Credit and grade will be given only upon completion of the full sequence. Mr. Chipp

285A–285B. Seminar in Twentieth-Century Art. (4–4) Three hours per week. Prerequisite: graduate standing and consent of instructor. Credit and grade will be given only upon completion of the full sequence. Mr. Mr. de Caso

286A–286B. Seminar in Twentieth-Century Painting and Sculpture. (4–4) Three hours per week. Prerequisite: graduate standing and consent of instructor. Credit and grade will be given only upon completion of the full sequence. Mr. Selz

290. Special Study for Graduate Students in the History of Art. (1–3) Three hours per week. The Staff

601. Individual Study for Master's Students in the History of Art. (1–8) Individual study in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for a master's degree. Enrollment is on a satisfactory/unsatisfactory basis.

The History of Art (1–8) Individual study, in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for the doctoral degree. Enrollment is on a satisfactory/unsatisfactory basis.

The History of Art (1–8) Individual study in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for the doctoral degree. Enrollment is on a satisfactory/unsatisfactory basis.

610. Introduction to Modern Art for Non-Majors. (3) See Interdepartmental Studies for the complete description of this course.


Univeristy Art Museum

The University Art Museum, plays an active role in instruction and research, giving students an opportunity for experience in connoisseurship and organization of exhibitions. (See University Art Museum in Index for further information.)

Asian Studies

Group Major Office, 260C Stephens Hall

Advisers: Mr. Chalmers A. Johnson (Department of Political Science), head adviser; Mr. Robert A. Scalapino (Department of Political Science), Mr. Karl D. Jackson (Department of Political Science).

Group Major in Asian Studies

The undergraduate group major in Asian studies is a rigorous but flexible interdisciplinary program designed to provide the student a groundwork in an Asian language, a broad range of interdisciplinary area-related course work, and at least a minimal familiarity with the methods of one discipline relevant to his or her area studies. The major program assists the student by organizing the rich course offerings in the Asian field at the University in such a way as to permit him or her to focus on a single geographical area, making use of a wide range of disciplines.

Prerequisite Courses in the Major

Students petitioning to enter the group major must have completed the following:

1. One year (three quarters) of a language appropriate to the area of regional specialization. (Area I—China, Area II—Japan, Area III—Southeast Asia)

2. Four courses drawn from the following list. Since majors are required to take upper division course work in at least two departments, at least two of these introductory courses must be selected from those two departments in which the candidate for the major intends to fulfill this requirement:

Agricultural Economics 23, World Agriculture (4)

Anthropology 1, Introduction to Physical Anthropology (5)

Anthropology 3, Introduction to Social and Cultural Anthropology (5)

Economics 1, Introduction to Economics (5)

Geography 1, Introduction to Physical Geography (5)

Geography 4, Introduction to Cultural and Historical Geography (5)

Geography 7, Spatial Organization of Human Activity (5)

History 19A–19B, Asian History (5–5)

History 31, The Art of China and Japan (5)

Political Science 2, Introduction to Political Science—Comparative Government and Politics (5)

Political Science 3, Introduction to Political Science—Scope and Methods (5)

Sociology 1A, Introduction to Sociology (5)

Additional Major Requirements

Once accepted in the major, the student is expected to select an area focus (Area I: China, Area II: Japan, Area III: Southeast Asia) and a disciplinary focus within that area and is required to complete the following course work:

1. One additional year of language appropriate to the area of regional specialization. Further study of the language is encouraged and will count toward the major unit requirement as indicated in the following sections. It is to be noted that, in the case of Malay/Indonesian and Thai, all or part of the first two years' work carries upper division credit. In this instance the first two years' work will satisfy the language requirement but will not count toward the major unit requirement.

2. Upper division course work in at least two departments, totaling 45 units. At least 12 units of work must be in one department (not a language department) referred to herein as the "disciplinary focus" and must include one course in that department which relates to the theories, methods and techniques of that discipline, which is not exclusively an area studies course.

3. A senior thesis of approximately fifty pages in length to be completed under the supervision of the major adviser or other appropriate member of the faculty. Up to 12 units of independent study credit may be given for work on the thesis, those units to count among the 45-unit major requirement.

Area I: China

A. The student must complete one additional year of Chinese (Mandarin). Further study of the language is encouraged, and will count toward the major unit requirement as indicated below.

B. The student must select one of the following disciplinary foci and complete at least 12 units of work from the courses listed there (see item 2 under "Additional Major Requirements" above).

Anthropology

1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser

2. Anthropology 170A or 170B, China (5,5)

3. One course from among the following: Anthropology 143, Plural Societies (5); Anthropology 148, Comparative Peasant Society (5); Anthropology 146, Men's Ecological Relationships (5); Anthropology 153, Medical Anthropology (5)

History

1. One course treating the theories and methods appropriate to the discipline, chosen with the consent of the major adviser

2. Two courses from among the following: History

NOTE: For key to symbols, see page 30.
184A, 184B, 184C, China (5,5,5); History 189A, Social History of China (5); History 190, Modern Chinese Intellectual History (5)

History of Art
1. History of Art 102A, Undergraduate Seminar: Problems in the Research and Interpretation in the Several Areas of the History of Art (5)
2. Two courses from among the following: History of Art 130A, 130B, Early Chinese Art (5.5); History of Art 131A, 131B, Later Chinese Art (5.5)

Economics
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser
2. Economics 106, The Economics of Marxism (4)
3. Economics 163, The Economics of the Communist World (4)

Political Science
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser
2. Two courses from among the following: Political Science 140H, Comparative Communism (5); Political Science 141F, Political Theory in Communist Political Systems (5); Political Science 143A, 143B, 143C; Government and Politics of Northeast Asia (5,5,5); Political Science 128A, American Role in Asia (5)

Sociology
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser
2. Two courses from among the following: Sociology 135, Social Change in Underdeveloped Countries (5); Sociology 164, Folklore and Society (5); Sociology 168, Agricultural Oriental Societies (5); Sociology 184, Social Structure of Communist Societies (5)
3. Additional units necessary to complete the unit requirement of the major may be selected from among the courses listed under other disciplinary focci above and from among the following:
   - Comparative Literature 160, Western Literary Crosscurrents in Twentieth Century China (4)
   - Geography 164, China, Japan and Korea (4)
   - Up to 20 units of the major requirement may be elected from the following language and literature courses offered by the Department of Oriental Languages:
     - Oriental Languages (Chinese) 100A, 100B, 100C, Advanced Chinese (4,4,4)
     - Oriental Languages (Chinese) 103, Classical Chinese: Medieval Texts (4)
     - Oriental Languages (Chinese) 110A, 110B, 110C, Readings in Chinese Vernacular Literature (4,4,4)
     - Oriental Languages (Chinese) 123, Classical Chinese: Medieval Poetry (4)
     - Oriental Languages (Chinese) 156A, 156B, Readings in Chinese Vernacular Literature (4,4,4)
     - Oriental Languages 112A, 112B, Chinese Literature in Transition (4,4)
     - Oriental Languages 171A, 171B, Development of Buddhism in the Far East (4,4)
4. In exceptional cases, individual waivers of specific course requirements for valid academic reasons will be considered with the approval of the major adviser.

Area II: Japan
A. The student must complete one additional year of Japanese. Further study of the language is encouraged, but will count toward the major unit requirement as listed below.
B. The student must select one of the following disciplinary focci and complete at least 12 units of work from the courses listed there (see item 2 under "Additional Major Requirements" above).

Anthropology
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser
2. Anthropology 171, Japan (5)
3. One of the following courses: Anthropology 149, Culture and Personality; Anthropology 150, Social Problems in Changing Cultures (5)

History
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser
2. Two courses from among the following: History 165A, 165B, 165C, Japan (5,5,5); History 165B, Social History of Japan (5)

Political Science
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser
2. Two courses from among the following: Political Science 143A, 143B, 143C, Government and Politics of Northeast Asia (5,5,5); Political Science 128A, American Role in Asia (5)

Geography
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser
2. Geography 163, Southeast Asia (5)
3. One course from among the following: Geography 100, Principles of Cultural Geography; Culture and Rural Environments (5); Geography 104, The City in the Third World (5); Geography 111, Systems of Cities and Regional Development (5)

Political Science
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser
2. Political Science 143D, Political Cultures of Southeast Asia (5), or Political Science 143E, Policy Problems of Southeast Asia (5)
3. One course from among the following: Political Science 143F, Political Cultures of Southeast Asia (5); Political Science 143E, Policy Problems of Southeast Asia (5); Political Science 128B, American Role in Asia (5)

Astronomy

Department Office, 601 Campbell Hall

Professors:
C. Stuart Bowyer, Ph.D.
John E. Gueswit, Ph.D.
Carl E. Heiles, Ph.D.
Harold F. Weaver, Ph.D.
(Chairman)

Leland E. Cunningham, Ph.D.
(Emerya)
The Department of Astronomy offers undergraduate and graduate instruction in a wide variety of fields, including the history of observational astrophysics; infrared, X-ray and radio astronomy; galactic structure and dynamics of stellar systems; high-energy astrophysics and cosmology; and spectroscopy. A considerable amount of research and teaching related to astronomy is done in other units at Berkeley, including the Space Sciences Laboratory and the Physics Department. Various professors in the Chemistry, Mathematics, Statistics, and Electrical Engineering departments have an active interest in astronomy and are available for consultation.

A variety of instruments is available to students and staff, including a 30-inch telescope at Leuschner Observatory (near the campus), a 120-inch telescope at Lick Observatory, an 85-foot radio telescope and two 20-foot dishes used as a mm interferometer at Hat Creek Observatory. Laboratories are available for the development of radio, infrared, and X-ray instruments, and for the precise measurement of optical images and spectra.

The Major

During the first two undergraduate years students must, in addition to fulfilling certain specific requirements of the College of Letters and Science, pursue studies that will prepare them for future work in astronomy. Specifically, the Department requires that during the first two years students take courses that provide a thorough understanding of:

1. Basic principles of physics: mechanics, properties of matter, electricity and magnetism, heat, wave-motion, sound and light. (Physics 5A, 5B, 5C, 5E)
2. Basic mathematics: analytic geometry, differential and integral calculus, differential equations, and linear algebra. (Math 1A, 1B, 1C, followed by Math 51A, 51B, 51C)

In addition, students are urged to take foreign language courses that will enable them to gain a reading knowledge of any one (and preferably two) of the three languages, German, Russian and French.

The last two years, leading to the A.B. degree in astronomy, are spent in more intensive work, primarily in the fields of astronomy, mathematics and physics. The specific plan of study to be followed by each student is to be worked out in consultation with the departmental advisor for the major, and must include at least 36 units of upper division work in astronomy and allied fields.

All astronomy majors are required to take Astronomy 127A-127B-127C-127D.


Students of marked ability may take certain graduate courses in astronomy during the senior year.

Honors Program. For honors in astronomy a student must fulfill the following requirements: (1) a grade point average of at least 3.5 in all courses in astronomy and related fields and an overall grade-point average of at least 3.3 in the University; (2) in Astronomy 127 A-127B-127C-127D, a minimum of two A's and two B's or three A's and one C; (3) an individual project or research or study, involving at least 3 units of Astronomy H195. The student's project is chosen in consultation with the major adviser, and the written report is judged by the major adviser and one other faculty member.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Programs

The graduate program is aimed at the Ph.D. degree. Entering students need not have majored in astronomy, although some background in astronomy is desirable. A strong background in physics is essential, however. In order to facilitate reading of research papers in German, Russian, and French as part of their graduate work, entering students are urged to study at least one of these languages as undergraduates.

In addition to the qualifying examination on the thesis topic required by the University, the Department requires students to pass a preliminary examination which tests breadth and depth of knowledge of three specialties chosen by the student from a list of about ten. Students choose, with the aid of their adviser, courses in the Department which are useful in preparing for the preliminary and qualifying examinations. A number of graduate courses taken outside the Department and must acquire one year's teaching experience. A tutorial program is designed to maintain regular contact with the faculty. The program normally takes four to five years. Additional information on the program is available upon request to the Department.

The requirements for the M.A. degree are 36 units in graduate or upper division undergraduate courses (18 of them in graduate courses) and the preliminary examination.

Lower Division Courses

2. Current Research in Astronomy and Astrophysics (3). Three hours of lecture per week. Prerequisite: Astronomy 10, 103, 7 or 73 or consent of instructor. This course considers the major breakthrough discoveries that have, from time to time, dramatically changed the astronomer's understanding of the universe; it describes the state of astronomical science when each breakthrough occurred, and analyzes how the breakthrough changed that state. Mr. Weaver (W).

7. Introduction to Modern Astronomy and Astrophysics (4). Three hours of lecture and two hours of laboratory per week. Prerequisites: Good facility in calculus and elementary physics. Not open to students who have received credit for Astronomy 1 or 10. Description and interpretation of the modern theories of various fields of modern physics. Modern astronomical instrumentation. Discussion of gravitation, relativistic, electromagnetic, and quantum radiations in relation to the structure and evolution of stars, galaxies, and the universe. Mr. Welch (F).

GS, Self-paced Introduction to Modern Astronomy and Astrophysics. (2-4) Four to seven hours of tutorial discussion per week with occasional laboratory. Prerequisite: Good facility in high school physics and mathematics (algebra and trigonometry). The same material as course 7 but in a self-paced format. Units assigned depending on number of study modules completed. May be repeated for credit up to a total of 4 units.

8. The Universe Through Radio Eyes. (3) Three hours of lecture per week. Prerequisite: Astronomy 7, 7S, 10, 10S or consent of instructor. Topics vary and may include modern theories of cosmic radiation, radio galaxies and quasars, pulsars, interstellar atoms and molecules, interstellar materials, processes of galaxy formation, and the physical understanding, with occasional use of mathematics.

9. Selected Topics in Astronomy (3). Three hours of lecture per week. Prerequisite: Astronomy 10, 10S, 7 or 73 or consent of instructor. Seminars in a variety of topics offered each quarter. Topics explored in greater depth than in introductory courses, courses taught by graduate students. Discussion and class participation encouraged. Examples of courses which may be offered during the 1979/80 academic year follow:

9A. Selected Topics in Astronomy: Stars. (3) Three hours of lecture per week. Prerequisite: Astronomy 10, 10S, 7 or 73 or consent of instructor. Structure and evolution. Variable stars. Binary stars.

9B. Selected Topics in Astronomy: Relativity and Cosmology. (3) Three hours of lecture per week. Prerequisite: Astronomy 10, 10S, 7 or 73 or consent of instructor. Evolution and origin of the Universe. Quasars. Curved spacetime, gravitation, observational tests. (May not be taken in addition to Astronomy 3).

9C. Selected Topics in Astronomy: Stellar Systems. (3) Three hours of lecture per week. Prerequisite: Astronomy 10, 10S, 7 or 73 or consent of instructor. Star clusters, galaxies and clusters of galaxies. Formation, dynamics and evolution.

9D. Selected Topics in Astronomy: Solar System. (3) Three hours of lecture per week. Prerequisite: Astronomy 10, 10S, 7 or 73 or consent of instructor. The Solar System: Structure and evolution. Mr. Weaver (F).

9E. Selected Topics in Astronomy: Interstellar Medium. (3) Three hours of lecture per week. Prerequisite: Astronomy 10, 10S, 7 or 73 or consent of instructor. Gas and dust between the stars, regions of star formation, structure of the Galaxy, chemical composition.

9F. Selected Topics in Astronomy: Observational Astrophysics. (3) Three hours of lecture per week. Prerequisite: Astronomy 10, 10S, 7 or 73 or consent of instructor. Telescopes, instruments, astronomical photograph, spectroscopy.

9G. Selected Topics in Astronomy: Life in the Universe. (3) Three hours of lecture per week. Prerequisite: Astronomy 10, 10S, 7 or 73 or consent of instructor. Study of a selection of unusual astronomical objects and objects which may be related to extraterrestrial sources, from an observational viewpoint.

10. Introduction to General Astronomy. (4) Three hours of lecture and 1 hour discussion per week. Prerequisites: Astronomy 10, 10S, 7 or 73 and 1 hour of chemistry and 1 hour of physics. Designed for students who are not required to take introductory astronomy but who are interested in the study of astronomy, a field of great contemporary importance, for its own sake. Open to students of any level who desire instruction and who are prepared to accept a rigorous mathematical description of modern astronomy with emphasis on the structure and evolution of stars, galaxies, and the Universe. Additional topics optionally dis...
cussed include quasars, pulsars, black holes and exo-
trastellar communication, etc. Individual instructors’
sympathies are available from the Department.
Mr. Bowyer, Mr. Phillips (W), Mr. Sirks, Mr. Weaver (Sp)

105. Self-paced Introduction to General Astron
omy. (1-4) One to four hours of discussion and 0-1 hours
of laboratory per week. Same material as Course 104.
Lab credit the same as in 104. Units and grades as-
signed at end of quarter, depending on number of
study units completed. May be repeated for credit up to
4 units. Mr. Gaustad (W, Sp) Mr. Weaver (Sp)

99. Directed Study in Astronomy. (1-3) Prerequisites:
Astronomy 7, 10 or 105 and consent of instructor.
Supervised observational studies or directed reading
must be taken in a self-paced format. Must be taken on
a passed/not passed basis. The Staff (F, W, Sp)

Upper Division Courses

hour lectures and one 1-hour discussion section per
week. Prerequisite: Physics 5A-5B-5C-5D-5E; Mathematic
5A-5B-5C-5D. Introduction to the principal fields of modern astrophysical research. Interdisci
bly for majors in the physical sciences and engi
neering. Mr. Bowyer (Sp)

127A. Solar System and Instrumentation. (4) Four-
hour lecture and one 1-hour discussion section per
week. Prerequisite: Physics 5A-5B-5C-5D-5E; Mathematics
5A-5B-5C. Solar System instrumentation; space probes;
gas and dust of the planets, atmospheres, interiors; solar
system history; the Sun. Mr. King (F)

127B. Stars, Clusters and Galaxies and Cosmology.
(4) Four hours of lecture per week. Prerequisite: course
127A. Binaries, luminosities, distribution of stars and
clusters; clusters of galaxies, galaxy dynamics and masses;
emission nebulae, spectra, reddening, molecules; current
procedures and techniques. Mr. King (W)

127C. Interstellar Medium and High Energy Astro-
physics. (4) Four hours of lecture per week. Pre-
requisite: course 127A. Interstellar medium; interstellar
emission nebulae, spectra, reddening, molecules; strengthen spheres; interstellar grains and clouds;
heating and cooling of interstellar medium; emission
processes; pulsars; X-ray sources; quasars. Mr. Heiles (Sp)

127D. Stellar Atmospheres, Structure and Evolu-
tion. (4) Four hours of lecture per week. Prerequisite:
course 127A. Model atmospheres; line broadening mecha
nisms; curve-of-growth, abundances; non LTE; emission
lines; equations of stellar structure; stellar energy
sources; evolutionary models; variable stars, white
dwarfs, supernovae, neutron stars. Mr. Spinrad (F)

106. Interstellar Matter. (3) Three hours of lecture
per week. A survey of the observational data on the
interstellar medium, with emphasis on the inferred phy
sical conditions. (Not open to students who have taken
216 prior to Fall 1975.) Mr. Heiles (W)

216. Introduction to Stellar Atmospheres. (3) Three
hours of lecture per week. Spectral characteris-
tics of normal and peculiar stars. Interpretation via
model atmosphere, line profiles, curve of growth, etc.
Line and continuous opacity, line-blanketing, convec-
tion, non-LTE, element abundances, current prob-
tem areas. (Not open to students who have taken
217A-217B-217C prior to Fall 1975.) (Sp)

217. Stellar Dynamics and Galactic Structure. (3)
Three hours of lecture per week. A basic course in
structure and kinematics of the galaxy; stellar population
concepts; dynamics of stellar systems with and without
encounters. (Not open to students who have taken
218 prior to Fall 1975.) Mr. Weaver (F)

219. Solar System Astrophysics. (4) Three 1-
hour lectures and two 1-hour discussion sections per
week. Prerequisite: course 127A-127B-127C-127D. The
physical foundations of solar system astronomy. The
study of planetary astrophysics and surfaces. Mete-
oroids, comets and the intermedary medium. Observa-
tional techniques and problems. Mr. Gaustad (Sp)

225A-225B-225C. Celestial Mechanics. (5-5-5)
Three 1-hour lectures and two 1-hour discussion sec-
tions per week. Prerequisite: course 219. (F) Sequence beginning (F)

228. Extragalactic Astronomy and Cosmology. (3)
Formerly 228 and 218C. Three hours of lecture per week.
Prerequisite: course 219. To students who have
received credit for courses 218C or 228 prior to Fall
Quarter 1975. Survey course: Classification and mor-
phology of galaxies, galaxy dynamics and masses,
population content, evolution, clusters of galaxies,
cosmological models and observations, primordial nu-
cleosynthesis, background radiation, distribution of
lines, and clusters. Mr. Spinrad (W)

236. Radio Astronomy. (3) Three hours of lecture
per week. Prerequisite: course 216. Comparison of radio
and optical instrumentation and techniques. Detailed
application of radiation and physics to objects ob-
served in the radio range, including emission nebulae,
gas clouds, and, at times, galactic plasmas, with applica-
tion to current observations.

238. Special Topics In Astronomy. (3) Three hours
of lecture per week. Prerequisites: Consent of instruc-
tor, may be repeated for credit. Topics will vary from
quarter to quarter. See Department of Astronomy
announcements.

245. Satellites Theory. (5) Three 1-hour lectures and
two 1-hour discussion sections per week. Prerequisite:
Consent of instructor. The motion of natural and artifi-
cial satellites. Practical determination of their orbits and
perturbations. Mr. Vazquez (W)

250. Special Topics In Astrophysics. (3) Three
hours of lecture per week. Prerequisite: Consent of instruc-
tor. Topics will vary from quarter to quarter. See
Department of Astronomy announcements. May be
repeated for credit.

258. Advanced Stellar Dynamics. (3) Three hours
of lecture per week. Prerequisite: Astronomy 218. Galac-
tic orbits, integrals, and perturbation theory. Galactic
stellar dynamics; galactic mass models; spiral structure,
density waves and resonances. Stellar encounter theory;
dynamics of star clusters; simulation techniques. Dy-
namics of elliptical galaxies; dynamics of discs; galaxy
interactions and collisions. (Not open to students who
have taken course 218 prior to Fall 1975.) Mr. Arons (W)

287. Plasma Astrophysics. (3) Three hours of lec-
ture per week. Application of magnetohydrodynamics and
plasma physics to astrophysical problems. Topics will be
chosen from such subjects as cosmic rays, solar and
stellar flares and winds, mhd dynamics, pulsars, X-ray
sources, supernova and supernova remnants, and
cosmic rays and active galactic nuclei. Mr. Arons (F)

276. Special Topics In High Energy Astrophysics.
(4) Four hours of lecture per week. Prerequisites: As-
tronomy 218, 228. A survey of current high energy
astrophysics to a wide range of astrophysical envi-
ronments. These may include topics such as interstellar
medium, supernova remnants, radio galaxies, seyfert galaxies,
intergalactic matter, and quasi-stellar sources.

280. Modern Observing Techniques. (1-5) Three
to fifteen hours of lab per week. Advanced instruction in
observational and reduction techniques making use of the
observing facilities of the Leuschner, Hat Creek and
Lick Observatories, and the facilities of the Department of
Astronomy and the Computer Center Mr. Spinrad (Sp)

286. Advanced X-Ray Astrophysics. (2) Two hours
of lecture per week. Prerequisite: Consent of instructor.
Advanced topics in X-ray astronomy and high energy
astrophysics. May be taken more than once. Mr. Bowyer (W)

287. Techniques and Instrumentation In High En-
ergy Astrophysics. (2) Two hours of lecture per week.
Intrinsic limitations of existing instrumentation in high energy astrophysics and current methods of data
retrieval will be discussed. Basic physical limitations of
existing and potential future instrumentation will be
analyzed. May be taken more than once. Mr. Bowyer (Sp)

200A. Introduction to Current Research. (1) One
hour of lecture per week. Must be taken on a satisfacto-
ry/unsatisfactory basis. Study of a research topic with
an individual student. Mr. Weaver (W)

290B. Introduction to Current Research. (1) One
hour of lecture per week. Must be taken on a satisfacto-
ry/unsatisfactory basis. Study of a research topic with
an individual student. Mr. Vazquez (F)

300. Instruction Techniques In General Astrono-
my. (1) Two hours of lecture per week. Must be taken on
a satisfactory/unsatisfactory basis. Discussion and prac-
tice of teaching techniques as applied to astrono-
my.

602. Individual Study for Doctoral Students. (1-8)
Individual study in consultation with the major field
advisor, intended to provide an opportunity for qualified
students to prepare themselves for the various examin-
ations required of candidates for the Ph.D. (and other doctoral degrees). May not be used for unit or resi-
dence requirement for the doctoral degree. Must be
taken on a satisfactory or unsatisfactory basis.

The Staff (F, W, Sp)

See Interdepartmental Studies for complete descrip-
tions of the following courses:

IDS 252A. Stellar Structure and Evolution. (3)
IDS 252B. Stellar Structure and Evolution. (3)
IDS 253. Astrophysical Spectroscopy. (3)
IDS 254. High Energy Astrophysics. (4)
IDS 285. Theoretical Astrophysics Seminar. (2)

Biochemistry

Department Office, 401 Biochemistry Building

Professors: Bruce N. Ames, Ph.D. Stuart M. Linn, Ph.D.
Clement E. Bellou, Ph.D. Robert N. Tjian, Ph.D.
Frederick H. Carpenter, Ph.D. Jesse C. Rabkowitz, Ph.D.
Michael J. Chamberlin, Ph.D. (Chairman) (Emeritus)
Donald L. Cole, Ph.D. Howard K. Schachman, Ph.D.
Charles A. Dekker, Ph.D. Allan W. Wilson, Ph.D.
Charles A. Derse, Ph.D. (Emeritus) (Emeritus)
Edward E. Penhoet, Ph.D. Esmoond E. Snell, Ph.D.
H. A. Barker, Ph.D. (Emeritus) (Emeritus)

Associate Professor: Howard K. Schachman, Ph.D.

Assistant Professors: Randy W. Soehken, Ph.D.

Professor: C. Arthur Knight, Ph.D. Robert T.H. Tjian, Ph.D.

Adjunct Professor: James A. Bassham, Ph.D.

Giovanna Fero-Fuzzi Ames, Ph.D.

Dottoressa in Biologia

Lecturer:

Mark D. Alper, Ph.D.

Harold O. Kammen, Ph.D.

Edward E. Penhoet, Ph.D.

Randy W. Soehken, Ph.D.

C. Arthur Knight, Ph.D.

Jesse C. Rabkowitz, Ph.D.

Howard K. Schachman, Ph.D.

Allan W. Wilson, Ph.D.

Esmoond E. Snell, Ph.D.

(Chairman)

(Chairman)

(Chairman)
Departmental Major Advisers: Mr. Ames, Mr. Ballou, Mr. Cole, Mr. Dekker, Mr. Linn.
Graduate Advisers: Mr. Carpenter, Mr. Penhoet, Mr. Schekman.

The Undergraduate Major. The Department offers two programs for the major: Plan I for students expecting to pursue graduate study in biochemistry, and Plan II for those who do not. Students in Plan I may elect the honors program.

The Major

Lower Division. Chemistry 4A–4C (or 1A–1B and 5); Chemistry 12A–12B (or 8A–8B for those expecting to follow upper division Plan II, see below); Mathematics 1A–1B–1C; Physics 8A–8B–8C (or 5A–5B–5C); Biology 1A–1B.

Recommended: Plan I: Additional courses in biological and physical science; a reading knowledge of one foreign language (German, French, Japanese, Russian).

Upper Division. Plan I: Biochemistry 100A–100B–100C; Biochemistry 101A–101B; Biochemistry 190; Chemistry 109A–109B (or 14 and 110A, 110C); Chemistry 12–14 (13 units); Plan II: Biochemistry 100A–100B–100C; Biochemistry 101A–101B; Biochemistry 190; Chemistry 109A–109B; Related electives (8 units).

Recommended: Plans I and II: additional courses in biochemistry and in allied subjects, chosen in accordance with a plan approved by the departmental advisor.

Transfer students: Note that Chem 5 is a prerequisite for Biochem 101A and cannot be taken concurrently with Biochem 100A because of a schedule conflict.

Honors Program. A student enrolled in the major under Plan I who has an overall grade-point average of 3.0 or higher and a grade-point average of 3.3 or higher in courses acceptable in the major may, with the approval of the major advisor, enroll in the honors program no later than the beginning of the senior year. In addition to the courses prescribed under the Plan I major, the student in this program will be required to complete 4 units in course 180 and to write a thesis based on the research. 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 an average of at least 3.3 in biochemistry courses and in those courses acceptable in the major. To graduate with honors, a student must also have a cumulative grade-point average of 3.3 or higher on all work completed in the University.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Study

The Department offers the M.A. degree (under either Plan I or Plan II as described in the Graduate Division section of this catalogue), and the Ph.D. degree. All students working for the Ph.D. degree are required to serve as teaching assistants for two quarters. For information concerning the requirements of either degree consult a graduate advisor in the Department.

Lower Division Courses

20: Current Topics in Biochemistry. (1) One 1-hour lecture per week. Prerequisite: sophomore standing or consent of the instructor. A course intended primarily to acquaint potential biochemistry majors with developments in this area. Typical topics include: genetic control of biochemical processes, molecular action of vitamins and hormones, biochemistry of evolution, mechanism of catalysis in living systems, membrane lipid structure, and others. 3 hours of lecture per week. (May be taken concurrently, with consent of the instructor.) The Staff (F, W, Sp).

295: Biochemistry Seminar. (1) One 1-hour lecture per week. Prerequisite: graduate standing in biochemistry or consent of instructor. With approval of instructor a student may enroll in only one-third of 295 for 2 units of credit. 201A. Purification and characterization of enzymes not previously described in the literature.
201B. Biochemical genetics of bacteria and their viruses and biochemical aspects of viral physiology and virology. Three 1-hour lectures and three 3-hour laboratories per week. M. Rabinowitz, Ms. G. Ams (W); Mr. Schekman (Sp).

*302. Biochemistry of Carbohydrates. (3) Three hours of lecture per week. Prerequisite: a course in biochemistry or consent of instructor. The role of complex carbohydrates in cell recognition, aggregation and coagulation, with examples drawn from bacterial, fungal and mammalian systems. Mr. Ballou (F).

*303. Structure and Function of Eukaryotic Cellular Membranes. (2) Two hours of lecture per week. Prerequisite: courses 100A–100B–100C or consent of instructor. The arrangement and biogenesis of eukaryotic cellular membranes, their role in the assembly and compartmentalization of cell organelles, and the function of the cell surface in various cell cycle events. (Related course on prokaryotic membranes, Bact. 207 offered in alternate years.) Mr. Schekman (W).

*304. Biochemistry of Proteins. (3) Three hours of lecture per week. Prerequisite: courses 100A–100B–100C or consent of instructor. The chemistry, or chemical properties of enzymes, and characteristics of the amino acids that represent about 50% of the total protein weight of the cell. Application of physical methods and separation techniques. Mr. Dekker (F).

206. Physical Biochemistry. (5) Four and one-half hours of lecture per week. Prerequisite: courses 100A–100B–100C or consent of instructor. Biochemical concepts and physical, theoretical and computer methods and the analysis of the structures and properties of nucleic acids and their proteins. Mr. Dekker (W).

210. Comparative Biochemistry. (2) Two hours of lecture per week. Prerequisite: Graduate standing. Open to undergraduate students who have received a passing grade in an upper division Biochemistry or Molecular Biology course. Contributions of comparative biochemistry to the molecular basis for fundamental biological, evolutionary, and ecological concepts of organisms. Mr. Wilson (Sp).

211. Introduction to Research in Biochemistry. (2–6) Prerequisite: graduate standing or consent of instructor. An introduction to research in biochemistry or an allied field, and consent of instructor. An introduction to the research laboratory for first-year graduate students. Lectures, laboratories, and conferences conducted in the laboratory by a member of the staff.

*213. Enzyme Synthesis and Control. (3) Three 1-hour lectures per week. Prerequisite: courses 102 or 100A–100B–100C and a course in genetics. Biochemical mechanisms that control the pathway of genetic expression with an emphasis on prokaryotic cells. Regulation of transcription and translation.

Mr. Chamberlin (W).

*214. Mechanisms of Enzyme Action. (3) Three 1-hour lectures per week. Prerequisite: course 102 or 100A–100B–100C, physical chemistry and advanced biochemistry, or consent of instructor. Concepts of the mode of action of enzymes. The modes of binding of substrates and the role of enzymes as pro tease inhibitors. Analysis of the thermodynamics and kinetics of these reactions. Catalytic mechanisms utilized by enzymes; and correlation of 3-dimensional structure and function. Mr. Kirsch (F).

285. Research Seminar. (1) One or two hours of lecture per week. Prerequisite: Biochemistry 602 or 604 taken concurrently, or completion of physical sciences. Two lectures and one hour of discussion. The Staff (F, W, Sp).

290. Seminar. (1) Graduate student seminar in biochemistry dealing with various topics which differ from year to year. The program will include several sections each quarter, each emphasizing different aspects of biochemistry. The Staff (F, W, Sp).

295. Biochemistry Seminar. (1) One hour of lecture and one hour of discussion and recitation per week. Students attend the weekly departmental research seminar given by an invited scientist. On the following day.
day, the students and a faculty member discuss the seminar for one hour. Must be taken on a satisfactory/unsatisfactory basis. Mr. Kammens in charge (W).

296. Research. (3-12) Formerly 280. Thesis research for graduate students majoring in biology. Students must enroll for not less than 3 units, except by special permission of the chairman of the department. The Staff (F, W, Sp).

299. Special Study for Graduate Students. (2-4) Reading and conference for properly qualified graduate students in biology under the direction of a member of the staff. The Staff (F, W, Sp).

602. Individual Study for Doctoral Students. (1-9) Individual study in consultation with the major field advisor, provided that a proposal for qualified students will be made for the various examination requirements of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral dissertation. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp).

Biology

Department Office, 4583 Life Sciences Building

Professors: Herbert G. Baker, Ph.D. (Botany); Paul Licht, Ph.D. (Zoology); Charles S. Nickl, Ph.D. (Physiology); William B. N. Berry, Ph.D. (Molecular Biology); John Gorter, Ph.D. (Pharmacology); William A. Jensen, Ph.D. (Paleontology); John A. West, Ph.D. (Botany); Frederick H. Pitt, Ph.D. (Zoology); Russell L. Jones, Ph.D. (Botany); Russea L. Jones, Ph.D. (Botany). Associate Professors: John E. Simmons, Ph.D. (Zoology); Wayne Sousa, Ph.D. (Zoology); Marilee H. Wake, Ph.D. (Zoology); Alexander J. Horn, Ph.D. (Mechanical and Environmental Engineering); William Z. Cande, Ph.D. (Geology); Carl S. Hickman, Ph.D. (Paleontology); Paul Licht, Ph.D. (Zoology); Robert C. Colwell, Ph.D. (Physiology). Assistant Professors: Mark D. Goldstein, Ph.D. (Botany); G. Steven Martin, Ph.D. (Zoology); Mark A. Clark, Prof. (Hydrology and Environmental Engineering); Carole S. Hickman, Ph.D. (Botany); Wayne Sousa, Ph.D. (Zoology).

Lecturer: Pat Wilde, Ph.D. (London Berkeley Laboratory).

Field Major in Biological Sciences

Field Major Office, 4583 Life Sciences Building

Major Advisers: Plan A, Option I: Mr. W. Z. Cande, Mr. S. Martin; Plan A, Option II: Ms. A. J. Brothers, Mr. W. A. Jensen; Plan B, Mr. Stent, Mr. Gerhart (F); Plan C, Mr. R. Barrett, Mr. J. Bartolomei, Mr. T. Duncan, Mr. J. Patton, Mr. W. Sousa; Plan D: Ms. C. Hickman, Mr. R. Smith, Mr. J. West.

This program serves the needs of students who can profit from broader training in the biological sciences than is possible in a departmental major. Four plans are offered under the Department of Biology, namely A, specialization in functional biology; B, specialization in systematic biology and morphology; C, specialization in ecology; and D, specialization in the area of marine biology.

Lower Division Courses. Required of all students in the major: Chemistry 1A-1B (6 units); Chemistry 8A-8B (5 units); Mathematics 16A (4 units); Physics 6A-6B, 6C (12 units); Biology 110A-110B (3-5 units); Genetics 100 (5 units); Genetics 110 (5 units); Genetics 131 (4 units); Entomological Sciences 100 (2 units) and Entomological Sciences 103L (2 units); Zoology 107A-107B (5-5 units), or Zoology 108A-108B (5-5 units) or Entomological Sciences 100 (5 units); Zoology 105 (6 units); Botany 105 (4 units); Botany 105L (5 units); Botany 120 (5 units); Botany 121 (5 units); Botany 125 (4 units); Botany 145 (4 units), or Entomological Sciences 103 (2 units) and Entomological Sciences 103L (2 units); Botany 140 (3 units); Botany 150 (4 units); Botany 150L (5 units); Botany 160 (4 units); Botany 160A-160B (3-3 units); Zoology 140 (6 units); Zoology 142 (4 units) or Zoology 143 (10 units) or Zoology 144 (10 units); Botany 150 (4 units); Botany 150L (5 units); Botany 150T (10 units); Botany 150 (10 units); Botany 150T (10 units); Botany 150 (10 units); Botany 150T (10 units); Botany 150 (10 units); Biomedical and Environmental Health Sciences 160A (4 units); one quarter course or summer course (4 unit minimum) at a marine laboratory; additional upper division courses in biological science to complete a minimum of 45 units of upper division work in the major.

Honors Program. The honors program consists of completion of Biology H196, Proseminar in Biology (1 unit), and two quarters of Biology H195, Special Study for Honors Candidates (6 units total), followed by a written report.

Single Subject Teaching Credential in Life Science. All credential candidates must be certified under the provisions of the California Teacher Preparation and Licensing Law. A bachelor's degree in Biology is recommended. A minor in a related subject (high school) is also recommended. Some courses are taken at the University of California, Berkeley. The School of Education, Student Personnel Office, Room 1615 Tolman Hall, early in their university career so that a program may be planned for meeting credential requirements. For a list of specific requirements, please refer to the Announcement of the College of Education for courses on the List.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Research Facilities

The electron microscope laboratory is an instructional and research unit of the College of Letters and Science. It houses equipment for use in electron microscopy—transmission and scanning microscopy and freeze fracture studies. The staff is skilled in all standard techniques of sample preparation and most specialized areas. The Laboratory provides informal training in addition to the formal courses it offers under the auspices of other departments (see below). Qualified graduate students, postdoctoral associates, faculty and research staff in biological or physical sciences may make special arrangements for individual training, and for use of the instruments, once they are trained. Nominal charges are made for use of the Laboratory for individual research work (schedule available on application). With permission of the Director, equipment can be used outside normal hours (8 AM-8 PM weekdays). The Laboratory provides demonstrations of the electron microscope and preparative techniques for on-campus courses and for arrangements for four groups on occasion. For further information contact the Director, 1581 Life Sciences Building.

Lower Division Courses

1A-1B: General Biology, (3-3-4) 1A—1B: Three hours of lecture and one hour of discussion per week. 1A: One 3 hour laboratory every other week. 1B—1C: One 3 hour laboratory every week. Prerequisite: Chemistry 1A (Sem. System) or Chemistry 1A—1B (Qtr. System). Chemistry 1C strongly recommended. Biochemistry 1A—1B recommended concurrently. Biology 1A taken previously by students will be equivalent to Biology 1C. Biology 1C is a prerequisite for Biology 2A—2C. Intended for students majoring in the biological sciences, but open to all qualified students. Biology 1A: Cell Structure and Function; Biology 1B: Organismic Form and Function, Biology 1C: Introduction to Ecology and Evolution. 1A: Mr. Stent, Mr. Gerhart (F); 1B: Mr. Martin, Mr. Wilt; 1C: Mr. Jensen, Mr. Rowell (Sp).

2. Topics in Biology. (2) Two hours of discussion per week. Prerequisite: preference given to freshmen, consent of instructor required. Reading and discussion of the literature on particular topics in the field of biology. May be repeated for credit, with consent of instructor, to a maximum of 8 units taken in different quarters. May be repeated for credit, with consent of instructor, to a maximum of 8 units taken in different quarters.

10. Marine Resources. (4) Three hours of lecture and 2 hours of laboratory per week. Prerequisite: open without prerequisite to all students and designed for those not specializing in the biological sciences. A consideration of the general role of marine organisms in man's activities. Emphasis is placed on the food chain and its relationship to the commercial fisheries and aquaculture. Mr. West (Sp).

11A—11B. Introduction to the Science of Living Organisms. (4-8) Three hours of lecture and three hours of laboratory per week. Prerequisite: Chemistry 1A—1B (Qtr. System) or Chemistry 1A-1B (Sem. System) recommended. Intended for students not majoring in Biological Science and for non-science majors. Principles of biological organization and functioning using examples from the animal and plant kingdoms. Similar in scope to Biology 1 except that knowledge of physical sciences is not required nor assumed. Science credits in the fall. Both parts must be completed for acceptance toward completion of the breadth requirement in the College of Letters and Science. Students may not receive credit for this course if they have credit for both Zoology 10 and Botany 10; or course 1A—1B. Mr. Cande, Mr. Martin (F, W).

12. Molds and Humans. (4) Three 1-hour lectures per week and one 2-hour laboratory per week. Prerequisite: open without prerequisite to all students and designed for those not specializing in the biological sciences. An introduction to the microbiology of the microbial flora in the human body with special emphasis upon their interactions with humans. Topics will include human disease, crop disease, fermentation, antibiotics, ecodys, drugs and poisons, waste disposal, composting, storage rots, protein production, chemical conversions, industrial use, etc.
Upper Division Courses

100. Problems in Marine Biology. (15) Full-time study at the Bodega Marine Laboratory. Prerequisite: Biology 1 or 11 and consent of instructor. Lectures, laboratory and field directed study on selected topics, stressing experience in original research. Mr. Hand, Mr. Smith (Sp)

150. General Ecology, (4) Three hours of lecture and one hour of laboratory per week. Prerequisite: Biology 1A-1B or 11A-11B; or the equivalent. An introduction to the principles of ecology, stressing the structure and dynamics of natural ecosystems, designed for biological science majors. Mr. Sousa

151. Microbial Ecology, (4) Two 1/2-hour lectures and one 3-hour lab demonstration per week. Prerequisite: General Biology 102 or 112A-112B. An introduction to microbial communities and their environments. Physical and chemical properties of soil and aquatic habitats; cycling of elements; activities of bacteria, fungi, protozoa; population dynamics. Limited enrollment. Mr. Schneider, Mr. Balmuth, Mr. Horne (Sp)

153. Developmental Biology, (3) Three hours of lecture per week. Prerequisite: course 1A-1B. An introduction to principles of embryonic and postembryonic development, stressing mechanisms of cell regulation, self assembly of macromolecular aggregates, relations of signaling and skeletal elements, and cell differentiation. Mr. Wilt (Sp)

100A–100B. Marine Geobiology, (3–3) Two hours of lecture and two hours of laboratory and one hour of discussion per field trip per week. Prerequisite: Biological Oceanography 103; and course 1A-1B. Interrelations of oceanographic, geologic, and biological marine sciences. See the course catalog for the list of available seminars and the geologic record. 100A: Geobiological cycles with emphasis on microorganisms; 100B: The oceanographic and geologic context of modern and recent biota. 100A: Ms. Hickman (W); 100B: Mr. Berry, Mr. Wilde (Sp)

**167. Biogeography, (3) Three hours of lecture per week. Prerequisites: senior or graduate standing; principles underlying patterns of geographic distribution and dispersal of organisms, based on critical analysis of evidence from biogeographic groups, especially those of the eastern hemisphere. The Staff (F)

H189. Special Study for Honors Candidates, (3) Prerequisite: H-189. Study, followed by a written report, with any faculty member in the Departments of Biology and Agriculture. May be repeated for credit. Ms. Wako (W, Sp)

H198. Proseminar in Biology, (1) One 1-hour meeting per week plus individual conferences as required. Upper division standing with an overall grade point average of 3.3 or better in the major. Reporting and group discussion on plans of individual students. Mr. Wako (F)

199. Supervised Independent Study and Research (1–5). Prerequisite: Background courses in chosen subjects. Enrollment is restricted by regulations listed on page 38. Must be taken on pass/no pass basis. The Staff (F, W, Sp)

Graduate Courses

221. Comparative Physiology and Endocrinology Seminar, (1) One hour of lecture per week. Prerequisite: permission of the instructor. Reviews and reports of current research in vertebrate endocrinology and physiology. Offered on a satisfactory/unsatisfactory basis. Mr. Licht, Mr. Nicoll, Mr. Bern (F, W, Sp)

**250. Tropical Biology—an Ecological Approach, (2) One 1-hour lecture and 3 hours of laboratory and field work per week. Prerequisite: graduate status in a biological discipline and a course in general scientific literature. Dynamics of tropical biota and their relationships to tropical environments; an intensive field course in Costa Rica offered in cooperation with the Organization for Tropical Studies: Jan–Feb, July–Aug. Biology 250 is sponsored by the Graduate Council. Mr. Baker, Mr. Colwell

301A–301B. Professional Preparation: Teaching of College Science, (4–4) One 1-hour lecture and 2 hours of laboratory per week. Prerequisite: graduate standing and appointment as a teaching assistant, or consent of instructor. Principles of teaching biology at the college level. Weekly seminars on approaches to biology, teaching methods, evaluation, and analysis of current problems in general biology to be taken on a satisfactory/unsatisfactory basis. The Staff (F, W)

Molecular Biology 10. Introduction to Molecular Biology. (3) See Molecular Biology for the complete description of this course.

Medical Physics 10. Atomic Radiation and Life. (4) See Medical Physics for the complete description of this course.

Nutritional Sciences 10. Survey of Nutritional Sciences. (3) See Nutritional Sciences for the complete description of this course.

Interdepartmental Studies 10A–10B–10C. Man and His Environment—Crisis and Conflict, (5–5–5) See Interdepartmental Studies for the complete description of this course.

Botany 431. Techniques of Electron Microscopy for Biologists. (3) See Botany for the complete description of this course.

Anatomy 495. Freeze-Etch Electron Microscopy. (2) See Physiology-Anatomy for the complete description of this course.

Biophysics and Medical Physics

Department Office, 103 Donner Laboratory

Professors:

Edward L. Alpen, Ph.D.
John W. Golman, M.D., Ph.D.
Edward S. Bearden, Ph.D.
Robert K. Mortimer, Ph.D.
Thomas H. Jukes, Ph.D.
John H. Northrop, Ph.D.
John W. Golman, M.D., Ph.D.
Cornelia A. Tobias, Ph.D.
Alexander V. Nichols, Ph.D.
Helen J. von Delft, Ph.D.
Robert M. Glaeser, Ph.D.

Lecturers:

John W. Golman, M.D., Ph.D.
John H. Northrop, Ph.D.
John W. Golman, M.D., Ph.D.

Graduate Study

Graduate degrees available under the supervision of the department are the Ph.D. in Biophysics, the Ph.D. in medical physics and master's degrees in biophysics and biotechnology. Graduate degrees are available to students who satisfy the requirements of the Graduate Group in Biophysics and Medical Physics.

Graduate Study

Graduate Courses

Medical Physics 10. Atomic Radiation and Life. (4) Three hours of lecture and one hour of discussion per week. Basic aspects of atomic radiations with examples from biomedical and physical fields. Provides liberal arts as well as science students with a framework for evaluating the complex changes associated with the atomic era.

10. Medical Physics Option

10A. Radiation and Biophysics, (4) Three hours of lecture and 3 hours of laboratory per week. Prerequisite: Physics 6C or 5E, Chemistry 11B, 151A-151B or equivalent with consent of instructor. For students who are preparing to do an introductory course in radiation biology. The Staff (W)

10B. Radiation Biology, (4) Three hours of lecture and four hours of laboratory per week. Prerequisite: Physics 6C or 5E, Chemistry 11B, or equivalent with consent of instructor. For students who are preparing to do an introductory course in radiation biology. Mr. Hayes, Mr. Nichols (F)

111. Biophysical Laboratory, (4) Two hours of lecture and 6 hours of laboratory per week. Prerequisite: junior or senior standing in biophysics or biology: physics major or alternative of biophysical sciences.

NOTE: For key to symbols, see page 36.
Radiation Biophysics

211. Molecular Radiation Biology. (3) Two 1 1/2-hour lectures per week. Analysis of the action of ionizing, ultraviolet and visible radiation on cells and viruses in relation to their effects on molecular biology. Emphasis is placed on the theoretical foundations for the study of macromolecules and intermolecular complexes. To include chemical and physical phenomena associated with increased atherogenesis in relation to their effects on molecules of biological interest, radiomimetic chemicals, intracellular repair of radiation damage in nucleic acids. Mr. Tobias (F)

212. Mutagenesis and Radiation Genetics. (3) Two 1 1/2-hour lectures per week. Genetic effects of radiation and chemotherapy. Mutagenic mechanisms, induced genetic recombination, chromosome breakage and rearrangement. Mr. Wolff (W)

213. Mammalian Radiation Biology. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 211 or permission of instructor. Analysis of the actions of ionizing, ultraviolet and visible radiation on mammalian cells and mammalian organ systems. Cell cycle; normal and abnormal cell kinetics; recovery phenomena; internally incorporated radiolabels; long term effects; environmental interactions. Mr. Tobias (F)

214. Radiological Physics. (3) Two 1 1/2-hour lectures per week. Prerequisite: Mathematics 104A or 121A or equivalent; Biology 1A-1B or consent of instructor. The representation of complex biological systems by differential equations and automata models. Dynamical systems. Chemical dynamics. Epidemiological and ecological models. Optimal control, model fitting and optimization. Medical applications. Survey of mathematical methods. Mr. Odell (F)

Cellular Biophysics

201. Membrane and Lipidoprotein Structure. (3) Three hours of lecture per week. Prerequisite: upper division courses in atomic and molecular physics (e.g., course 137); and physical chemistry, or consent of instructor. Characterization of biological membranes and lipidoprotein macromolecules by physical techniques. Emphasis is placed on the theoretical foundations for each of the physical methods. Topics include nerve myelin, plasma membrane, membrane junctions and fusion, energy transducing membranes, and serum lipoproteins. Mr. Owicki (W)

202. Electrical and Transport Properties of Membranes. (3) Two 1 1/2-hour lectures per week. Analysis of electrical function, structure, resistance, and conductance; electro-diffusion and ion movement; propagation of nerve impulses; models and theories. 204A-204B-204C*. 204A: Mr. Nicholls (W)

205. Radiation Biophysics. (3) Two 1 1/2-hour lectures per week. Analysis of the action of ionizing, ultraviolet and visible radiation on cells and viruses in relation to their effects on molecular biology. Emphasis is placed on the theoretical foundations for the study of macromolecules and intermolecular complexes. To include chemical and physical phenomena associated with increased atherogenesis in relation to their effects on molecules of biological interest, radiomimetic chemicals, intracellular repair of radiation damage in nucleic acids. Mr. Tobias (F)

212. Mutagenesis and Radiation Genetics. (3) Two 1 1/2-hour lectures per week. Genetic effects of radiation and chemotherapy. Mutagenic mechanisms, induced genetic recombination, chromosome breakage and rearrangement. Mr. Wolff (W)

213. Mammalian Radiation Biology. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 211 or permission of instructor. Analysis of the actions of ionizing, ultraviolet and visible radiation on mammalian cells and mammalian organ systems. Cell cycle; normal and abnormal cell kinetics; recovery phenomena; internally incorporated radiolabels; long term effects; environmental interactions. Mr. Tobias (F)

214. Radiological Physics. (3) Two 1 1/2-hour lectures per week. Prerequisite: Mathematics 104A or 121A or equivalent; Biology 1A-1B or consent of instructor. The representation of complex biological systems by differential equations and automata models. Dynamical systems. Chemical dynamics. Epidemiological and ecological models. Optimal control, model fitting and optimization. Medical applications. Survey of mathematical methods. Mr. Odell (F)

Medical Physics

IDS 210. Physical Basis of Radiology and Nuclear Medicine. (3) See Interdepartmental Studies for the complete description of this course.

232A-232B. Medical Physics of Pathologic Processes. (2-2) Two hours per week. 232A. Carcinogenesis. Evaluation of current status of evidence; environment and public health carcinogenesis and an attempt to integrate such evidence into a consistent picture. Leading concepts concerning development of malignancy will be considered in detail.

232B. Atherogenesis. Examination of factors and processes associated with increased atherogenesis in arterial systems. Identification of pathological aspects of abnormal metabolic states at molecular, cellular and tissue levels; review of risk factors in human atherosclerosis, with emphasis on blood lipoproteins. 285A-285B-285C. Biophysics Group Prossem. (1-1-1) One hour per week. Current topics in the biophysical sciences. Must be taken on a satisfactory/unsatisfactory basis. Faculty of the Graduate Group in Biophysics and Medical Physics. (F, W, Sp)

285L. Biophysics Group Prossem Laboratory. (2) Eight hours of laboratory per week. Introduction to research programs that are actively in progress in laboratories of Faculty of the Graduate Group in Biophysics and Medical Physics for which credit is desired. Must be taken on a satisfactory/unsatisfactory basis. Faculty of the Graduate Group in Biophysics and Medical Physics. (F, W, Sp)

290. Seminar. (1-1-3) One and one-half hours of semiar per week. Graduate student seminars in biophysical areas including cellular, radiation, medical and theoretical biophysics. Seminars will offer several sections covering different topics; topics will be announced each quarter. Enrollment in more than one section is permitted. The Staff (F, W, Sp)

295. Special Topics in Biophysics and Medical Physics. (1-3) One to three hours of lecture per week. Prerequisite: same as for other Biophysics graduate courses. Lecture courses at advanced level offered as result of current interests of faculty & graduate students. Recent topics have included: electron spin resonance of biomolecules, tumor biology—diagnosis therapy, biophysical energy conversion processes, scanning electron microscope in biology, chemotherapy, three dimensional image reconstruction, views of cancer. The Staff (F, W, Sp)

299. Individual Research: Biophysics and Medical Physics. (1-12) Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1-8) Individual study for the comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

Biotostastics

Graduate Programs and Degrees

The Group in Biostatistics offers two graduate programs: M.A. and Ph.D. These programs are appropriate for students who have either a strong mathematical and biological background with a great interest in the biomedical sciences, or degrees in the biological sciences with a major interest in mathematics and statistics. For further information, consult the graduate advisers, Mr. Brand, Mr. Chiang, Miss Scott.

The M.A. degree can be obtained under Plan I or Plan II, but students must proceed directly to the Ph.D. program.
Preparation for Graduate Study

It is realized that few of the entering students will be prepared in mathematics, statistics, and the subject matter required. Most prerequisites, however, can be made up during the first year of graduate study. Minimum entrance requirements consist of two full-year courses in calculus, and one-year courses in mathematics or biology, or a one-year course in mathematical statistics or biostatistics, and in biology, zoology, or physiology.

Research Facilities

Graduate students in the group have direct access to a small electronic computer and also have available to them the services of the University Computer Center. A unique facility available to group members is the O'Neil R. Collins, Ph. D.

Watson M. Laetsch, Ph.D.

William A. Jensen, Ph.D.

Rudolf Schmid, Ph.D.

Thomas O. Duncan, Ph.D.

graduates with the fundamental aspects of plant structure and function of plants. They must demonstrate a reading knowledge of one foreign language (see above) in their first year of graduate work, and they are expected to attend Botany 395 or Biology 301A-301B the first time they are Teaching Assistants and graduate seminars (Botany 290 or equivalent) for two quarters of each of the first and second years of graduate study. Students' further course work will be planned with an advisory committee during the first quarter and subsequently with the major professor and the graduate adviser. Students should note that faculty of the Department of Botany are members of several graduate groups described in appropriate bulletins of the Graduate Division. Students may enroll in such group programs with a faculty member of Botany as their major professor. For further details on the requirements for the M.A. and the Ph.D. degrees, as well as the facilities available for graduate study in botany, please consult the graduate advisers.

The Botanical Garden in Strawberry Canyon provides opportunities for research with living plants, supplies teaching material for classes on campus, and serves as an outdoor laboratory for students: its collections are especially rich in succulents, South American, South African, European, and Australian plants. The combined University and Jepson Herbaria offer a world-wide, Floristic, Geographic, Historical, and Library which provide a foundation for basic research in systematic botany, ecology, physiology, and evolution, not only for faculty, staff, and students but also for visiting scholars and for biological studies throughout the United States and the world. For further information on the Botanical Garden, see Index.

Prequisites: For cogent reasons, but rarely, instructors will consider accepting in courses students who do not have all of the prerequisites. Prerequisites are stated in terms of Berkeley courses but equivalent courses taken elsewhere will be acceptable.

Lower Division Courses

*11. General Botany. (5) Three 1/2-hour lectures and two 1-hour laboratories per week. Prerequisites: Biology 1A-1B. Emphasis will be on the structure, life history and relationships of the major groups of plants. Mr. Kaplan (F)

*13. Practical Botany. (2) One 3-hour laboratory-workshop per week to be given at the Botanical Garden. Prerequisites: Consent of instructor; fundamentals of plant physiology, taxonomy, and morphology as related to the principles and practice of ornamental horticulture. To be taken on a pass/no pass basis. Mr. Ornulf (F)

10. Plant Biology. (4) One 1-hour lecture and one 1-hour audiotutorial study session (to be arranged by students) per week. Open without permission to all students and designed for those not specializing in the biological sciences. Emphasis of the course is placed on the fundamental concepts of biology as illustrated by the structure and function of plants. Mr. Jensen (F)

Upper Division Courses

101. Survey of Mycology. (5) Two 11/2-hour lectures and two 3-hour laboratories per week. Prerequisite: Biology 1A-1B; course recommended. See above for the full description of each laboratory. Mr. Duncan (W)

102. General Phycolgy. (5) Two 11/2-hour lectures and two 3-hour laboratories per week. Prerequisite: Biology 1A-1B; course recommended. An emphasis is on morphology, phylogeny, and systematics. Laboratories include study of representative types, identification of field-collected specimens for culture, and simple experiments on development and reproduction. Mr. Collins (W)

104. Marine Botany. (10) Full-time study at Bodega Marine Laboratory in the first half of the semester, including lectures, laboratory, field work and special problems, with emphasis on marine algae. Prerequisite: Biology 1A-1B; course recommended. Arrangements must be made well in advance for a place in the class and for personal accommodations. Inquiries regarding details are to be addressed to: The Director, Bodega Marine Laboratory, P.O. Box 247, Bodega Bay, California 94923.

105. Principles of Plant Morphology. (5) Three 11/2-hour lectures and two 3-hour laboratories per week. Prerequisite: Biology 1A-1B; course recommended. An analysis of the structural diversity of multicellular plants, particularly of angiosperms, with emphasis on the developmental mechanisms responsible for this variation in form and the significance of this diversity in relation to the evolution of the plants. Mr. Orr (Sp)

*110. Evolutionary Morphology of Vascular Plants. (5) Two 11/2-hour lectures and two 1-hour laboratories per week. Prerequisites: Biology 1A-1B and course 105 recommended. An analysis of the evolution and comparative morphology of vascular plants studied from the viewpoint of both fossil and living representatives. Mr. Baker (Sp)

112. Anatomy of Vascular Plants. (5) Two 11/2-hour lectures and two 3-hour laboratories per week. Prerequisite: Biology 1A-1B; course recommended. A consideration of the functional and developmental aspects of cell, tissue, and organ structure, including comparisons of species to such pollination, dispersal, and water availability. Mr. Collins (Sp)

115. Plants and Man. (4) Two 11/2-hour lectures and 2 hours of demonstration per week. Prerequisite: Botany 1A-1B and course 105 recommended. An introduction to the evolution of domesticated and the cultural evolution of man. Mr. Baker (F)

120. Taxonomy of Seed Plants. (5) Three 11/2-hour lectures and two 3-hour laboratories per week. Prerequisite: Biology 1A-1B; course recommended. A course of high school level on classification and biology or botany. Mr. Collins (W)

*128. Computer-assisted Methods in Systematics and Ecology. (4) One 1-hour lecture, one 2-hour discussion, and one 4-hour open laboratory per week. Mr. Collins (W)

NOTE: For key to symbols, see page 32.
Prerequisite: one course in systematic or taxonomic biology and one course in ecology. An examination of the morphological adaptations and physiological mechanisms involved in the control of development and reproduction. A project using computer-assisted methods in systematics and ecology including computer-assisted taxonomic analysis, evolutionary estimation, and information retrieval. A project using these methods will be conducted by each student. 

Mr. Duncan

124. Field Course in Plant Taxonomy and Ecology. (10) Full-time study in the first half of the summer at the University of California Field Station at Sagle Creek, near Truckee, California. Field course 124 is devoted to the study of physiological tolerances of plants and the nature of limiting factors of the environment as they influence patterns of distribution and diversity. Course 124 consists of three 1-hour lectures per week and two 3-hour laboratories per week. Arrangements must be made well in advance for a place in the class and for personal accommodations. Inquiries should be addressed to the Department of Botany, University of California, Berkeley, California 94720.

125. The California Flora. (4) Two 1-hour lectures and two 3-hour laboratories per week. The relation of California plants and plant communities to soils, climate, geological history and recent history. The use of keys for the identification and identification of the native and introduced members of the California flora. 

Mr. Ornduff (Sp)

130. Plant Cell Biology. (6) Three 1-hour lectures and one 4-hour laboratory per week. Prerequisite: Biology 1A-1B and Chemistry 8A, 8B. A synthesis of morphological, biochemical, and genetic information on cell function, structure, and development. 

Mr. Canaday

144. Plant Physiology. (5) Three 1-hour lectures and two 3-hour laboratories per week. Prerequisite: Biology 1A-1B and Chemistry 8A, 8B. A study of the physiology of higher plants. Prepared for biology field majors. Not open to students who have taken course 145. 

Mr. Feldman (F)

146. Maintenance Physiology and Development. (5) Three 1-hour lectures and three 3-hour laboratories per week. Prerequisite: Biology 1A-1B; Chemistry 8A, 8B; Biochemistry 102. Emphasis on water relationships, ion uptake, and developmental physiology of higher plants. Designed primarily for Botany majors. Not open to students who have taken course 144.

Mr. Jones, Mr. Feldman (Sp)

154. Plant Ecology. (3) Three 1-hour lectures per week. Prerequisite: Biology 1A-1B and Biology 150. The structure, development, and history of the vegetation of higher plants. Emphasis on field and laboratory investigations of the plant community. 

Mr. Ornduff (Sp)

158. Laboratory in Plant Ecology. (2) Two 3-hour laboratory periods per week. Prerequisite: Biology 1A-1B or consent of instructor. Laboratory for course 154 in Plant Ecology.

*159. Seminar for Botany Majors. (2) One 1-hour meeting per week. Prerequisite: Senior standing Botany majors. Students have the opportunity to discuss topics of botanical interest. Must be taken on a pass/no pass basis. 

195. Special Study for Honors Candidates. (1-6) Prerequisite: eligibility for admission to the Honors Program. 

The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1-3) Enrollment is restricted to students listed on page 36. Additional limitations: at least one upper division course in Botany and an overall grade-point average of at least 3.0. Must be taken on a pass/no pass basis. 

The Staff (F, W, Sp)

Graduate Courses


Mr. West (F)

*210. Plant Ecology. (4) Two hours of lecture and three hours of laboratory per week. Prerequisite: course 101 or 110. An advanced treatment of the biology of arbores. Given every two or three years.

Mr. Duncan, Mr. Ornduff (F)

224. Evolutionary Ecology. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: course 120 or equivalent and permission of instructor. Lectures will consider the morphological, cytological, biochemical, and experimental foundations of plant systematics, the variation patterns that exist in nature, the taxonomic problems that these patterns pose and methods for the solution of these problems. Laboratories consist of advanced techniques in data gathering and data analysis. 

Mr. Duncan, Mr. Ornduff (F)

226. Plant Interactions. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: course 120 and Genetics 100. A survey of processes involved in the development and maintenance of ecolo- gical associations between plants and animals. Given in alternate years.

Mr. Baker (Sp)

249A–249B–249C. Advanced Plant Physiology. (4-4-4) Meetings with the faculty for an evening of discussion every two to three weeks. Prerequisite: Consent of instructor. No one quarter of 249 is prerequisite to another.

249A. Intensive reading and analysis of the literature on water relations, transpiration, translocation of inorganic nutrients and organic solute transport. Designed for candidates for the Ph.D. in the area of plant physiology. Given every sixth quarter, beginning Fall 1976.

Mr. Jones, Mr. Jacobson (F)


Mr. Jones (Sp)

249C. Intensive reading and analysis of the literature in plant growth and development. Designed for candidates for the Ph.D. in the area of plant physiology. Given every sixth quarter, beginning Fall 1977.

Mr. Jones (F)

259. Advanced Plant Ecology. (3) Three hours of discussion per session. Prerequisite: an upper division course in plant ecology and consent of instructor. Intensive reading and analysis of the literature in the field of plant ecology. Designed for candidates for the Ph.D. in the area of plant ecology.

290. Seminar. (2) One 1-hour meeting per week. Prerequisite: consent of instructor. Advanced study in various fields of botany. Topics will be announced in advance of each quarter. Enrollment in more than one quarter is not permitted. Prerequisite: Must be taken on a satisfactory/unsatisfactory basis. 

The Staff (F, W, Sp)

299. Research. (1-2) Graduate student research. Must be taken on a satisfactory/unsatisfactory basis. 

The Staff (F, W, Sp)

395. Botanical Teaching. (2) One 2-hour lecture per week. Prerequisite: open to all graduate students in the Department of Botany. The course will cover the aims and methods of teaching botany at the college and university level. All new Teaching Assistants in the department are expected to enroll. Must be taken on a satisfactory/unsatisfactory basis. 

2431. Techniques of Electron Microscopy for Biologists. (2) Two 1-hour lectures per week. Prerequisite: graduate standing, approval of major professor, and consent of instructor. The purpose of this course is to familiarize students with the principles and theory of electron microscopy. May be taken without Botany 431L. 

2431L. Laboratory on Techniques of Electron Microscopy for Biologists. (3) Three 3-hour laboratory periods per week. Prerequisite: graduate standing, approval of major professor. Offered in alternate years. Course 431L must be taken concurrently with Botany 431L. The purpose of this course is to prepare graduate students to use the techniques to use electron microscopy in their research. 

2432. Individual Study for Doctoral Students. (1-6) Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or resident requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. 

The Staff (F, W, Sp)

Botany Colloquium. (0) One 1-hour meeting per week. Meetings for the presentation of original work by the faculty, visiting lecturers, and graduate students. 

The Staff (F, W, Sp)

Buddhist Studies

Group Major Office, 4115 Dwinelle Hall

Professors: Robert N. Boltz, Ph.D. (Sociology and Comparative Studies) James Caffal, Ph.D. (History of Art) 

Robert Goldman, Ph.D. (South & Southeast Asian Studies) 

Padma Mohee, Ph.D. (History of Art) 

Associate Professors: James E. Bosson, Ph.D. (Oriental Languages) 

Barend A. van Nooten, Ph.D. (South and Southeast Asian Studies) 

Chairman: P. S. Jaini 

Graduate Adviser: Lewis R. Lancaster

Group Major in Buddhist Studies

The Group in Buddhist Studies offers an interdisciplinary program of study and research leading to the Ph.D. degree in Buddhist Studies. The Group, which cooperates closely with the Department of South and Southeast Asian Studies and the Department of Oriental Languages, emphasizes the close ties of religion with the social, economic, and political developments of the region. Students who wish to join the program may choose either an emphasis in Sanskrit or in an East Asian language, i.e., Chinese or Japanese. For those who choose the Sanskrit emphasis, the required secondary language will be Chinese or Tibetan; for the Chinese/Japanese emphasis, the required secondary language will be Sanskrit.

Preparation. For admission to the graduate program the student shall have completed an M.A. in one of the following appropriate Asian languages or have equivalent language preparation. Early in the student's doctoral career, written examinations in two modern languages must be passed. These languages must be relevant to the student's program and have the approval of the graduate adviser.

Further information about the program, including a full statement of the requirements for advancement to candidacy, is available upon request from the Group Office.

212. Advanced Seminar in Buddhist Studies. (4) Three 1-hour lectures per week. Prerequisite: consent of instructor. Specialized topics in Buddhist Studies, involving the use of Sanskrit, Tibetan, and Chinese materials. May be repeated for credit with consent of instructor. 

Mr. Lancaster (in charge) (F, W, Sp)

Chemistry

Staff and courses are listed under the College of Chemistry.

Choice of College

A student can complete a major in chemistry in either the College of Letters and Science (A.B. degree) or the College of Chemistry (B.S. degree). Both curricula are approved by the American Chemical Society, and either is a satisfactory foundation for a career in chemical industry, for the teaching of chemistry, or, if completed with high academic standing, for graduate work in chemistry.
Chemistry Major in the College of Letters and Science

Major Office, 420 Latimer Hall
Major Adviser: Mr. Cason

Major Requirements

Mathematics: 1A, 1B, 1C.
Physics: 4A, 4B, 4C, 12A, 12B, 12C, 104A, 110A, 110C, 112, and a choice of 105, 106, 107, or 111A–111B. (For students who wish to transfer to the American Chemical Society, this must be 111A–111B.)

Enough additional units in upper division chemistry and allied subjects to make a total of 30.

Honors Program. In addition to completing the requirements for the major in chemistry, a student in the honors program must (a) earn a grade-point average of at least 3.3 in upper division courses in the major and major in the University; and (b) be recommended upon passing H114, 121, or 127 with a grade of B-1- or higher in at least 3 units of at least 3.3 in upper division courses in the major.

Field Major in Physical Sciences

Students interested in this major please see Physical Sciences for the description of the major program.

California Teaching Credential

For information concerning the California Teaching Credential (Single or Multiple Subject), see the Announcement of the School of Education.

Graduate Study in Chemistry

Students interested in graduate study are referred to the Chairman of the Department of Chemistry, 419 Latimer Hall, for information.

Classics

Department Office, 5303 Dwinelle Hall

Professors: John K. Anderson, M.A., F.S.A. (Graduate Adviser) (Classical Archaeology)
William S. Anderson, Ph.D.
Peter R. Brown, B.A.
John P. Wilson, Ph.D.
(Chairman)

Crawford H. Greenewalt, Jr.
Professor:

Mark Griffith, Ph.D.

Anthony W. Bulloch, Ph.D.

Robert C. Knaap, Ph.D.

Associate Professors:

Ronald S. Stroud, Ph.D.

Joseph Fontenrose, Ph.D.

Robert W. Rodger, Ph.D.

Leslie L. Thrale, Ph.D.

Stephen G. Miller, Ph.D.

Florence V. Mastonrad, Ph.D.

Donald J. Masstromade, Ph.D.

Robert K. Krueger, Ph.D.

Departmental Major Advisers: (Greek, Latin, Classical Languages) Mr. W. S. Anderson (W, Sp), Mr. Bulloch, Mrs. Goldstine.

Departmental Graduate Advisers: (Classics) Mr. Griffith, (Classical Archaeology) Mr. J. K. Anderson.

The Department of Classics offers a complete undergraduate and graduate program in Greek and Latin languages, literature, and civilizations. It groups its courses of instruction under the headings of Greek, Latin, and Classics. The object of the Greek and Latin courses is to teach students how to read the great works of ancient literature in the original languages, and to acquaint students with the achievements of classical civilization. The purpose of the undergraduate courses called Classics is to give the student instruction in Greek and Roman civilization in all its phases—literature (read in translation), mythology, religion, government, and archaeology. The latter courses require no knowledge of Greek and Latin. The graduate courses, all of which are designated Classics, are advanced courses in Greek, Latin, and classical archaeology, all requiring knowledge of one or both of the languages.

The Majors

The Department of Classics offers three undergraduate majors: Greek, Latin, and Classical Languages.

Major in Greek. Greek 1-2 or 1A-1B-1C; 40A-40B-40C (may be taken concurrently with upper division courses 100, 101, 102, 103; 12 units chosen from other upper division Greek courses; 16 units chosen either from additional upper division courses in Greek or from recommended upper division courses. Recommended: courses in Classics, Greek, Sanskrit (see South and Southeast Asian Studies), Art 140A, 140B, 141, History 110A–110B.

Major in Latin. Latin 1, 2, 20, 30 or equivalent; 40A-40B-40C (may be taken concurrently with upper division courses 100, 101, 102, 103; 12 units chosen from Latin 145 and/or Latin 150; 16 units chosen either from additional upper division courses in Latin or from recommended upper division courses. Recommended: courses in Classics, Greek, Sanskrit (see South and Southeast Asian Studies), Art 144, History 111A–111B.

The Major in Classical Languages. Greek 1-2 or 1A-1B-1C; Latin 1, 2, 20, 30 or equivalent; Greek 40A-40B-40C or Latin 40A-40B-40C (may be taken concurrently with upper division courses 100, 101, 102, 103; 12 units chosen from Greek 115 and/or Latin 145; 150; (c) either Greek 150A or Latin 160, (d) three quarters of either Greek 155 or Latin 155 taken during the senior year. Latin (a) the major program, including Latin 160 and at least one part of both Greek 115 and Greek 120; (b) three quarters of Greek 115 taken during the senior year. Latin (a) the major program, including Latin 160 and at least one part of both Greek 115 and 150; (b) three quarters of Latin 115 taken during the senior year. Classical Languages: (a) the major program; (b) at least two courses chosen from Greek 115, Greek 120, Latin 145, Latin 150; (c) either Greek 150A or Latin 160, (d) three quarters of either Greek 155 or Latin 155 taken during the senior year.

To be admitted to the honors program, students must have a grade-point average of 3.3 or higher overall in the University and 3.3 or higher in the courses in the major. They may graduate with Honors, High Honors, or Highest Honors, the level to be determined by the Honors Committee of the Department.

Substitutions: Under exceptional circumstances the undergraduate adviser is empowered to authorize substitution for any required reading course numbered 100 to 107, if such substitution is deemed necessary and advisable.

Letters and Science List of Courses: 182 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Intercollegiate Center for Classical Studies in Rome. There will be an opportunity for some Classics majors to attend the Intercollegiate Classical Center at Rome. This is an intercollegiate program for classical undergraduates. All students interested in this program should consult the Major Adviser.

Preparation for Graduate Study

To enter graduate study in Classics, students should complete a minimum of 10 in Classical Languages or a satisfactory equivalent). For those desiring only a Masters Degree in Greek or Latin, the corresponding major in Greek or Latin suffices. These programs should be regarded as minimum requirements. Students are urged to supplement the requirements for the major in Classical Languages with two or three senior reading courses (Greek 115 or Latin 145 or 150). They are strongly advised also to have an adequate reading knowledge of French and German, since they must pass examinations in both for the Ph.D. degree, and in one of them (or in Italian, which is also recommended) for the M.A. degree; furthermore, without both French and German they will be greatly handicapped in graduate study of classical subjects (and they will find Italian very useful too). Prospective graduate students in Classics should also take upper division prose composition in both languages (Greek 115 and Latin 160A–B); they will need competence in both Greek and Latin composition for the Ph.D. qualifying examinations.

The Graduate Major

The Master of Arts degree may be taken in Greek, Latin, Classics (each under Plan B: a program of 35 units in graduate and advanced undergraduate courses, and a series of examinations), or Classical Archaeology (under Plan A: a program of 30 units of graduate and advanced undergraduate courses, and a dissertation).

The Doctor of Philosophy degree may be taken in Classics or Classical Archaeology. Whatever the graduate students' principal interest—literature, history, philosophy, archaeology, or other subjects—they should take a broad program and acquaint themselves with every field of classical study. They must read widely in Greek and Latin authors and in Greek and Roman history, since both M.A. and Ph.D. qualifying examinations require an extensive knowledge of literature and history. They are especially advised to enter courses in epigraphy, paleography, comparative grammar, and Greek dialects when they are offered, since the interval between offerings of each is at least three years. The graduate program is varied from year to year so that in a normal period of graduate study students may take courses in several fields and periods. For details of the M.A. and Ph.D. programs consult the graduate adviser.

Classics

Courses that do not require a knowledge of Greek or Latin. Courses in this group are designated Classics 10A, Classics 10B, etc.

10A–10B. The Golden Age of Greece. (4-4) Three 1-hour lectures per week. Roman civilization in its greatest age (133 B.C.–14 A.D.) as revealed in the works of its statesman, poets, and historians. Translations of Greek and Latin authors and in Greek and Roman history, and art. 10A is not prerequisite to 10B.

11A–11B. The Golden Age of Rome. (4-4) Three 1-hour lectures per week. Roman civilization in its greatest age (133 B.C.–14 A.D.) as revealed in the works of its statesman, poets, and historians. Translations of Latin classics studied in their historical and social setting, will illustrate the formation of the Roman state and its emergence as a world capital. 11A is not prerequisite to 11B.

17A–17B–17C. Elementary Course in Classical Archaeology. (4-4-4) Three 1-hour lectures and one 1-hour discussion per week. 17B or 17C may be taken first.

17A. The development of Greek Civilization from the Late Bronze Age to 700 B.C. as illustrated by the monuments of Mycenae and Troy (F).

17B. Monuments of Greek civilization 700-300 B.C., with particular reference to the life of the citizen. (F)

17C. Monuments of western civilization from the Hellenistic Age to the Age of the Antonines, with particular reference to urban development and provincial organization. (W, Sp)

29. The Classical Myths. (4) Two 1-1/2 hour lectures per week. A study of Greek, Roman, and Indian myths with emphasis on the universal meanings of ancient traditions. The interaction of myth, religion, and philology as a means of understanding some aspects of past and present cultures. (L)
175C. Topography and Monuments of Rome and Ancient Italy (F).
175D. Topography and Monuments of Asia Minor.
176A—176B. Ancient Greek and Roman Religion. (4—4) Three 1-hour classes per week. Individual conferences to be arranged. The worship of the gods in ancient Greece and Rome; cults and religious ideas.
176A. Greece.
176B. Rome.
Mr. Bulloch (W).

180. Ancient Athletics. (4) Three 1-hour classes per week. Study of ancient athletes and athletics including athletic training, facilities, competitions, and the role of athletics in Greek and Roman society.
Mr. Miller (F).

185. Political and Social Thought of the Ancient World. (4) Three 1-hour lectures per week. A study of individual plays and the concept of the comic genre in the works of Aristophanes, Menander, Plautus, and Terence.

195A. Society and the Supernatural from Marcus Aurelius to Symeon Stylites. (4) Three 1-hour class meetings per week. The role of athletics in Greek and Roman society. Mr. Threatte (W), Mr. Griffith (Sp).

197. Readings in Mythology. (1) One hour of laboratory per week. Prerequisite: course 100. Must be taken concurrently with course 175, for students prepared to read relevant texts in Greek.

H195B—H195C. Honors Course in Greek. (3—3—3) Prerequisite: appropriate linguistic preparation and eligibility for admission to the honors program. Latin independent study over three quarters, terminating in the writing of a thesis, which will be evaluated by an Honors Committee of three members. The written thesis is to be submitted to all three members of the committee no later than three weeks before the Monday of examination week of the final quarter, and the student shall be permitted to receive the level of honors and grade no later than the Monday of examination week. Credit and grade awarded upon completion of the sequence.

199. Directed Group Study for Advanced Undergraduates. (1—5) Prerequisite: restricted to senior honor students.

196. Directed Group Study for Advanced Undergraduates. (1—5) Enrollment is restricted by regulations on page 36. Additional restrictions: limited to senior honor students. Must be taken on a passed/not passed basis.
Staff (F, W, Sp).

Latin

Lower Division Courses
(Courses in this group are designated Latin 1, 2, 20, 30, etc.)

1. Latin for Beginners. (6) Five 1-hour class meetings per week. First part of two-part course in elementary Greek. Mr. Mastronarde (Sp).
2. Greek for Beginners. (6) Five 1-hour class meetings per week. Second part of two-part course in elementary Greek. Mr. Mastronarde (W).
3. 100A. Greek literature to 300 B.C. (4—4) Three one-hour lectures per week. An introduction to the literature of ancient Greece and Rome: cults and religious ideas.
4. 100B. Latin literature under the Roman Empire. Mr. W. S. Anderson (Sp).
5. 100C. Latin literature under the Roman Republic. Mr. Rosenmeyer (W).

Upper Division Courses

101. Homer. (4) Three 1-hour class meetings per week. Prerequisite: course 100. Mr. Nagler (W).
102. Plato. (4) Three 1-hour class meetings per week. Prerequisite: course 100. Mr. Rabinowitz, Mr. Stroud (W), Mr. Rabinowitz, Mr. Stroud (Sp).
103. Drama: Euripides (4) Three 1-hour class meetings per week. Prerequisite: course 100. Mr. Threatte (Sp).

110. Latin Workshop. (12) Formerly 12, Intensive elementary instruction in Latin, the equivalent of Latin 1, 2 and 20 or 30. Prepares students for all upper division Latin courses. Prerequisite: Instructor's permission. Not open to students who have received credit for DISG Humanities 12L.

12. Latin for Beginners: Intensive Course. (6) Five 1-hour class meetings per week. Introduction to Latin grammar and selected readings in prose and poetry. Not open to students who have received credit in Latin 1 or 2. Successful completion allows student to go directly into Latin 20.

14A—14B. Beginning Latin: Self-paced Course. (1—1—4) Material covered is the same as in Latin 1—2. Students begin at one level. Divided into 6 parts, each equivalent to 1 unit. Mandatory enrollment for 2 units; one unit may be taken with special permission only if more than 2 units may be taken. Six units of unit credit beyond the requisite 2 will be awarded at the end of the quarter. If 2 units do not fulfill the 12 unit study requirement, student shall receive grade no later than the end of the quarter. The 12 unit minimum must be sought from the dean of the student's college. Admission subject to instructor's approval. (F, W, Sp).

20. Introduction to Latin Prose. (4) Formerly 3. Three 1-hour class meetings per week. Prerequisite: one of the following: course 2, 12, 148B or equivalent. Reading in Latin literature with emphasis on reviewing grammar and developing ability to read prose. Course is prerequisite to all subsequent Latin courses. Competency at this level may be established by an examination
administered during pre-registration week of each quarter. (F, W, Sp)

30. Introduction to Latin Poetry. (4) Formerly 5. Three 1-hour class meetings per week. Prerequisite: Latin 20 or equivalent established by examination. Selections from Latin literature with emphasis on developing ability to read poetry. Course is prerequisite to all upper division Latin poetry courses. (F, W, Sp)

40A-40B-40C. Intermediate Latin Composition, Grammar and Sight Reading. (4-4-4) Formerly 9A-9B. Development of skills in writing of Latin prose and sight reading: review of grammar. Prerequisite: ability to read poetry. Course is prerequisite to all selections from Latin literature with emphasis on development of Roman political institutions. Latin 10 or equivalent established by examination. Staff (W). Mrs. Goldstine (Sp)

9B-9C. Development of skills in writing of Latin prose and poetry from Cassiodorus to the Italian Renaissance, concentrating on outstanding periods such as the Carolingian Revival and the twelfth century, with reference to the classical tradition and its influence. Three 1-hour class meetings per week. Prerequisite: course 10 or 20. Mrs. Goldstine (F).

Upper Division Courses

104. Vergil. (4) Three 1-hour class meetings per week. Prerequisite: course 10 or 30. Mr. W. S. Anderson (F).

106. Horace: Odes and Epodes. (4) Three 1-hour class meetings per week. Prerequisite: course 10 or 20. Selected readings. (F)

107. Cicero. (4) Three 1-hour class meetings per week. Prerequisite: course 10 or 20. Mr. Knapp (W), Mr. Murgia (Sp)

150A. Sallust. (4) Three 1-hour class meetings per week. Reading of Sallust. Staff (F, W, Sp)

150B. Seneca. Mr. Thrette (Sp)

150C. Cicero. Mr. Knapp (F)

**150E. Livy.**

150F. St. Augustine.

155A. Prudentius. (4) Three 1-hour meetings per week. Prerequisite: course 107. Reading of Prudentius.

155B. Poets of the Myth of Rome. (4) Three 1-hour meetings per week. Prerequisite: course 107. Reading of the poets of the myth of Rome.

155C. Ammianus Marcellinus. (4) Three 1-hour meetings per week. Prerequisite: course 107. Reading of Ammianus Marcellinus.

160A-160B. Advanced Latin Prose Composition. (4-4) Formerly 109A-109B. Three 1-hour class meetings per week. Advanced instruction in the writing of Latin prose. Mr. Murgia (W), Mr. Goldstine (Sp)

166. Latin Verse Composition, (4) Two 1 1/2 hour class meetings per week. Prerequisite: Latin 160. Advanced instruction in the writing of Latin verse in various meters.

177. Ovid, The fasti. (4) Three 1-hour class meetings per week. Prerequisite: course 104 and 106. Combining reading in the Fasti with a study of Roman monuments, religion, calendar and astronomy, and history. Mr. Knapp (Sp)

188. Sources for Roman History. (4) Three 1-hour class meetings per week. Reading of texts for which students in the graduate program in ancient history and archaeology are held responsible.

H195A-H195B-H195C. Honors Course in Latin. (3-3-3) Prerequisite: appropriate linguistic preparation and eligibility for admission to the honors program. Largely independent study over three quarters, terminating in the writing of a thesis, which will be evaluated by an Honors Committee of three members. The written thesis is to be submitted to all three members of the committee no later than three weeks before the Monday of examination week of the final quarter, and the committee shall agree upon the level of Honors and grade no later than the Monday of examination week. Credit and grade awarded upon completion of the sequence. Staff (F, W, Sp)

198. Directed Group Study for Advanced Undergraduates. (1-6) Prerequisite: restricted to senior honor students. Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1-6) Enrollment is restricted by regulations on page 36. Additional restriction: limited to senior honor students. Must be taken on a passed/not passed basis. Staff (F, W, Sp)

Classics

Graduate Courses

For new students: Classics 200A is prerequisite to all other graduate courses in Greek, without special permission. Classics 200B is prerequisite to all graduate courses in Latin, without special permission.

Courses vary from year to year and are not necessarily given in alternating years.

200A-200B. Proseminar. (4-4) Two 1 1/2-hour class meetings per week. An introduction to the general literature of classical philology, to methods of research, and to textual criticism.

200A. Proseminar to Greek. Mr. Mastronarde (F)

200B. Proseminar to Latin. Mr. Murgia (W)

201A-201B-201C. Survey of Greek Literature. (4-4-4) Two 1 1/2 hour class meetings per week. A sequence of readings and lectures on the Greek literature for which advanced graduate students are held responsible. To be offered in alternate years.

21A. Early Greek, Homer through Choral Lyric. Mr. Knapp (Sp)

21B. Tragedians and Historians of the Fifth Century. Mr. Mastronarde (W)

21C. From Aristophanes to Hellenistic Literature. Mr. Rosenmeyer (Sp)

202A-202B-202C. Survey of Latin Literature. (4-4-4) Two 1 1/2 hour class meetings per week. A sequence of readings and lectures on the Latin literature for which advanced graduate students are held responsible. To be offered in alternate years.

202A. Early Latin through Cicero. Mr. Murgia (W)

202B. Augustan Literature.

202C. Post-Augustan Literature.

210A. The Language of Homer. (4) Two 1 1/2-hour class meetings per week. An introduction to the early history of the Greek language using the evidence of the Linear B tablets and the Homeric poems. Problems of phonology, morphology, and syntax will be studied and an introduction provided to the major dialect divisions and their significance for Homer.

210B. Homer. (4) Two 1 1/2 hour class meetings per week. Language, meter, and questions of oral poetry. Mr. Nagler (Sp)

211. Heaslop. (4) Two 1 1/2 hour class meetings per week.

212. Greek Lyric Poets. (4) Two 1 1/2-hour class meetings per week.

212A. Earlier. Mr. Griffith (F)

212B. Later.

213. Greek Dramatists. (4) Two 1 1/2 hour class meetings per week.

213A. Aeschylus.

213B. Sophocles.

213C. Euripides. Mr. Mastronarde (Sp)

213D. Aristophanes.

213E. Menander.

214. Greek Epigraphy. (4) Two 1 1/2 hour class meetings per week. Mr. Stroud (W)

NOTE: For key to symbols, see page 36.
215. Greek Historians. (4) Two 1/2-hour class meetings per week.

216. Greek Literature. (4) Two 1/2-hour class meetings per week.

217. Greek Orators. (4) Two 1/2-hour class meetings per week.

218. Greek and Latin Romance. (4) Two 1/2-hour class meetings per week.

220. Hellenistic Poetry. (4) Three one-hour meetings per week. A study of the major writers of one of the most important periods in Greek literature (amongst whom Callimachus, Theocritus, Apollonius Rhodius, the Greek anthropists). Mr. Bulloch (W).

221. Introduction to Papyrology. (4) Two 1/2-hour class meetings per week. An introduction to reading, transcribing, and editing Greek and Latin papyri, seeking to evoke an appreciation for the historical, legal, social, and literary contributions of papyrology to the knowl
e of the classical world.

222. Greek and Latin Linguistics. (4) Two 1/2-hour class meetings per week.

224. Roman Society and Roman Law. (4) Two 1/2-hour class meetings per week. The social, legal, and administrative background to the literary sources for the Roman Empire. Mr. Knapp (F).

245. Latin Literature of the Middle Ages. (4-4) Two 1/2-hour class meetings per week. Select problems in Roman Imperial history from 59-235 A.D.

256. Topics in Late Antiquity and Byzantine Literature. (4) Two 1/2-hour class meetings per week. Investigation of a topic in late antiquity or Byzantine litera
ture. Mr. Brown (Sp).

270A-270B. Seminar In Classical Archaeology. (4-4-4) Two 1/2-hour class meetings per week. Advanced study of ancient Greek art objects and sites. (270A) Mr. J. K. Anderson (Sp)

270B. Tacitus. Mr. J. K. Anderson (Sp)

271. Pan-Hellenism and Nemea. (4) One 3-hour meeting per week. In addition to providing an opportu

273. Introduction to Roman Literature. (4) Two 1/2-hour class meetings per week. An introduction to the major writers and themes of Roman literature.

230A. Plautus. Mr. W. S. Anderson (F)

230B. Persius and Juvenal. (Sp)

231A. Lucretius. Mr. W. S. Anderson (F)

231B. Vergil. Mr. W. S. Anderson (F)

231C. Post-Vergilian.

232. Roman Philosophers and Rhetoricians. (4) Two 1/2-hour class meetings per week.

233. Roman Epic Poets. (4) One 1/2-hour class meetings per week. 

234. Roman Lyric Poets. (4) Two 1/2-hour class meetings per week.

235. Roman Pastoral and Elegiac Poets. (4) Two 1/2-hour class meetings per week. 

236. Roman Satirists. (4) Two 1/2-hour class meetings per week. 

237. Latin Historians. (4) Two 1/2-hour class meetings per week.

238. Roman Drama. (4) Two 1/2-hour class meetings per week.

239. Roman Lyric Poets. (4) Two 1/2-hour class meetings per week.

240. Latin Literature of the Middle Ages. (4-4) One 2-3 hour class meeting per week.

241. Latin Literature of the Early Middle Ages, 500-900 A.D. Special attention will be given to the classical tradition and its influence.

242. Latin Literature of the High Middle Ages, 900-1300 A.D. Study of the evolution of medieval style with special attention to twelfth and sixteenth.
foreign language and either classical Latin or classical Greek including two courses beyond Greek 100, (3) demonstrate, through either examination or course work, a sense of the historical development of their primary language, and (4) satisfactorily write the wording of an honors thesis in Comparative Literature H198. Students interested in the honors program are urged to consult an adviser in the Department of Comparative Literature at their earliest opportunity.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

The Graduate Program

The M.A. program normally prepares students for doctoral work at Berkeley or, when taken in conjunction with the appropriate teaching credential, leads to the award of a teaching credential in addition to encouraging research involving the study of literary documents in more than one language. Additional information may be sought from the instructor in charge of graduate studies in the Department of Comparative Literature.

Undergraduate Preparation. Students interested in the graduate program in Comparative Literature at Berkeley are advised that strong undergraduate preparation in at least two foreign languages will speed up their work at the graduate level. A reading knowledge of two foreign languages is required for the M.A., and a reading knowledge of four foreign languages (including both Greek or Latin and French or German or Russian) is required for the Ph.D.

Requirements for the M.A. Degree. A minimum of 36 approved graduate and upper division units including (1) at least 18 graduate units, (2) at least two introductory graduate courses in Comparative Literature, and (3) work in at least two separate ancient or modern literatures (for example, English and Italian), one of which must be studied in depth and the other in areas relevant to the student’s aims and interests. The required course work in individual literatures depends upon the student’s previous training but must include at least two courses (totaling not fewer than 8 units) in each of two foreign languages. Courses in at least two additional languages (not fewer than 10 units and including two or more graduate courses) must be taken in the major literature. Courses on foreign literature in English translation may not be counted in satisfaction of the requirements listed above. The first year of graduate study is usually spent preparing for the M.A. written examination on a list of approved texts selected by the student in consultation with the advisor, but students working in Oriental or Near Eastern literatures should expect to spend at least two additional quarters preparing for the degree.

Requirements for the Ph.D. Degree. While only one graduate seminar is formally required beyond the M.A., students have the responsibility of preparing themselves through course work and reading, for the written and oral doctoral qualifying examination on (1) the development of one literature with heavy emphasis on the principal periods and the major authors and (2) two additional literatures in only one period each. After consultation with the advisor, students may request to be examined on only two literatures if the student has satisfied the period of specialization requirement in the 180 required units. The doctoral qualifying examination may not be taken until all four foreign-language reading requirements have been satisfied. There is a final oral examination on the dissertation and its immediate area.

Lower Division Courses

1A-1B. English Composition in Connection with the Reading of World Literature: Honors Section. (4-4) Three 1-hour lectures and discussion periods and one tutorial meeting per week. Prerequisite: Subject A examination or course. 1A or equivalent course is prerequisite to 1B.

Expository writing based on analysis of selected masterpieces of ancient and modern literature. The Staff (F, W, Sp)

1H1A—1H1B. English Composition in Connection with the Reading of World Literature: Honors Section. (4-4) Three 1-hour lectures and one tutorial meeting per week. Prerequisite: (a) Subject A examination, (b) a 3.00 grade-point average in high school English, (c) a reading knowledge of an ancient or modern foreign language, and (d) permission of the instructor in charge of Comparative Literature 1A—1B. The honors section is limited to 10 qualified freshmen who meet as a group for round-table discussion and attend weekly tutorial lectures. In addition to the core reading, individual assignments provide each student with opportunity to exploit his or her linguistic and literary training. The Staff (F, W, Sp)

2A—2B-2C. Composition in Connection with the Reading of World and French Literature. (5—5—5) Three 1-hour lectures per week. Prerequisite: three years of high school French with a B average. Course open only to entering freshmen. Expository writing done in connection with the reading of selected masterpieces of ancient and modern literature and study of selected French texts read in the original. Course will prepare students for more advanced work in French literature. The Staff (F, W, Sp)

40A—40B—40C. World Literature and Literature. (4—4—4) Three 1-hour lectures and one hour of discussion per week. A study of women as portrayed in literature, and of women writers. The topic will vary from quarter to quarter; a student may take no more than two topics. The Staff (F, W, Sp)

104—104B. Introduction to Literary Forms. (4—4—4—4) Two 1-hour lectures and one hour meeting per week. Comparative study of Eastern and Western literary masterpieces of world literature. *114A. Forms of the Epic. Mr. Damon

114B. Forms of the Novel. Mr. Miller (W)

114C. Forms of the Drama. Mr. Maser (Sp)

114D. Forms of the Lyric. Mr. Larson (F)

114E. Forms of the Cinema. Mr. Augst

Upper Division Courses

Group I: Unrestricted Courses

(Open to all students in the upper division; enrollment not limited.)

112A—112B. Introduction to Modern Greek. (5—5) Three 1-hour lectures and one hour meeting per week. Comparative study of modern Greek as literature from the years of classical Greek at college, including a course on Homer and a course on either Plato or a dramatist. Modern Greek literature is approached through morphology and syntax studied in comparison with Attic Greek; reading of selections of progressive length and complexity. The Staff (W, Sp)

120. The Biblical Tradition in Western Literature. (4) Three 1-hour lectures per week. Examination of selected aspects of the Biblical tradition and their relevance to the study of literature. Mr. Alter (Sp)

125. The Mystical Tradition in Literature. (4) Two 1-hour lectures and one 1-hour meeting per week. A survey of the major concepts in the philosophy of mysticism and their expression in literary form. Examples of mysticism drawn from at least one Western and one Eastern tradition, with emphasis on key problems such as love and sex, social justice and individual fulfillment. Mr. Nagler (W)

*145A—*145B. Byzantine Literature. (4—4) Three 1-hour lectures and discussion periods per week. Survey of the development of the principal literary forms of the Byzantine empire from the fourth to the mid-nineteenth century. 145B: later Byzantine literature from the mid-nineteenth century. The Periods. 151—155, 157—158, 162—163. Foreign reading and discussion or permission of the instructor; in addition, graduate students in Comparative Literature wishing to enroll in one of these courses must know at least one foreign language in addition to the primary materials studied therein. Lectures and discussion are in relation to one period of literary history in related literatures. *151A—*151B—*151C. The Ancient Mediterranean World. (4—4—4) Three 1-hour lectures and discussion periods per week. Mr. Rosenmeyer

152A—*152B—152C. The Middle Ages. (4—4—4) Three 1-hour lectures and discussion periods per week. Mr. Dietr (F), Mr. Monroe (Sp)

*153A—153B—153C. The Renaissance. (4—4—4) Three 1-hour lectures and discussion periods per week. Mr. Larson (W), Mrs. Clubb (Sp)

*154A—*154B—*154C. Enlightenment and Romanticism. (4—4—4) Three 1-hour lectures and discussion periods per week. Mr. Johanssen (F); Mr. Hughes (W)

155E. Fiction of the Americas. (4) Three 1-hour lectures and one 1-hour discussion period per week. Prerequisite: at least four quarters in one foreign language and at least two quarters in lower division or upper division literature. Comparative investigation of the interrelationships between modern poetry and modern painting, sculpture, music, and film, with particular emphasis on the period 1875 to the present. Mr. Matlock

157. Literature in the Southern Hemisphere and in areas not limited.)


*180. Mannerism in Art and Literature. (4) Two 1-hour lectures and discussion periods per week. Study of the phenomenon of mannerism, both as a literary and artistic constant as well as an historical developmental period, will be studied by means of drawn and written materials in literature and art. The Staff (F, W, Sp) Mr. Hitchcock (Sp)

*185. Myth and Literature. (4) Two 1-hour lectures and discussion periods per week. Study of the earliest myth-texts on record and the progressive growth of literature out of mythology which has continued to the present day. Myth and oral composition. Emphasis on the development of the various mythological classics; an examination of various literary interpretations of myths as reflected in varying idioms. Mr. Nagler

187. Women’s Perspective in Literature. (4) Three 1-hour lectures and one hour of discussion and exercises per week. Comparative study of women writers or the portrayal of women in the literature of various national cultures. Topics vary from year to year. Miss Masiello (W)

Group II: Restricted Courses

(Designated primarily for students whose major subject is Comparative Literature; sections limited to fifteen students each.)

The Junior Courses

100A—100B. Introduction to Comparative Literature. (4) Three 1-hour lectures and one tutorial meeting per week. Prerequisite: one upper-division literature course in a foreign language or of the history of ideas. This course is designed for students interested in gaining an overview of comparative and interdisciplinary methods and analysis. 1A: lyric, epic, drama. 1B: lyric, narrative. The Staff (W, Sp)

100C. Comparison of Authors: English, French, German. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: course 100 or equivalent, and at least four quarters of comparative literature, including at least one quarter in French or German. Comparison of three important authors, English, French, German; one foreign author must be read in the

NOTE: For key to symbols, see page 36.
original language; examination and substantial comparative paper required. Mr. Weisinger (F)

190B. Comparison of Authors: English, French, Latin. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: course 100 or equivalent, and at least four quarters in upper division literature, including at least one quarter in French or Latin. Comparison of three important authors, English, French, Latin; one foreign author must be read in the original language; examination and substantial comparative paper required. Mr. Anderson (Sp)

190C. Comparison of Authors: English, French, Spanish. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: course 100 or equivalent, and at least four quarters in upper division literature, including at least one quarter in French or Spanish. Comparison of three important authors, English, French, Spanish; one foreign author must be read in the original language; examination and substantial comparative paper required. Miss Huet (W)

*1900. Comparison of Authors: English, Spanish, Italian. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: course 100 or equivalent, and at least four quarters in upper division literature, including at least one quarter in Spanish or Italian. Comparison of three important authors, English, Spanish, Italian; one foreign author must be read in the original language; examination and substantial comparative paper required.

*1900. Comparison of Authors: English, Latin, Greek. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: course 100 or equivalent, and at least four quarters in upper division literature, including at least one quarter in Latin or Greek. Comparison of two or three important authors, English, Latin, Greek; one foreign author must be read in the original language; examination and substantial comparative paper required.

190U. Comparison of Authors: Unlisted Literatures. (4) Individual conferences to be arranged. Prerequisite: course 100 or equivalent, and at least four quarters in upper division literature, including at least one quarter in a relevant foreign language. Comparison of two or three important authors, including at least one belonging only to a literature not listed in the above courses. The works belonging to the literatures unlisted in the other 190 courses must be read in the original languages. Substantial comparative paper required. The Staff (Miss Walker in charge) (F, W, Sp)

Tutotial Courses

H196. Special Honors. (1) Prerequisite: course H1A-H1H. With permission of instructor and approval of the instructor in charge of undergraduate studies in Comparative Literature. Weekly tutorial meetings including oral examination. May give a focal point to the work done in separate courses in literature and to lead to the writing of an honors thesis. Students are limited to H196. May be repeated each quarter until the senior year.

The Staff (Miss Walker in charge) (F, W, Sp)

H198. Honors Course. (1-4) Prerequisite: honors standing in a literature major; permission of the instructor in charge of undergraduate studies in Comparative Literature. Weekly tutorial meetings including oral examination. May give a focal point to the work done in separate courses in literature and to lead to the writing of an honors thesis under the supervision of a member of the faculty.

The Staff (Miss Walker in charge) (F, W, Sp)

199. Directed Group Study for Upper Division Students. (5) Prerequisite: permission of instructor and approval of the instructor in charge of tutorial instruction in areas not covered by regularly scheduled courses.

The Staff (Miss Walker in charge) (F, W, Sp)

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted to regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (Miss Walker in charge) (F, W, Sp)

Graduate Courses

Introductory Graduate Courses

200. Methods of Study in Comparative Literature. (4-4) One 2-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages. Examination of a problem in the comparative study of literature. Mr. Miller (Sp)

212A-*212B. Studies in Contemporary Literature. (4-4) One 2-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages. Comparative investigation of a topic in contemporary Western literature. Mr. Augst

250A-250B. Studies in Critical Theory. (4-4) One 2-hour lecture and discussion period per week. Prerequisite: preparation in Greek and one other foreign language. Comparative investigation of a topic in Western literature. When the course is offered during more than one quarter, credit and grade will be assigned upon completion of sequence.

270-274. Continuing Seminars. (2) One 2-hour lecture period per week. Prerequisite: enrollment of students who have received the M.A. and are studying for their qualifying examinations in Comparative Literature. Discussion is to focus on specific problems of the literature of the period. Must be taken on a satisfactory/unsatisfactory basis.

289. Special Study. (1-6) Primarily for students engaged in preliminary exploration of a restricted field, involving the writing of a report. May not be substituted for the seminar course. The Staff (F, W, Sp)

299. Directed Research. (5-10) When used for doctoral dissertation research, this course must be taken on a satisfactory/unsatisfactory basis.

Graduate Seminars

204A-*204B. Studies in Relations Between Classical and Modern Literatures. (4-4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages, at least one of which must be either Greek or Latin. 204A is not prerequisite to 204B. Comparative investigation of a topic in Western literature involving the study of classical and post-classical documents. Mr. Anderson (Sp)

210A-210B. Studies in Medieval Literature. (4-4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in two medieval languages. 210A is not prerequisite to 210B. Comparative investigation of a topic in Western literature from the fifth century and the fourteenth.

215A-215B. Studies in Renaissance Literature. (4-4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages. 215A is not prerequisite to 215B. Comparative investigation of a topic in Western literature between the end of the Renaissance and the beginning of the contemporary period.

220A-220B. Studies in Neoclassical Literature. (4-4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages. 220A is not prerequisite to 220B. Comparative investigation of a topic in Western literature between the end of the Neoclassical period and the beginning of the contemporary period.

230A-230B. Studies in Oriental-Western Literary Relations. (4-4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in an Oriental or one other foreign language. 230A is not prerequisite to 230B. Comparative investigation of a literary topic requiring the study of both Oriental and Western documents. May vary from year to year. May be repeated for credit.

231A-231B. Studies in Relations Between Near Eastern and Western Literatures. (4-4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in one Near Eastern or European language. Undergraduate students should consult the instructor. 231A is not prerequisite to 231B. Comparative investigation of a literary topic requiring the investigation of both Near Eastern and Western documents. Since topics and texts vary from year to year, the course may be repeated for credit. Mr. Monroe (F)

235A-235B. The Experience of Tragedy. (4-4) One 3-hour lecture and discussion period per week. Prerequisite: course 245A or 245B. Study of the sense of the tragic in Greek, Elizabethan, and 20th century literature; culture and society underlying the respective tragic visions, from Aristotle to Hegel, Nietzsche, and to the existentialist and sociological schools.

240A-240B-240C. Problems in Comparative Literature. (4-4-4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages. Examination of a problem in the comparative study of literature. Mr. Miller (Sp)

245A-*245B. Studies in Comparative Literature. (4-4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages. 245A is not prerequisite to 245B. Comparative investigation of a topic in contemporary Western literature. Mr. Augst

Graduate Tutorial Courses

299. Special Study. (1-6) Primarily for students engaged in preliminary exploration of a restricted field, involving the writing of a report. May not be substituted for the seminar course. The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1-6) Individual study for the comprehensive or language requirements in consultation with the field advisor. Units may not be used to meet either unit or residence requirements for the master's degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1-6) Individual study in consultation with the major field advisor, intended to provide opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

Teachers' Courses

360A-360B-360C. Methods of Teaching Literature and English Composition. (1-1-1) One 1-hour lecture per week. Prerequisite: appointment as a teaching assistant or consent of instructor. Discussion of approaches to teaching composition at the college level in relation to the reading of masterpieces of literature. Designed primarily for teaching assistants in the composition course. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

Computer Science

Computer Science Division Office, 573 Evans

Faculty and Courses

Computer Science Faculty and courses are listed under College of Engineering (see Index)

Choice of College

Undergraduates who wish to major in computer
Announcement of the College of Letters and Science.

Graduate Program

Graduate degree programs are available as preparation for research and teaching (Master of Science and Doctor of Philosophy in Computer Science for Engineering) and for careers in design, development and management (Master of Engineering and Doctor of Engineering). For details on graduate programs and procedures see the Engineering section of this catalog.

Demography

Graduate Group Office, 2234 Piedmont Avenue

Professors:
- Pranab Bardhan, Ph.D.
- Ronald Lee, Ph.D.
- David Briilinger, Ph.D.
- Richard Herr, Ph.D.
- Helen Wallace, M.D.
- Barbara Heyns, Ph.D.
- Melvin Webber, Ph.D.
- Pranab Bardhan, Ph.D.
- Robert Reed, Ph.D.
- Richard Walker, Ph.D.
- Andrew Fisher, Ph.D.
- Carl Mosk, Ph.D.
- Eugene Hammel, Ph.D.
- Robert Reed, Ph.D.
- Barbara Heyns, Ph.D.
- Barbara Heyns, Ph.D.
- Eugene Hammel, Ph.D.
- Eugene Hammel, Ph.D.
- Eugene Hammel, Ph.D.

Associate Professors:
- Pranab Bardhan, Ph.D.
- Richard Herr, Ph.D.
- Helen Wallace, M.D.
- David Briilinger, Ph.D.
- Eugene Hammel, Ph.D.
- Eugene Hammel, Ph.D.
- Eugene Hammel, Ph.D.

Assistant Professors:
- Barbara Heyns, Ph.D.
- Eugene Hammel, Ph.D.
- Eugene Hammel, Ph.D.
- Eugene Hammel, Ph.D.
- Eugene Hammel, Ph.D.
- Eugene Hammel, Ph.D.
- Eugene Hammel, Ph.D.

Acting Associate Professor:
- Kenneth Wachter, Ph.D.

Graduate Program Office, 2234 Piedmont Avenue

The campus-wide Graduate Group in Demography offers general course work at both the undergraduate and graduate levels, as well as professional training leading to the Master of Arts and Ph.D. degrees in Demography. Particular emphasis is placed on the interrelationships between population structure and change and on the social and economic characteristics of populations. Interpretations of historical data are stressed.

The Master’s degree is designed as a final degree for those who wish to pursue a professional career at that level of training, and as a second degree for students earning the doctoral degree in a related discipline. Doctoral students in Demography are required to take a Master’s degree in an allied discipline; the basic course work for the Master’s program is required for the doctoral degree as well. Graduate students already enrolled in the University in other disciplines are admissible to Demography courses if they have completed the prerequisites. Seniors are admissible to the graduate courses by consent of the instructor. There is no undergraduate major.

Students already enrolled in another graduate program at the University of California, Berkeley, who wish to earn a degree in Demography may apply by executing a change of major or addition of major. Students not already enrolled in the University who wish to enter the degree programs or who wish to pursue coursework only, for professional upgrading, should apply to the Chairman. General deadlines for application specified by the Graduate Division apply. The general requirements of the College Senate and the Graduate Division for degree programs apply. For specific degree requirements, please inquire of the Chairman.

Development Studies

L&S: Development Studies / 119

196. Demographic Methods for Anthropology and History. (4) Three hours of lecture per week. An introduction to demographic methods with an emphasis on field interviewing, archival interpretation, data reduction and analysis, and family reconstruction.
- Ms. Howell (Sp)

Graduate Courses

200. Consequences of Population Change. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Economic, social and technological causes of fertility, mortality, nuptiality, migration. Demographic transition theory; sociological and economic theories of fertility; human capital, job search, and family theories of migration. Interventions versus development-in general; economic theories of marriage and divorce.
- Mr. Lee (Sp)


211. Demographic Analysis—Flawed and Incomplete Data. (4) Three hours of lecture per week. Prerequisites: consent of instructor. Emphasis on estimation of demographic rates and structures from flawed or incomplete data. Model schedules and life tables, Brass techniques, adjustment of census enumerations, and estimation of vital rates from census data using stable population techniques; basic population projection methods.

270. Topics in the History of Population. (4) Three hours of lecture per week. Selected pivotal topics in historical demography. Emphasis particularly on western Europe and America, family reconstitution and aggregative analysis, household composition, and historical critique of the theory of demographic transition.
- Mr. Wacht (W)

Related Courses in Other Departments

Economic Demography (Economics 175). (4)


Population Theories (Sociology 123). (8)

Demographic Methods (Sociology 272A–272B). (4–4)

Development Studies

Group Major Office, Institute of International Studies, 209 Moses Hall

Major Advisers: Mr. Jytoldina Das Gupta (Political Science), Head Adviser; Mr. P. K. Bardhan (Economics); Mr. Alain de Janvry (Agricultural Economics); Mr. John J. Gumpert (Anthropology); Mr. Elbaki Hermansah (Political Science); Mr. Lovell Dittmer (Political Science); Mr. David Coller (Political Science); Mr. Louis L. Lowell (Political Science); Mr. Charles Machell (Anthropology); Mr. Robert Reed (Geography); Mr. Carl G. Robert (Director, IIS).

Group Major in Development Studies

The program in development studies offers an opportunity for a systematic study of the problems, processes and prospects of the development of human and material resources in the developing areas of the world. The problems of development and underdevelopment are enormous and enormously complex, and they transcend the boundaries of conventional academic disciplines. To study development problems adequately requires an analysis which draws upon several disciplines and includes

Note: For key to symbols, see page 56.
a balanced understanding of historical and contemporary perspectives. The study of development as social transformation further necessitates a blending of knowledge and perspectives from political science, economics, sociology, psychology, anthropology, geography, history, and the resource and environmental sciences.

Through the program in development studies, a coordinated and comprehensive plan for interdisciplinary study of political, economic, and social development issues can be devised by setting up a schedule of relevant courses from the various academic departments and programs on the Berkeley campus. The courses available are listed and described briefly in a brochure available at the Group Major Office. From the rich variety of offerings within and across departments, there is a wide range of potential programs of study to suit the interests of students within terms of appropriately selected criteria. Students are aided in combining courses in a systematic way by members of the faculty committee, consisting of representatives from several academic departments, and, on a more regular basis, by the major adviser, also a member of the faculty committee. The program is under the supervision of the interdepartmental committee of faculty members organized through the Institute of International Studies.

Students participating in the program follow a plan of study organized as an interdisciplinary group major leading to a Bachelor of Arts degree in development studies. They are required to take courses in more than one discipline and to pursue detailed study of at least one specific area. In the procedural aspects of organizing an undergraduate plan of study, students in the program are assisted by the staff in the Group Major Office, participating faculty members, the students' faculty adviser, and teaching associates working in the program.

Lower Division Courses. Anthropology 3; Political Science 2; Economics 1.

Recommended Courses. Sociology 1A-1B; Conservation and Resource Studies 23; Geography 4, 18; Environmental Design 4; Sociology 20; Statistics 2.

Upper Division Courses. A total of 48 units of upper division (1) core courses, (2) research methods, and (3) area courses.

Core Courses. Twenty-three (23) units in two or more disciplines: Sociology 100, 135; Economics 171, 172; Political Science 140A, 140C; Geography 111, 130; Anthropology 144, 150, 154; Conservation and Resource Studies 161; Political Economy of Natural Resources 100A-100B; Public Policy 184; City and Regional Planning 107, 110. Up to two substitutions of courses may be permitted in the major with the approval of a major adviser.

Research Methods. Ten (10) units: Sociology 105A-105B; Political Science 131A-131B or 132A-132B; Anthropology 167A-167B, 190A-190B; History 101A-101B; Economics 141. Note: These students wishing to take research methods in the Department of Economics must also take Economics 100A-100B and Statistics 2 before enrolling in Economics 141, thus in effect turning the research methods course into a 20-unit series. Note: Anthropology 167A or 167B is prerequisite to Anthropology 190A-190B. Anthropology 190A-190B must be taken concurrently with Anthropology 190L-190M.

Area Courses. Fifteen (15) units. These are to be selected with the approval of the major adviser. For the entire course list and descriptions, please obtain a development studies brochure available in the Group Major Office. (Students will be encouraged to take area courses in related fields. Related language training will be recommended but not required.)

A maximum of three courses of 15 upper division units outside the College of Letters and Science may be included in the major, e.g., courses in Forestry, Visual Design, Entomology, Genetics, Engineering, Journalism, and related fields. Political Science, Public Health, City and Regional Planning.

Honors Program. Admission to the honors program is contingent upon the student’s attaining senior standing with a grade-point average of 3.3 or higher both for courses in the group major and for all work undertaken in the University. In addition to completing the normal requirements for the major, the honors student is required to write a thesis on research performed in Development Studies H195. The thesis will be reviewed by a member of the faculty committee and approved by a selected group from the same committee.

H195. Honors in Development Studies. (Prerequisite: Senior standing, with 3.3 or higher both for courses in the group major and for all work completed at the University. The honors student is required to write a thesis on research performed in the H195 course. The thesis will be reviewed by a member of the faculty committee and approved by a selected group from the same committee.

Drastic Art

Department Office, 101 Dwinelle Annex

Professors: Travis Bogard, Ph.D. Robert W. Goldsteyn, M.A. Harry M. Frey, M.A. William L. Oliver, Ph.D. (Chairman)

Associate Professors: George S. House, Ph.D. Dunbar M. Ogden, II, Ph.D. John Warren Travis, M.A.

Assistant Professor: Marc A. Roth, Ph.D.

Senior Lecturer: George Ulrich, B.A.

The Majors

Dramatic Art


Upper Division. Forty-five units of upper division courses in the Department of Dramatic Art including 120, 121, 129 and 10 units chosen from courses 122, 123A, 123B, 124, 125, 126, 127, 151A, 151B, 151C; at least 2 and not more than 5 units of 170, 171, or 190. See also Tryout Regulations, below.

Dramatic Art—Dance

(Students are required to take a dance technique course each quarter.)


Upper Division. Forty-five units of upper division courses in the Department of Dramatic Art including 121, 141A-141B-141C, 142A-142B-142C, 143A-143B-143C, 144A-144B, 145, 146A, 150A-150B; five units chosen from courses 122, 123A, 123B, 124, 125, 126, 127, 151A, 151B, 151C; at least 2 and not more than 5 units of 170, 171, or 190. See also Tryout Regulations, below.

Honors Program. Majors in the Department of Dramatic Art with an overall grade-point average of 3.3 in the University and in the major may, with the approval of the Department of Dramatic Art, including at least 18 units of graduate and upper division work in the Department of Dramatic Art, including at least 10 units of graduate work. Admission is by special examination.

Honors Program. Majors in the Department of Dramatic Art with an overall grade-point average of 3.3 in the University and in the major may, with the approval of the Department, apply for admission to the honors program. Application should be made through a departmental major adviser not later than the end of the student’s junior year. Students accepted in the honors program will include in their programs course H195A, intensive critical study of texts of dramatic literature, acting, playwriting, directing, and design; and H195B, development of studies begun in H195A, either under circumstances of actual theatrical production or as a senior thesis.

No course in Dramatic Art offered in satisfaction of undergraduate major requirements may be taken on a passed/not passed basis except Dramatic Art 141A-141B-141C, 142A-142B-142C, 143A-143B-143C, 170, 171, and 190.

Letters and Science List of Courses: 182 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Programs

Preparation for Graduate Study. The background of a student undertaking work toward an advanced degree should approximate that of an undergraduate major student in the Department of Dramatic Art at Berkeley. Applicants for admission who need extensive preparatory work either in dramatic literature or in performance may be required to take the necessary courses while enrolling for two or three quarters as students in limited status in the College of Letters and Science, or for course work in the Graduate Division. In some instances a one-year course of study for a second bachelor’s degree may be in order.

Advising and Evaluation of Student Program. From year to year a team of two faculty advisers will assist each graduate student in developing a program. At the end of each academic year the faculty as a whole evaluates individually the work of each student. This analysis augments the regular indications of course grades and of the comments from instructors and advisers. With these observations the faculty seeks to ensure, as far as possible, that each student is working at maximum capacity toward a degree objective and a professional goal.

Requirements for the M.A. Degree. Students enrolled in the graduate program in Dramatic Art are generally presumed to be training as stage directors and working toward the Ph.D. degree. They will become eligible to apply for the M.A. degree upon completion of the Ph.D. qualifying examination. In exceptional cases, students interested in 3.3 a.c. or higher, playwriting, and design may be accepted for work toward the M.A. degree only. Admission is by special arrangement, including, in the cases of actors and dancers, an audition, and in the cases of designers and playwrights, submission of portfolios of designs or manuscripts of original plays.

Requirements for the Ph.D. Degree. Students accepted for the M.A. only will be required to complete forty-five units of graduate and upper division work in the Department of Dramatic Art, including at least 18 units of graduate work. The program is to include the following: During the first year, one of the twenty-week seminars, 222A-222B, 222A-222B, 224A-224B, 225A-225B; the seminar in Critical Approaches to Theatre (226); fulfillment of the performance requirement; and a language examination in either French or German. During the second year, performance work as assigned, two 2-unit courses of Directed Group Study and credits toward the M.A. Comprehensive Examination.

Requirements for the Ph.D. Degree. Graduate study including graduate and upper division work in the Department of Dramatic Art. The lower class program is to include the following: During the first year, the year-long course in Directing (260A-260B-260C); one of the twenty-week seminars, (222A-222B, 223A-223B, 224A-224B, 225A-225B); the seminar in Critical Approaches to Theatre (226); fulfillment of the performance requirement; and a language examination in either French or German. During the second year, development of studies begun in H195A, either under circumstances of actual theatrical production or as a senior thesis.

For further details on the requirements for advanced degrees, consult the Graduate Division section of this catalog, and the department office in 101 Dwinelle Annex.

The University Theatre

Under the direction of the Department of Dramatic Art, the University Theatre offers a major and workshop series of play productions, extending into the laboratory of stage practice, the theories of dramatic literature, and...
criticism, and production studied in the departmental curriculum. These programs are selected to present to the University community distinguished dramas of various periods and cultures. Participation is open to all registered students, majors and nonmajors, interested in acting, design, or directing.

The University Dance Theatre presents an annual concert of works choreographed by the faculty and performed by the students. Student works are presented at quarterly choreographic workshops. The Bay Area Repertory Dance Company, an in-residence dance company, presents concerts and demonstrations throughout the year in schools and community centers on the West Coast. Unit credit may be earned for work in drama and dance production.

For further information inquire at the office of the Department of Dramatic Art.

Tryout Regulations

General Tryouts for faculty-directed productions, and for student-directed productions under courses 293 and course 295 (when scheduled) are held each quarter and if cast, to perform in a given production. Those not cast in the Fall are required to participate in subsequently scheduled General Tryouts during the academic year and to perform if cast. Special Tryouts for a student-directed production under courses H195B and 25A-25B-25C are scheduled in conjunction with the department bulletin boards. In addition to attending General Tryouts, students enrolled in an acting class, with the exception of course 10, are required each quarter to attend until cast all Special Tryouts and to perform if cast.

Dramatic Art majors cast in the University Dance Theatre Concert are considered to have participated in the fall quarter and if cast, to perform in a given production. Participation in General Tryouts, students enrolled in an acting class, with the exception of course 10, are required each quarter to attend until cast all Special Tryouts and to perform if cast.

Dramatic Art-Dance majors cast in the concert are required to tryout at the General Tryouts in the fall quarter and if cast, to perform in a given production. Those not cast in the Fall are required to participate regularly in scheduled Special Tryouts during the academic year and are announced on the department bulletin boards. In addition to attending General Tryouts, students enrolled in a dance class, with the exception of course 20, are required each quarter to attend until cast all Special Tryouts and to perform if cast.

Dramatic Art-Dance majors and students in the Department of Dramatic Art are encouraged to participate in both productions, including classes and majors who may fulfill the "Special Tryout" requirement in the normal way for Dramatic Art majors or by auditioning for Choreographic Workshops.

Dramatic Art

Lower Division Courses

10. Introduction to Acting. (5) Five 1-hour sessions per week. Prerequisite: consent of instructor. (F, W, Sp) 

11A–11B. Beginning Scene Study and Voice Work. (5–5) Three 2-hour sessions per week. Prerequisite: placement and consent of instructor. Course to be taken consecutively, beginning winter quarter. Credit and grade will be awarded upon completion of the full sequence.

25A–25B. Introduction to Dramatic Literature. (4–4) Three 1-hour lectures and two 1-hour discussion periods per week. Prerequisite: Subject A, examination or course. Course 25A is prerequisite to 25B. Courses to be taken consecutively, beginning fall quarter. Readings are indicated in connection with the study of dramatic literature. Mr. Roth (F, W)

*39. Introduction to Playwriting. (5) Three 1 1/2-hour lectures per week.

45A–45B–45C. Introduction to Theatre. (5–5–5) Three 1-hour lectures and ten hours of laboratory per week. Prerequisite: consent of instructor as required for all courses. Scenes construction from designer's concepts to physical realization, stage practice and management. Each course in the sequence may be repeated once for credit; however, total units may not exceed 15. Mr. Ulric (F, W, (Sp)

Upper Division Courses

Acting

110A–110B–110C. Intermediate Acting. (5–5–5) Three 2-hour sessions per week. Prerequisite: one year of undergraduate work in acting, and consent of instructor. Courses to be taken consecutively, beginning fall quarter. May be repeated for credit; however, repeated units may not be used to fulfill major requirements. Mr. Serman, Ms. Susel (F), Mr. Prindle (Sp)

114A–114B–114C. Advanced Acting. (5–5–5) Three 2-hour sessions per week. Prerequisite: two years of undergraduate work in acting or the equivalent, including voice and speech training, and consent of instructor. Courses to be taken consecutively, beginning fall quarter. May be repeated for credit; however, repeated units may not be used to fulfill major requirements. Mr. Oliver (F), Mr. Goldwyn (W), Mr. Prindle (Sp)

Literature

120. Dramatic Theory. (5) Five 1-hour lectures per week. Prerequisite: junior standing or successful completion of Dramatic Art 121 or consent of instructor. A critical study of the dramatic event in the light of basic theatrical concepts and documents. Mr. Bogard (F)

121. Survey of Dramatic Literature. (5) Five 1-hour lectures and two 1-hour discussions per week. Examination of major works of dramatic literature from the Ancient Greek Period to the present. Mr. Goldwyn (Sp)

122. Dramatic Literature of Western Civilization: The Ancient Greek and Roman Drama. (5) Five 1-hour lectures per week. Mr. House (F)

123A–123B. Dramatic Literature of Western Civilization: European Drama to 1700. (5) Five 1-hour lectures per week.

123A. Medieval Drama to 1600. Mr. Rosenberg (W)

123B. The Seventeenth Century Drama. Mr. Rosenberg (Sp)

*124. Dramatic Literature of Western Civilization: Continental Drama, 1500–1700. (5) Five 1-hour lectures per week.

125. Dramatic Literature of Western Civilization: European Drama, 1700–1850. (5) Five 1-hour lectures per week. Mr. Roth (Sp)

126. Dramatic Literature of Western Civilization: European Drama, 1850–1918. (5) Five 1-hour lectures per week. Mr. Rosenberg (W)

127. Dramatic Literature of Western Civilization: European and American Drama, 1920–Present. (5) Five 1-hour lectures per week. Mr. Oliver (Sp)

129. Senior Proseminar. (5) Five 1-hour lectures per week. Prerequisite: course 120, senior standing. Sections limited to 20 students. Studies in a single playwright or mode of theatre. Not for practice of acting or playwriting. Designed primarily for senior students majoring in Dramatic Art. Mr. Goldstein, Mr. Rosenberg (F, M), Mr. Ogden (W), Mr. Bogard (Sp)

Playwriting

139A–139B–139C. Playwriting. (5–5–5) Three 1 1/2-hour lectures per week. Prerequisite: course 39 or the equivalent. Students may take 139A–139B with credit and grade assigned upon completion of the sequence or they may take 139C–139C–139C rollover or consent of instructor. The study of the fundamental composition group readings and discussion of written work. Any credit that is not given, qualified students may apply to the instructor for permission to take course 239A–239B–239C. Mr. Rosenberg (Sp)

Dramatic Art-Dance

Students intending to complete the major in Dramatic Art-Dance and students proposing to include dance as part of a multi-subject major must consult with Mr. Wood prior to enrollment.

Lower Division Courses

40A–40B–40C. Beginning Modern Dance Technique. (1–1–1) Five 1 1/2-hour studios per week. Prerequisite: course 110A–110B–110C or consent of instructor. College level dance technique in the population of the body and extremities as a totality. Must be taken on a passed/not passed basis. May be repeated for credit.

141A–141B–141C. Intermediate Modern Dance Technique. (1–1–1) Five 1 1/2-hour studios per week. Prerequisite: courses 140A–140B–140C or consent of instructor. College level dance technique in the population of the body and extremities as a totality. Must be taken on a passed/not passed basis. May be repeated for credit.

144A–144B. Source Movement. (2–2) One 1 1/2-hour lecture and two 1 1/2-hour studios per week. Prerequisite: courses 40A–40B–40C. Beginning application of dance technique as a means of communication and expression in the theatre. Utilization of movement as a means of extending natural movement in rhythm, energy, and space with emphasis on style and qualitative analysis. May be individually directed or in a group directed.

145. Music Resources for Dancers. (3) Two 1 1/2-hour studios and one 1 1/2-hour laboratory per week. Prerequisite: courses 144A–144B or concurrent enrollment. An historical overview of the different periods of music in specific relation to dance. Methods of research. Analysis of choreographic values of music and experimentation in their usage. Mrs. Marcus (F)

146A–146B–146C. Choreography. (5–5–5) Two 1 1/2-hour lectures and three 1 1/2-hour studios per week. Prerequisite: courses 144A–144B. Analysis of theories of form and structure and their practical application in relation to content. Course 146A directed towards solos; 146B towards duets and trios; 146C towards groups. Mr. Wood (F, W, Sp)

147A–147B. Dance Analysis. (5–5) One 1 1/2-hour seminar and two 1 1/2-hour studios per week. Prerequisite: courses 144A–144B or concurrent enrollment. An historical overview of the different periods of dance analysis. Methods of research. Analysis of choreographic values of music and experimentation in their usage. Mrs. Marcus (F)

148A–148B–148C. Introduction to Dance Techniques for Actors. (1–1–1) Three 1-hour seminars and three 1-hour studios per week. Prerequisite: course 148A and consent of instructor. Instruction in the methods and principles of class construction with emphasis placed on movement development. Mr. Wood (W)

History of the Theatre

150A–150B. Dance History. (5–5) Three 1-hour lectures and two 1 1/2-hour studios per week. Prerequisite: consent of instructor.

150A. Primitive to Renaissance. Mrs. Wood (W)

150B. Renaissance to Twentieth Century. Mr. Wood (Sp)

NOTE: For key to symbols, see pass 36.
Special Courses

Performance—University Theatre

270. Theatre Laboratory, (1–5) To be arranged. Prerequisite: graduate standing and consent of instructor. Practice in theatre design, lighting, and stage production in faculty-directed productions. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

271. Theatre Performance. (1–5) To be arranged. Prerequisite: graduate standing. Advanced practice in acting. May be repeated for credit. The Staff (F, W, Sp)

276. Special Studies. (5–10) To be arranged. Prerequisite: advancement to doctoral candidacy. Must be taken on a satisfactory/unsatisfactory basis. Reserved for students engaged in work on their doctoral dissertation. The Staff (F, W, Sp)

286. Directed Group Study. (1–8) To be arranged. Prerequisite: completion of a year of graduate work in the Department of Dramatic Art. Berkeley. Topics to be announced at beginning of each quarter. The Staff (F, W, Sp)

299. Special Studies. (1–6) To be arranged. Prerequisite: consent of instructor. Not open to practice of acting, directing, design, or playwriting. May be repeated for credit. The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1–8) Prerequisite: by arrangement. The 45-unit course requirement for the M.A. degree. Individual study for the comprehensive or language examinations required for candidates for the Ph.D. must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

Related Courses in Other Departments


Twelfth-Century German Drama (German 130A). British and American Drama, 1860 to the Present (English 114C). Strindberg (Scandinavian 108).

Nineteenth-Century German Drama (German 130A). British and American Drama, 1860 to the Present (English 114C). Strindberg (Scandinavian 108).

Sixteenth-Century German Drama (German 130A). British and American Drama, 1860 to the Present (English 114C). Strindberg (Scandinavian 108).


Form in Drawing (Art 2A). Drama: Euripides (Classics: Greek 103). The Plays of Ibsen (Scandinavian 108). The Plays of Ibsen (Scandinavian 108).

Strindberg (Scandinavian 108).
Scandinavian Drama of the Twentieth Century (Scandinavian 109).

Chekhov (Slavic 134C).

The Modern Drama of the Nineteenth, Sixteenth and Seventeenth Centuries (Spanish 105).

Modern Period Drama: from the Romantic Period to the Present (Spanish 119).

The Danish Drama of the Nineteenth Century (Danish 105).

The Danish Drama of the Twentieth Century (Danish 102).

The Norwegian Drama of the Twentieth Century (Norwegian 101).

The American Drama of the Twentieth Century (American 101).

Economics

Department Office, 250 Barrows Hall

Professors: George A. Akreolof, Ph.D. Pranab K. Bardhan, Ph.D. George F. Brait, Ph.D., L.L.D. (hon.)

Claus M. Cipolla, Laureate in Economic History Deirdre Driscoll, Dr. rer. pol. (hon.)

Anthony C. Fisher, Ph.D. David Gale, Ph.D. Steven M. Goldman, Ph.D.

Gregory Grossman, Ph.D. Bert Hansen, Ph.D. (Chairman)

John C. Harsanyi, Ph.D. Sidney S. Hsiao, Ph.D.

John M. Leitch, Ph.D. Andreus Mas-Colell, Ph.D. James L. Pierso, Ph.D.

Thomas J. Rottenberg, Ph.D.

Ph.D.

Stephen Smale, Ph.D. Richard C. Solow, Ph.D.

Lloyd Ulman, Ph.D. Pravin Varaiya, Ph.D.

Benjamin N. Ward, Ph.D. Joe S. Bain, J.D. (Emeritus)

John H. Coates, Jr., Sc.D., L.L.D., LL.M. (Emeritus)

Thomas J. DiLorenzo, Ph.D. (emeritus)

Michael L. Wieseman, Ph.D. (emeritus)

Assistant Professors: Robert D. Coote, Ph.D. Roger Crangle, Ph.D.

Jeffrey A. Frankel, Ph.D. Richard J. Gilbert, Ph.D.

Jean U. Hannah, Ph.D. (emeritus)

Lecturers: Kalpana Bhardwaj, Ph.D.

Lovett S. Janus, Ph.D.

Eugene M. Swann, M.A., L.I.B. (emeritus)

The Major

Lower Division. Dutch 1-2-3 or equivalent.

Upper Division. The student is expected to complete a minimum of 45 upper division units, but no more than 54, from those courses listed below. Of these the following are required: Language courses: Dutch 110 and 130.

Literature courses: Dutch 150 plus 4 units in either the Dutch 140 series, Dutch 160, or Dutch 180.

Culture courses: Dutch 170 or one History of Art course (1708, 174, 175).

History course: History 142.

Senior Thesis: Dutch 190.

Additional courses are to be selected from the following list to complete the major: Dutch (see German Department for complete description of these courses) 110, 120, 130, 140, 150, 160, 170, 180, 190, 198, 199; German 104, 105, 106; Comparative Literature 180, 190UL, 210A; Linguistics 165; History 126A, 128, 1308, 142; History of Art 1708, 174, 175.

Honors Program. Students accepted in the honors program will enroll in Dutch 198 (1-6 units) for a total of 6 units and will be expected to write a senior thesis (Dutch 190) with distinction.

For additional information, consult the adviser for the group major in Dutch studies, 5329 Dwinnell Hall.

East European Studies

Office, Slavic Languages and Literatures, 5416 Dwinnell Hall

The Department of Slavic Languages and Literatures offers courses in several non-Slavic languages and literatures as the opportunity arises both for those pursuing the Department's own degree and for interested students from other departments. There is no undergraduate major or graduate program in East European Studies. Languages frequently taught include Hungarian and Romanian. For further information, see East European Studies course listings following Slavic Languages and Literatures.

Economics

Department Office, 250 Barrows Hall

Professors: George A. Akreolof, Ph.D. Pranab K. Bardhan, Ph.D. George F. Brait, Ph.D., L.L.D. (hon.)

Claus M. Cipolla, Laureate in Economic History Deirdre Driscoll, Dr. rer. pol. (hon.)

Anthony C. Fisher, Ph.D. David Gale, Ph.D. Steven M. Goldman, Ph.D.

Gregory Grossman, Ph.D. Bert Hansen, Ph.D. (Chairman)

John C. Harsanyi, Ph.D. Sidney S. Hsiao, Ph.D.

John M. Leitch, Ph.D. Andreus Mas-Colell, Ph.D. James L. Pierso, Ph.D.

Thomas J. Rottenberg, Ph.D.

Ph.D.

Stephen Smale, Ph.D. Richard C. Solow, Ph.D.

Lloyd Ulman, Ph.D. Pravin Varaiya, Ph.D.

Benjamin N. Ward, Ph.D. Joe S. Bain, J.D. (Emeritus)

John H. Coates, Jr., Sc.D., L.L.D., LL.M. (Emeritus)

Thomas J. DiLorenzo, Ph.D. (emeritus)

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Lecturers: Kalpana Bhardwaj, Ph.D.

Lovett S. Janus, Ph.D.

Eugene M. Swann, M.A., L.I.B. (emeritus)
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degree requirements is given in the brochure, Ph.D. The program is oriented toward the doctorate, and new students enrolled in the School of Law or in other doctoral programs on the Berkeley campus may take a Master's or a Ph.D. degree in economics if approved by both departments. The requirements for an M.A. are: (1) a background in economic theory equivalent to that provided in Economics 101A–101B or 200A–200B; (2) four units of approved course work, of which 18 units must be in graduate economics courses numbered 201 or greater; (3) satisfactory performance in two written qualifying examinations. Each student's program must be approved by the economics graduate adviser and may include a balanced mixture of applied and theoretical courses. Students in other graduate programs at Berkeley who are interested in receiving an M.A. in economics should see the Department's Graduate Secretary for further details.

Law and Economics

The School of Law and the Department of Economics sponsor a concurrent program which permits students to study for the degree of Juris Doctor while preparing for the Ph.D. degree in economics. In four years a well-prepared student can receive the law degree and the Ph.D. Further information may be obtained from the Chairman of the Graduate Committee of the Department of Economics.

Lower Division Courses

1. Introduction to Economics. (5) Three hours of lecture and two hours of section meeting per week. A survey of economics, designed to give an overview of the field: supply and demand, resource allocation in a market economy, national economic policy.

20. Law and Economics. (4) Three hours of lecture and one hour of section meeting per week. Prerequisite: course 1 or 103. An analysis of the law and the legal process, emphasizing the impact of law on the field: supply and demand, resource allocation in a market economy, national economic policy. Staff (W, Sp)

75. World Population and Economics. (4) Three hours of lecture and one hour of section meeting per week. Prerequisite: course 1 or 103. A survey covering basic population analysis and an outline of the history of world population. The problems of "over-population," urbanization, public health, and environmental quality.

Upper Division Courses

100A–100B. Economic Analysis. (5–6) Three hours of lecture and two hours of section meeting per week. Prerequisite: course 1 or 103. A course suitable primarily for Plan A economics majors wishing to receive credit for 101A. Basic economic theory with an emphasis on the microeconomic theory, the firm, problems of economic efficiency, competition and monopoly. Staff (F, W, Sp)

101A–101B. Economic Theory. (5–6) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: course 1 or 103 and Mathematics 1A–1B; students who have taken course 100A may not receive credit for 101B. Problems of general equilibrium, income distribution and economic equity. Macroeconomic principles, problems of unemployment, inflation and growth. Staff (F, W, Sp)

102. Aggregative Economic Theory and Policy. (6) Three hours of lecture and one and one-half hours of conference per week. Prerequisite: course 100A or 101A. Basic economic theory, the Keynesian model, aggregate demand, monetary theory, Policy alternatives to promote economic stability and growth.

103. Principles of Economics. (6) Three hours of lecture and two hours of discussion per week. Prerequisite: upper division standing. An introductory survey of the principles of micro- and macroeconomics. Students may not receive credit for both course 1 and 103.

104. Introduction to Mathematical Economics. (4) Formerly 124A. Three hours of lecture per week. Prerequisites: Mathematics 5A or 5B or 10A. A selected topics illustrating the application of mathematical techniques in the field, emphasizing the impact of law on the field: supply and demand, resource allocation in a market economy, national economic policy.

105. History of Economic Thought. (4) Three hours of lecture per week. Offered in alternate years. Prerequisite: course 100A–100B or 101A–10B. The classical school of economic thought, and the contributions of Karl Marx.

107. History of Economic Thought Seminar. (5) Three hours of seminar per week. Prerequisite: Economics 100A–100B or 101A–10B. A critical analysis of neoclassical economic theory. Challenges to the postulate of rationality, the ethics of capitalism, and behavior of the market system.

108. Critique of Modern Economic Theory. (4) Three hours of lecture per week. Offered in alternate years. Prerequisites: course 100A or 101A. A selected topics illustrating the application of mathematical techniques in the field, emphasizing the impact of law on the field: supply and demand, resource allocation in a market economy with more intensive analysis of selected topics.

111A. Economic History of the Medieval and Renaissance Europe. (Formerly 111.) Three hours of lecture per week. Prerequisite: course 1 or 103. Survey of the economic and social developments in Western Europe from the eleventh to the sixteenth century that paved the way for the Industrial Revolution. Staff (F); Hansen (W, Sp)

111B. The Economic History of the Agricultural and Industrial Revolutions. (Formerly 115.) Three hours of lecture per week. Prerequisite: course 1 or 103. The rise of the European economy to world dominance in the period 1815–1914. The diffusion of the Industrial Revolution, the development of the world trading system, the rise of modern imperialism.

113. Economic History of the World Economy in the 20th Century. (Formerly 116.) Three hours of lecture per week. Prerequisite: course 1 or 103. Development and crises of the advanced economies with particular emphasis on their trading relations and their relationship with the underdeveloped economies of other nations. Staff (F)

1112. World Economic History Seminar. (4) Three hours of seminar per week. Prerequisite: one of the following: course 111A, 111B, 111C or 111D, as announced each semester. A seminar paper will be required. To be offered 1979/80 only.

113M. American Economic History. (5) Three hours of lecture and two hours of section meeting per week. Prerequisite: course 100A. An analysis of neoclassical and Keynesian economic history in the American economy; emphasis on factors explaining economic growth and on the changing distribution of income and wealth.

114. American Economic History Seminar. (5) Three hours of seminar per week. Prerequisite: course 113 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

121. Industrial Organization. (4) Three hours of lecture per week. Prerequisite: course 100A or 101A. The organization and structure of industries and their markets in the American economy; competitive behavior, price policy, and market performance.

122. Industrial Organization Seminar. (5) Three hours of seminar per week. Prerequisite: course 121 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

123. Government Regulation of Industry. (4) Three hours of lecture per week. Prerequisite: course 121. Problems of public policy in the field of industrial organization. The maintenance of competition, antitrust policy, regulation of public utilities, public policy and regulation of international trade.

124. Economics of Transportation. (4) Three hours of lecture per week. Offered in alternate years. Prerequisite: course 100A or 101A. Principles of pricing and resource allocation, techniques for allocating resources in the transportation industry, with emphasis on policy problems such as regulation of transport firms and public investment in transport facilities.

125. Economics of the Environment. (4) Three hours of lecture per week. Prerequisite: course 100A or 101A. A theoretical analysis of the sources of environmental degradation and of public policy measures designed to preserve and improve human environment. A number of case studies will be examined.

131. Public Finance. (4) Three hours of lecture per week. Prerequisite: course 100A–100B or 101A–10B. Taxation, public finance, government expenditure programs, and public debt operations.

132. Public Finance Seminar. (5) Three hours of seminar per week. Prerequisite: course 131 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

133. Economics of State and Local Governments. (4) Three hours of lecture per week. Prerequisite: course 100A–100B or 101A–10B. An analysis of public finance and expenditure policy with an emphasis on metropolitan areas. Tax revenue and public expenditure policies of state and local governments; problems of metropolitan revenue sharing.

134. Cost-Benefit Analysis. (4) Three hours of lecture per week. Prerequisite: course 100A or 101A. Methods of program evaluation and budgeting, economics of government programs.

135. Monetary Theory and the Banking System. (4) Formerly 121A. Three hours of lecture per week. Prerequisite: course 100A or 101A. A survey of the economic and social developments in Europe and North America dominated by the gold standard.
157. Economics of Health, Education and Welfare. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Enrollment will be limited. A seminar paper will be required.

158. Health, Education and Welfare Seminar. (5) Three hours of seminar per week. Prerequisites: courses 157 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

159. Minority Economics. (4) Three hours of lecture per week. Prerequisite: consent of instructor. The staff will be the instructors. The role of government programs in health, education, and welfare in contemporary American society.

160. Economics of the Soviet Union. (4) Three hours of lecture per week. Prerequisite: course 1 or 103. The Soviet economy, its growth, institutions, and performance. Special attention will be given to the relationship of population growth to economic development and the "neo-Malthusian" literature on resource limitations.

161. Economic Systems Seminar. (5) Three hours of seminar per week. Prerequisite: course 161 or 163 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

162. Economic Development. (4) Three hours of lecture per week. Prerequisites: Economics 100A–100B or 101A–101B. Theories of economic development and of underdevelopment; historical aspects, policies for achieving development in poor countries, favorable conditions for development in rich countries.

163. Economic Development Seminar. (4) Three hours of seminar per week. Prerequisites: courses 161 or 103. A detailed study of the problems of development in a selected geographic area. The specific regions to be studied will be announced annually. May be repeated for credit with the permission of the instructor.

164. Economic Development Seminar. (5) Three hours of seminar per week. Prerequisite: course 161 or 163 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

165. Economic Demography. (4) Three hours of lecture per week. A general introduction to demo Preventive health care. Introduction to economic demography emphasizing the economic determinants of mortality, fertility, and labor force participation. Special attention is given to the relationship of population growth to economic development, and the "neo-Malthusian" literature on resource limitations.

166. Economic Demography Seminar. (5) Three hours of seminar per week. Prerequisite: course 175 and consent of instructor. Enrollment will be limited. A seminar paper will be required.


168. International Economic Policy. (4) Three hours of lecture per week. Prerequisite: course 181 or 136 or 102. International monetary institutions, common mar- kets, tariffs, foreign exchange controls. The relations between trade, growth, and development.

169. International Economics Seminar. (5) Three hours of seminar per week. Prerequisite: consent of instructor. Enrollment will be limited. A seminar paper will be required.

170. International Economics. (3–5) Three to five hours of lecture per week. Topics to be covered will be announced at the beginning of each quarter. May be repeated for credit.

171. Field Studies. (1–5) Number hours per week to be announced. Prerequisite: upper division standing. Written proposal must be approved by Department Chairman. Supervised field studies in economics. Projects may be initiated by the student. May be repeated once for credit.

172. Directed Group Study. (1–5) Number hours per week to be announced. Prerequisite: upper division standing and consent of instructor. Written proposal must be approved by Department Chairperson. Seminars for students interested in a field which will vary from year to year. Topics may be initiated by students. May be repeated once for credit.

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174. Supervised Independent Study and Research. (1–5) Number hours per week to be announced. Prerequisite: upper division standing. Written proposal must be approved by Department Chairperson. Enrollment is restricted by regulations listed on page 36. Must be taken on a pass/no pass basis.

The Staff (F, W, Sp)

Graduate Courses

200A–200B. Fundamentals of Economic Theory. (4–4) Three hours of lecture per week. Prerequisite: consent of instructor. Economics of Students with a strong background in economics or mathematics should enroll in Economics 201A–201B. Preparation for the Ph.D. program including: aggregate economic theory, the firm, consumer theory, general equilibrium, capital theory, and welfare economics.

201A–201B. Economic Theory. (4–4) Three hours of lecture per week. Prerequisites: courses 100A–100B or 101A–101B. General equilibrium, Walrasian general equilibrium, 190B–190C or equivalent. Mathematics 190B–190C may be taken concurrently with courses 201A–201B. Basic preparation for the Ph.D. program including: aggregation theory, national accounting and index problems, survey of major short-term models. The implications of various expectations hypotheses, wage-price determination, the role of money and financial assets, theories of consumption and investment, growth, unemployment, inflation, dynamic systems, and international considerations.

202C. Capital and Economic Growth. (3) Two hours of lecture per week. Prerequisite: courses 201A–201B or consent of instructor. The course will discuss the nature of capital and consider the role of capital accumulation in modern theories of economic growth and planning.

203. Advanced Topica In Economic Theory. (3) Two hours of lecture per week. Prerequisite: consent of instructor. May be repeated for credit.

205A–205B. History of Economics Thought. (4–4) Formerly 205. Three hours of lecture per week. Prerequisite: Economics 205A is not a prerequisite to 205B. Analysis of the relationship between historical conditions, economic theory, and economic policy from the Greeks to modern times.

206. Mathematical Economics. (3–3–3) Two hours of lecture per week. Prerequisites: courses 100A–100B or Statistics 100A or equivalents. Mathematical analysis of economic theory. The course will cover a range of mathematical techniques and of economic topics as possible, including theories of choice, personal probability, general equilibrium, games, growth, and stability.

210A. Introduction to Economic History. (3) Three hours of lecture per week. A brief survey of some central themes in world economic history with an emphasis on methodology. Ph.D. students normally take this course in satisfaction of the deparmental requirement in economic history.

210B. Selected Topics In European Economic History. (3) Three hours of lecture per week. Prerequisite: consent of instructor. May be repeated for credit.

210C. Selected Topics In American Economic History. (3) Two hours of lecture per week. Prerequisite: course 210A.

210D. Selected Topics In East Asian Economic History. (3) Three hours of lecture per week. An intensive study of the economic history of Japan from the Tokugawa period to the present—prerequisite for modern growth and development.

211. Seminar In Economic History. (4) Two hours of seminar per week. Prerequisite: consent of instructor. May be repeated for credit.

215A. Marxism and Modern Capitalism. (3) Two hours of lecture per week. Contemporary Marxist approaches to modern capitalism.

215B. Political Economy of Crises. (3) Hours of lecture per week. Brief survey of theories of political economic interactions in going concerns, followed by monetary policy in practices in interactions under conditions of instability and crisis.

215C. Class Structure and Inequality In the United States. (3) Hours of lecture per week. Class structure, conflict and power as determinants of income and wealth inequality in the United States.

216. Seminar In Political Economy. (3) Two hours of seminar per week. Prerequisite: consent of instructor. May be repeated for credit.

220A–220B–220C. Industrial Organization. (3–3–3) Two hours of lecture per week. Prerequisite: 220A or consent of instructor. Price, Market structure, conduct, and performance in the unregulated sector of the American economy. The characteristics and economic problems of regulated public utilities. Public policies related to promotion or restriction of competition.

221. Seminar In Industrial Organization, Regulation, and Policy. (4) Two hours of seminar per week. Prerequisite: consent of instructor. May be repeated for credit.

222. Economics of Public Enterprise. (3) Three hours of lecture per week. Prerequisite: course 220A or consent of instructor. The performance of public enterprises in a dominantly private economy. Appraisal and explanation of the actual performance of public enterprises.

230A–230B–230C. Public Finance. (3–3–3) Two hours of lecture per week. Prerequisite: 230A is prerequisite to 230B; 230B is prerequisite to 230C. Public finance and taxation theory, public debt and fiscal policy, politics with respect to public finance.

231. Seminar In Public Finance and Urban Economics. (4) Two hours of seminar per week. Prerequisite: consent of instructor. May be repeated for credit.

235A–235B–235C. Aggregate Economics. (3–3–3) Three hours of lecture per week. Prerequisite: course 235A is prerequisite to 235B; 235B is prerequisite to 235C. Monetary economics; theory of aggregate economic policy; short term planning models; fiscal and monetary policy with respect to public finance.

237. Monetary Economics. (3) Two hours of lecture per week. Prerequisite: 210C or consent of instructor.

238. Seminar In Advanced Macroeconomics and Money. (4) Two hours of seminar per week. Prerequisite: consent of instructor. May be repeated for credit.

240. Introduction to Econometrics. (4) Three hours of lecture per week. Prerequisite: Statistics 131 or equivalent. Students who have received credit for Economics 241A may not receive credit for this course. A survey course designed for graduate and undergraduate students in economics and related disciplines. Problems in the application of statistical methods in economics, illustrated by a representative selection of empirical studies.

241A. Econometrics. (4) Three hours of lecture and one and one half hour section per week. Prerequisite: Statistics 100A–100B–100C or 200A–200B–200C or consent of instructor. This course is designed for students who have received credit for Economics 240 may receive only partial credit for 241A. Intended for students specializing in econometrics and others with strong mathematical backgrounds. Introduction to the linear statistical model and its applications in economics.

NOTE: For key to symbols, see page 36.
Special problems in analyzing data from non-controlled experiments.

241B–241C. Econometrics. (4–3) Three hours of lecture per week for 241B; two hours of lecture per week for 241C. Prerequisite: course 240A and 241A and Statistics 200A–200B–200C and Mathematics 111. Course 241B is prerequisite to 241C.

241B: Econometric theory, including model specification, data sources, and a critical analysis of representative empirical studies.

242. Applied Econometrics Seminar. (4) Two hours of seminar per week. Prerequisite: course 241A and 241B. May be repeated for credit. Offered in alternate years.

250A–250B–250C. Labor Economics. (3–3–3) Two hours of lecture per week for 250B; two hours of lecture per week for 250C. Prerequisite: course 250A. Section 250B is prerequisite to 250C; 250B is prerequisite for 250C. Analysis of labor market behavior.

251. Seminar in Labor Economics. (4) Two hours of seminar per week. Prerequisite: consent of instructor. May be repeated for credit.

256. Topics in Urban Economics. (4) Three hours of lecture per week. Prerequisite: Econometrics 155 or equivalent, and consent of instructor. An analysis of specific problems of public policy in urban areas. Topics covered will vary from year to year, but will usually include urban public finance, politics, transportation, welfare, and housing. The effect of governmental form on the delivery of public services will also be considered.

256A–256B–256C. Economic Systems. (4–3–3) Two hours of lecture per week for 256A, one hour of seminar per week for 256B, and two hours of lecture per week for 256C. Prerequisite: course 256A is prerequisite to 256B, 256B is prerequisite to 256C. Methodology and policy analysis of competing economic systems; their institutions, and the ideologies underlying them. Course studies of the Soviet Union and other non-market economies.

261. Seminar in Comparative Economic Systems. (4) Two hours of seminar per week. Prerequisite: consent of instructor. May be repeated for credit.

270A–270B–270C. Economic Development. (3–3–3) Three hours of lecture per week. Prerequisite: course 270A is prerequisite to 270B, 270B is prerequisite to 270C. The problems of development analyzed both theoretically and through case studies. Attention given to the problem of dual economies, internatinal capital flows, alternative development strategies, specific policies to promote development, including national planning.

271. Seminar in Economic Development, Demography and International Trade. (4) Two hours of seminar each week. Prerequisite: consent of instructor. May be repeated for credit.

275A–275B–275C. Economic Demography. (3–3–3) Two hours of lecture per week. Prerequisite: course 275A is prerequisite to 275B, 275B is prerequisite to 275C. Techniques of demographic analysis, economic influences upon population and labor force growth, relationships between population changes and economic development.

280A–280B–280C. International Economics. (3–3–3) Two hours of lecture per week. Prerequisite: course 280A is prerequisite to 280B, 280B is prerequisite to 280C. The world economy as a general equilibrium system. The theory of international economics, international economic institutions, trade policy.

289. Special Topics in Economics. (3–3) Two to three hours of lecture per week. Prerequisite: consent of instructor. Topics of different sections to be announced annually. May be repeated for credit.

290. Directed Group Study for Graduates. (1–9) 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. Offered on a satisfactory/unsatisfactory basis. (The Staff, F, W, Sp)

602. Individual Study for Doctoral Students. (1–6) Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified doctoral candidates to prepare Ph.D. examinations or for candidates of the Ph.D. to be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)


English

Department Office, 322 Wheeler Hall
University Professor: Josephine Miles, Ph.D., Litt.D. (Emeritus)


Associate Professors: Janet Adelman, Ph.D. Joel Altmann, Ph.D. John S. Anson, Ph.D. Julia Barker, Ph.D. Julian C. Boyd, Ph.D. Carol Chin, Ph.D. Margaret A. Doody, D.O,Ph.D. Frances Ferguson, Ph.D. Richard Pangco, Ph.D. Andrew L. Griffin, Ph.D.

Assistant Professors: Ann Bankoff, Ph.D. Bryan Barsky, Ph.D. Michael A. Benjamin, Ph.D. Diane Buzek, Ph.D. Patrick Doerr, Ph.D. Joel Fleming, Ph.D. Michael Harper, Ph.D.

Acting Assistant Professor: Steven M. Knapp

Lecturers: Thom Gunn, M.A. Iraheem Reed

Departmental Major Advisers: Consult Departmental Office.

The Department of English offers undergraduates considerable flexibility in shaping a program in British and American literature around a core of basic courses. English 1A–18 students ground in the fundamentals of composition and literary analysis; English 147A–147B–147C provides an intensive survey of major authors in English from Chaucer through Yeats; the survey is supplemented by courses in American Literature and in the classical and biblical backgrounds of English Literature; the senior seminar allows students to begin to bear on the work of a single major author the critical techniques and learning acquired in previous years. Beyond these courses, students are largely free to construct their own programs in consultation with their advisers. Colloidal study in art, history, literature, philosophy, and language is recommended but not specifically required.

Subject A. Students must have fulfilled the requirement in Subject A before taking any course in the Department of English. For further information, see Subject A listing in index.

Major Program

The English major consists of not fewer than fourteen five-unit courses in English, of which at least nine must be upper division courses. Students are required to include the following six items in their programs: (1) English 117 and 118; (2) one in American Studies 116; English 180E; Classics 34, Comparative Literature 41A; Comparative Literature 120; (4) English 147A–147B–147C (which should be taken in their historical sequence); (5) at least one upper division course in Shakespeare (but not English 117E); and (6) English 151 (a period or type course appropriate as background for the major author to be studied in 151 is strongly recommended).

After declaring the English major, a student is permitted to take an additional 14 courses needed to complete the major on a P/NP basis (this includes English 99 and 199). All courses specifically required for the English major (e.g. 1A–1B, 117, 147A–147B–147C, 151) must be taken for a letter grade.

Honor's Program. Students with an overall grade point average of 3.3 or higher and a grade point average of 3.3 or higher in courses in the major may apply for admission to the honors program not later than the second quarter of their senior year. Candidates for the A.B. with honors in English are required to write a bachelor's thesis (for which 5 units of credit are given under English 199) in their senior year. The thesis may be an extension of the student's work in English 151 or may deal with another area already explored by them. A final vote of the number of the Department of English must agree to direct the thesis. Interested students may obtain application forms for the program in the Department of English Office.

Please Note: The quarter in which a particular course will be given, and the instructor who will give it, as specified in this catalog, may have to be changed during the academic year. Students should consult the Department's Announcement of Courses for the current academic year for courses on the list. The Department of English reserves the right to discontinue any course at any time during the academic year. Students should consult the Department's Announcement of Courses for the current academic year (available from the Department Office, Room 322 Wheeler Hall) for current listings of courses and instructors for each quarter. Specific offerings in the following fall quarter courses vary from year to year: English 108, 109, 171, 172, 173, 174, 175, 176, 177, 203, 208, 250, and 270; offerings and instructors for each quarter of the current academic year are listed in the Department's Announcement of Courses.

Many of the courses listed below have limited enrollment.

Letters and Science List of Courses: 162 units from the List must be included in the 187 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Preparation for Graduate Studies

Those interested in graduate study in English should familiarize themselves with the regulations of the Graduate Division. Students who expect to be admitted to graduate studies in English are strongly advised to gain a solid background in foreign languages. The Department of English requires candidates for the Ph.D. to pass examinations in a minimum of two foreign languages.

Graduate Study

The Ph.D. Program. Students are admitted to graduate study only in the fall quarter. The program requires successful completion of twelve letter-graded courses, including an introductory course in literary scholarship (208), normally taken in the first quarter of graduate study, and a two-quarter seminar (250) before advancement to candidacy. The first two years of
study are devoted to acquiring and demonstrating comprehensive knowledge of five fields of study: Old and Middle English; Renaissance and Shakespeare; the Restoration and Eighteenth Century; Nineteenth- and Twentieth-Century British Literature; and American Literature. Comprehensive knowledge may be demonstrated by a series of field examinations or successful completion of wide-ranging courses in each period arranged in consultation with graduate advisers. The balance of the graduate program requires passage of an oral qualifying examination of two to three hours, and the writing of a dissertation. Additional details on requirements for the doctorate in English, including language requirements, are available from the English Graduate Office, Room 319 Wheeler Hall.

The M.A. Program. The M.A. program in English is separate from the Ph.D. program. It welcomes a broad range of applications, including older students, from a variety of academic and cultural backgrounds. It is designed to serve students who wish to undertake one year’s intensive graduate study in the general field of English and/or American literature, or who wish to pursue a special interest that lies within or cuts across the traditional fields. A student’s course of study will be determined individually at the beginning of the year in consultation with the adviser, and may or may not include a short thesis or approved special project. In special cases, study for the M.A. degree may be extended into a second year. The M.A program requires successful completion of (a) eight courses (or 36 units), at least four of which must be in the graduate division, at least three of these in English; (b) a final examination, the nature of which is determined in consultation with the adviser and the Graduate Chairman, and which may vary from the written comprehensive examination to an oral examination in the general area of an approved program for the student. Those with no general language requirement may enter M.A. students.

Teacher Training. The Department of English offers an examination waiver program for the Single Subject teaching credential in English; that program has been submitted for approval to the California Commission for Teacher Preparation and Licensing. For further information contact the departmental teacher training advisors or the Student Personnel Office, School of Education, 1615 Tolman Hall.

Courses in Writing

Lower Division

1A–1B. First-Year Reading and Composition. (5–5) Four to 4 1/2 hours of lecture per week. Prerequisite: course 1A–1B or equivalent, and consent of instructor.

40. Intermediate Expository Writing. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: course 1A–1B or equivalent and consent of instructor.

42. Writing in Connection with the Reading of Important Books of the Nineteenth and Twentieth Centuries. (6) Four to 4 1/2 hours of lecture per week. Prerequisite: course 42A or 1A–1B or equivalent and consent of instructor.

45. Introduction to the Writing of Verse. (5) Four to four and one-half hours of lecture per week. Prerequisite: course 42A or 1A–1B or equivalent and consent of instructor.

111A–111B. Advanced Composition for Potential Teachers of English in Secondary Schools. (5) Four to four and one-half hours of lecture per week. Advanced composition and methods of teaching composition; emphasis on writing about literature with readings from literature for American ethnic groups suitable for young people. Primarily for students who wish to pursue English as their single subject teaching field.

112D. Advanced Composition for Potential College Teachers. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of instructor. Special section in advanced prose for teaching assistants, readers, and honors students in departments other than English.

112E. Advanced Composition for Potential Teachers in Secondary and Elementary Schools. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of student. Primarily for students seeking the secondary teaching credential whose teaching major or minor is not English.

Admission to all courses numbered 143 is by consent of the instructor. Since instructors often wish to see samples of a student’s writing before making a decision, students should see the instructor well before the beginning of the term in which the course is offered. Any of these courses may be repeated for credit, but students normally may enroll for only one at a time.

143A. Short Fiction. (5) Four to 4 1/2 hours of lecture per week. Mr. Loewinsohn (W), Mr. Michaels (Sp).

143B. Verse. (5) Four to 4 1/2 hours of lecture per week. Mr. Loewinsohn (F), Mr. Gunn (W), Mr. Scott (Sp).

143C. Long Narrative. (5) Four to 4 1/2 hours of lecture per week. The student will work throughout the quarter on a single project, either fiction (novel) or nonfiction (biography, history).

143D. Expository and Critical Writing. (5) Four to 4 1/2 hours of lecture per week. Mr. Krast (Sp).

143E. Advanced Expository Prose: Report Writing. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: admission by permission of the instructor. Designed primarily for students whose major is not English. Intensive practice and instruction in composition with attention to questions of style and document publication appropriate to a variety of professional and academic disciplines.

1143F. Playwriting. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of instructor.

1143G. Non-Fiction Writers' Workshop. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of instructor. Application of research and critical methods to non-fiction. Primary emphasis is on expository technique, rather than on defining new subject matters, and modes of inquiry. Class discussion of student work to be complemented by bibliographical tours of library reference sources, theories of argument and documentation, etc.

143T. Poetry Translation Workshop. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of instructor. Training in poetry translation, with emphasis on gaining knowledge of at least one foreign language. Open to those who wish to assimilate foreign influences for writing poetry or to seek a fuller understanding of any foreign poetry by rendering it into English.

144. Practical Writing. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of instructor. Training in expository prose without emphasis on literary subject matter. Attention to general standards of effective writing and to specific problems in the prose of class members. Two weekly lecture-discussions follow by a section meeting led by an Associate. Designed for non-majors.

Mr. Rader (W)

Courses in Language

Upper Division

114. Modes of Writing. (Exposition, Fiction, Verse, etc.) (5) Four to 4 1/2 hours of lecture per week. Prerequisite: course 1A–1B or equivalent, and consent of instructor.

25. Language. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Designed for sophomores, but open to students in the upper division. The origins and evolution of the English tongue; oral and written language, change, and growth in language with emphasis on English; interrelations of language and thought. Emphasis on English as spoken in America, customs, attention given to social and regional dialects. Mr. Boyd (W)

110A–110B. The English Language. (5–5) Four to 4 1/2 hours of lecture per week. Prerequisite: 110B: either 110A or a course including English materials composed before 1400 or instructor’s permission.

110A. Structure of the English Language. Ms. Banfield (W), Mr. Niles (Sp)

110B. History of the English language. Mr. Niles (Sp)

Courses in Literature

Lower Division

110A. Methods and Materials of Literary Study. (5) Four to 4 1/2 hours of lecture per week. Study of literary and critical texts, and of critical methods and theories.

1120. Modern British and American Literature. (5) Four to 4 1/2 hours of lecture per week.

26. Introduction to the Study of Poetry. (5) Four to 4 1/2 hours of lecture per week. Lectures and discussion intended to develop the student’s ability to read, understand and evaluate fiction. Designed primarily for students whose major is not English, but majors and prospective majors are welcome. Mr. Tuveson (W)

28. Introduction to the Study of Drama. (5) Four to 4 1/2 hours of lecture per week. Lectures and discussion intended to develop the student’s ability to read, understand and evaluate plays. Designed primarily for students whose major is not English, but majors and prospective majors are welcome.

30. Introduction to American Literature. (5) Four to 4 1/2 hours of lecture per week.

44A–44B. American Literature. (5–5) Four to 4 1/2 hours of lecture per week. Lectures on great works of the world’s literature.

44A. Classical Literature. Ms. Middletown (F).

44B. Medieval and Renaissance Literature. Ms. Banfield (Winter), Ms. Duggan (Summer).

44C. Literature since the seventeenth century.

Upper Division

100. Methods and Materials of Literary Criticism. (5) Four to 4 1/2 hours of lecture per week. (Sections limited to 20 students.) The Staff (F, W, Sp).

104A–104B. Irish Literature. (5–5) Four to 4 1/2 hours of lecture per week. Prerequisite: 104A is prerequisite to 104B.

110A. Gaelic Literature 700–1800 (in translation). Study of the prose saga-cycles, satirical, classical lyric poetry, and bardic poetry, developing the mythological and traditional background of modern Irish literature.

110B. The Native Tradition in English 1800-present: locating the conflict on the contemporary stage in the lives of Yeats, Synge, Joyce, Beckett, Behan, Flann O’Brian, the modern poets, with attention to their nineteenth- and twentieth-century counterparts. Mr. Carleton, Mr. Edgeworth, and the Nation writers.

108. Special Topics. (5) Four to 4 1/2 hours of lecture per week. (Sections limited to 20 students each.) Designed primarily for English majors. Topics vary from year to year. May be repeated for credit, on a different topic. Students should consult the department’s Announcements of Courses for offerings in the current academic year.

The Staff (F, W, Sp).

106. Special Topics—Reading Courses. (2–2) Two hours of lecture per week. Readings in selected literary topics. Topics vary from year to year. Extensive readings; written assignments and examinations at the discretion of the instructor may be repeated for credit with a different topic and permission of the instructor.

The Staff (F, W, Sp).

114A–114B. 114C. English Drama. (3–5–5) Four to 4 1/2 hours of lecture per week.

114A. English drama to 1603. Mr. Anson (F)

114B. English drama 1603–1700. Mr. Anson (W)

114C. British and American drama from 1600 to the present.

116. The English Bible as Literature. (5) Four to 4 1/2 hours of lecture per week. Mr. Coolidge (F), Mr. Gunn (W), Mr. Jordan (W)

117A–117B. Shakespeare. (5–5) Four to 4 1/2 hours of lecture per week. A chronological survey of Shakespeare’s career.

Mr. Greenblatt (W, Sp)

117E. Shakespeare for Nonmajors. (5) Four to 4 1/2 hours of lecture per week.

NOTE: For key to symbols, see page 30.
117F. Shakespeare and Film. (5) Four to 4 1/2 hours of lecture per week. Close study of the texts and films based on 8-10 plays. Lectures will emphasize the critical implications of transposing plays to film. The plan for the course is the critical understanding of Shakespeare, and the course satisfies the departmental requirement of a course in Shakespeare in the major.

117J. Shakespeare. (5) Four to 4 1/2 hours of lecture per week. Limited to 25 students. Studies of selected plays, with practice in various critical approaches, e.g., establishing text, relating to source, choosing concepts of comedy and tragedy, influence of theatrical conditions on technique. Mr. Stout (F), Ms. Richmond (Sp).

117S. Shakespeare. (5) Four to 4 1/2 hours of lecture per week. Lectures on Shakespeare and reading of his best work. Mr. Traugott (F), Mr. Burgess (W).

117T. Shakespeare in the Theater. (2.5) Two to 2 1/2 hours of lecture per week. Mr. Miyoshi (Sp).

120A-120B. Medieval Literature, (5-6) Four to 4 1/2 hours of lecture per week. Students may receive credit for 120A without taking 120B.

120C. The English Lyric. (5) Four to 4 1/2 hours of lecture per week. The development of the English tradition of structure and style in lyric poetry. Mr. Anson (F).

121A-121B. Romantic Period. (5-5) Four to 4 1/2 hours of lecture per week.

121A. Blake, Wordsworth, Coleridge and contemporaries. Ms. Ferguson (F).

121B. Byron, Shelley, Keats and contemporaries. Ms. Ferguson (W).

122A-122B. Victorian Period. (5-5) Four to 4 1/2 hours of lecture per week.

122A. British literature from about 1840 to 1870. Mr. Tracy (F).

122B. British literature from about 1870 to 1901. Mr. Miyoshi (W).

123. Nineteenth-Century British Prose. (5) Four to 4 1/2 hours of lecture per week.

124. Short Story. (5) Four to 4 1/2 hours of lecture per week. Study of five novelists of the nineteenth century. Mr. Anson (W).

149. The English Lyric. (5) Four to 4 1/2 hours of lecture per week. A study of the development of the English tradition of structure and style in lyric poetry. Mr. Anson (F).

150A-150B. Age of Chaucer. (5-5) Four to 4 1/2 hours of lecture per week. Mr. Kratins (F).

151. The Sonor Course. (5) Sections limited to 20 students each. A period or type course appropriate as background for a major or minor in the English major. The class will produce and perform a play studied in 177T. Mr. Altmann (W).

151M. Milton. Four to 4 1/2 hours of lecture per week. Readings will vary from quarter to quarter. May be repeated for credit with a different topic and permission of the instructor.

151K. Five Approaches To The Novel. (5) Four to 4 1/2 hours of lecture per week. Study of five novelists of different ethnic backgrounds and comparison of their techniques and aesthetic. To be offered 1979-80. Ms. Ferguson (W).

152. Chaucer. (5) Four to 4 1/2 hours of lecture per week. To be offered to students who have completed course 154A prior to Fall, 1974, may not enroll in 154A. Mr. Traugott (Sp).

153. Shakespeare. Four to 4 1/2 hours of lecture per week. Mr. Altman (W).

154. Milton. (5) Four to 4 1/2 hours of lecture per week. Mr. Knapp (F).

155A. Age of Chaucer. (5-5) Four to 4 1/2 hours of lecture per week. Mr. Kratins (Sp).

155B. Pearl Poet and early Chaucer. Mr. Kratins (F).

155C. Langland and late Chaucer. Mr. Nelson (W).

156. Backgrounds of English Literature in the Continental Renaissance. (5) Four to 4 1/2 hours of lecture per week. A survey of the principal continental documents which are important in understanding the English Renaissance. Mr. Richmond (F).

160A. Autobiography. (5) Four to 4 1/2 hours of lecture per week. Mr. Griffin (Sp).

160B. British Literature: 1900-1945. (5) Four to 4 1/2 hours of lecture per week. Mr. Paterson (F).

161. British and American Poetry: 1900-1945. (5) Four to 4 1/2 hours of lecture per week. Mr. Parkinson (F).

162. British and American Poetry: 1945 to the Present. (5) Four to 4 1/2 hours of lecture per week.

163. Contemporary Literature. (5) Four to 4 1/2 hours of lecture per week.

164. Translation and the Arts. (5) Four to 4 1/2 hours of lecture per week. Studies in the relationship of English literature to the arts. May be repeated for credit with a different topic and permission of the instructor.

171. Literature and Sexual Identity. (5) Four to 4 1/2 hours of lecture per week. A study of the functions of the depiction of sexual identity in literature in relation to themes, literary convention, psychology, and the particular politics and sociology of individual cultures. The course may range broadly over Western literature or concentrate on one historical period. May be repeated for credit with a different topic and permission of the instructor. Mr. Bernstein (Sp).

172. Literature and Psychology. (5) Four to 4 1/2 hours of lecture per week. Studies in the relationship of English literature to psychology. May be repeated for credit with a different topic and permission of the instructor.

173. The Language and Literature of Films. (5) Four to 4 1/2 hours of lecture per week plus film viewings. A study of film as a medium for representation, cinematic techniques and the "language" of film. Lectures, class discussions, and film viewings. May be repeated for credit with a different topic and permission of the instructor.

174. Literature and History. (5) Four to 4 1/2 hours of lecture per week. Topics will vary from quarter to quarter. The course may be repeated for credit with a different topic and permission of the instructor.

175. Women Writers. (5) Four to 4 1/2 hours of lecture per week. Reading topics and points of view. May be repeated for credit with a different topic and permission of the instructor.

190C. Comedy. (5) Four to 4 1/2 hours of lecture per week. Study of representative comic forms, techniques and points of view. Mr. Anson (Sp).

190E. The Epic. (5) Four to 4 1/2 hours of lecture per week. Reading and discussions of epics, considering their cultural and historical contexts, the nature of their composition, and the development of the form.

191K. Five Approaches To The Novel. (5) Four to 4 1/2 hours of lecture per week. Study of the romance as a literary genre. Topics may vary from quarter to quarter; focus may be historical or restricted to a particular period (e.g., medieval, modern). May be repeated for credit with permission of the instructor.

1985. Satire. (5) Four to 4 1/2 hours of lecture per week. A study of representative satiric forms, techniques and points of view. Mr. Altman (F).

1986. Tragedy. (5) Four to 4 1/2 hours of lecture per week. Study of representative tragic forms, techniques and points of view. Mr. Altman (F).

199K. Five Approaches To The Novel. (5) Four to 4 1/2 hours of lecture per week. Study of five novelists of different ethnic backgrounds and comparison of their techniques and aesthetic. To be offered 1979-80 and 1980-81. Honors and Tutorial Courses

Lower Division

90. Sophomore Seminar: Great Books of the Western Tradition. (6) Four to 4 1/2 hours of lecture per week. Intensive study of major works, for example: Orestes; The Republic; Augustus; Confessions; Divine Comedy; King Lear; Montaigne, Essays; The Prince; Don Quixote; Paradise Lost; Brothers Karamazov. The pre-
lation of Dreams. Limited to 15 students. Normally expected to remain enrolled for both quarters. Grading will be assigned and five units of credit will be granted when the thesis has been completed and has been approved by the three faculty readers.

The Staff (F, W, Sp)

Upper Division

H195. Honors Course. (5) Prerequisite: open only to seniors in the honors program. H195 entertains the writing of a bachelor's thesis, which may develop from work begun in a section of 151. The subject of the thesis must be approved by the instructor in charge and by the Chairman of the Major Advisers. The completed thesis will be read by the instructor in charge and two other faculty members. The thesis must be proposed and its subject approved in a regular quarter. It may be completed in one quarter, in two consecutive quarters, or in one quarter and a consecutive summer session. If the thesis is completed in one quarter, the grade will be assigned and five units of credit will be granted when the thesis has been completed and has been approved by the three faculty readers.

The Staff (F, W, Sp)

196A. Junior Seminar: Great Books of English and American Literature. (5) Four to 4 1/2 hours per week. Major works, including: Chaucer, Shakespeare, Thomas More, Milton, Spenser, Carlyle, T.S. Eliot, Virginia Woolf, others. Prerequisite: English 196. Normally open only to junior students with an average of not less than 3.5 or better. (Not limited to English majors.) Admission by consent of seminar staff.

The Staff (W)

196B. Senior Seminar: Special Topics. (5) Four to 4 1/2 hours per week. The topics will fall within one of the following general areas: (1) "Critical and Methodological Problems in the Study of Literature," topics: Comedy; Stylistics; Genres; Modes of Literary Analysis; Psychoanalytic Criticism; Dramatic Literature and Problems in Staging; Literature and Sociology; Literature and Politics. (2) "Literary Modes and Eras." Sample topics: Politics and Literature in 18th-Century England, 19th-Century French Literature, the Middle Ages. May be repeated with consent of the instructor and the approval of the chairman of major advisers. Readings and practice. The Staff (F)

200. History of Literary Criticism. (5) Three 1 1/2-hour lectures per week.

201. Graduate Readings. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of the instructor. An Introduction to the range of Renaissance Latin. The Staff (W)

203. Graduate Readings. (5) Four to 4 1/2 hours of lecture per week. Prerequisites: 202B—A knowledge of the structure of English, of Old English, and of Latin. 205A. Structure of English. The structure of present-day English—pronunciation, grammar, vocabulary, dialects. Mr. Boyd (W)

205B. History of English. Mr. Renoir (Sp)

206. Problems in the Study of Literature. (5) Four to 4 1/2 hours of lecture per week. Approaches to literary study are considered with emphasis on such matters as methodology and bibliography, critical theory and practice.

The Staff (F)

210. Readings in Medieval Latin. (5) Four to 4 1/2 hours of lecture per week. Prerequisites: Latins 205B or equivalent. An introduction to the central language and literature of the Middle Ages. May be repeated with consent of instructor. Mr. Dieth (W)

210C. Readings in Renaissance Latin. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of the instructor. An introduction to the range of Renaissance Latin. The Staff (W)

211A. Introduction to Old English. (5) Four to 4 1/2 hours of lecture per week. Open to seniors with consent of the instructor. Rapid reading of Old English texts. Mr. Renoir (W)

211B. Beowulf. (5) Four to 4 1/2 hours of lecture per week. Open to qualified undergraduates, with the instructor's consent. Mr. Renoir (W)

213. Readings in Middle English. (5) Four to 4 1/2 hours of lecture per week. Rapid reading of selections in Middle English, from the twelfth century through the fifteenth. Mr. Renoir (F)

254. Readings in Milton. (5) Four to 4 1/2 hours of lecture per week. Studies in the major works of Milton standards. Practice with actual student papers. The focus is on students whose level of skills may disqualify them from regular freshmen programs.

297. Community College English Programs: Principles and Practice. (5) Two hours of lecture and three hours of supervised classroom practice per week. Prerequisite: completion of three quarters of work in the graduate English program. Designed to acquaint students with typical community college English programs and to prepare the student to participate, and to assist in community college English classes, especially at the remedial level of freshman writing classes.

Graduate Courses

For admission to some seminars, special competence in a foreign language may be required, at the discretion of the instructor.

204. Celtic Studies. (5) Four to 4 1/2 hours of lecture per week. Intended for specially qualified Ph.D. candidates. The Staff (F, W, Sp)

205A—205B. The English Language. (5) Four to 4 1/2 hours of lecture per week. Prerequisites: 202B—A knowledge of the structure of English, of Old English, and of Latin. 205A. Structure of English. The structure of present-day English—pronunciation, grammar, vocabulary, dialects. Mr. Boyd (W)

205B. History of English. Mr. Renoir (Sp)

207. History of Literature. (5) Three 1 1/2-hour lectures per week.

208. Problems in the Study of Literature. (5) Four to 4 1/2 hours of lecture per week. Approaches to literary study are considered with emphasis on such matters as methodology and bibliography, critical theory and practice.

The Staff (F)

210. Readings in Medieval Latin. (5) Four to 4 1/2 hours of lecture per week. Prerequisites: Latins 205B or equivalent. An introduction to the central language and literature of the Middle Ages. May be repeated with consent of instructor. Mr. Dieth (W)

210C. Readings in Renaissance Latin. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of the instructor. An introduction to the range of Renaissance Latin. The Staff (W)

211A. Introduction to Old English. (5) Four to 4 1/2 hours of lecture per week. Open to seniors with consent of the instructor. Rapid reading of Old English texts. Mr. Renoir (W)

211B. Beowulf. (5) Four to 4 1/2 hours of lecture per week. Open to qualified undergraduates, with the instructor's consent. Mr. Renoir (W)

213. Readings in Middle English. (5) Four to 4 1/2 hours of lecture per week. Rapid reading of selections in Middle English, from the twelfth century through the fifteenth. Mr. Renoir (F)

246A—246B. Medieval Education (excluding, or at least not prominently featuring, Shakespeare)

246E—246F Restoration and Eighteenth Century

Mr. Traugott, Mr. Feingold (F, W)

246G—246H Romantic and Victorian (Modern British literature will be covered in 203)

246I—246J American Literature. (5) Mr. Michaels (F, W)

250A—250B. English Seminars. (5) Five 2-3-hour meeting per week. Required of all graduate students. Extends to consecutive quarters; normally in-progress grades will be assigned for the first quarter. Students may take a second 250 course for credit with the permission of his or her advisor and the instructor. Offerings vary from year to year. Students should consult the Department's Announcement of Courses for offerings in the current academic year.

The Staff (F, W, Sp)

251A—251B. Colloquia for Students in the English M.A. Program. (5-8) One 4-hour meeting per week. Open only to students in the M.A. Program. Extends to consecutive quarters; normally in-progress grades will be assigned for the first quarter. Qualified students should consult their advisers and the Department's Announcement of Courses for offerings in the current academic year.

Mr. Tracy, Mr. Oliver (F, W)

270. Research Seminars. (5) One 2-3-hour meeting per week. Intended for specifically qualified graduate students; candidates will not satisfy the seminar requirement. May be repeated for credit. Offerings vary from year to year. Students should consult the Department's Announcement of Courses for offerings in the current academic year

288. Special Studies. (5-10) Normally reserved for students directly engaged upon the doctoral dissertation. The Staff (F, W, Sp)

289. Special Study. (1-5) 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.

The Staff (F, W, Sp)

290. Individual Study. (1-6) Prerequisite: graduate standing. Individual study, in consultation with the graduate adviser, intended for qualified students to do necessary work to prepare themselves for language examinations and the comprehensive examination. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

290B. Individual Study for Doctoral Studies. (1-8) Individual study in consultation with the major field adviser for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

Environmental Studies

Group Major Office, Division of Special Programs, 301 Campbell Hall

Lecturer: Ms. Doris Sloan

Major Advisers: Mr. Clyde Wehnhagl, Head Adviser, Area I, Physical Science; Mr. James Cason, Jr.; Area II, Biological Science: Mr. Herbert G. Baker; Area III, Social Science: Mr. Ormer Granner.

Group Major in Environmental Studies

The group major program is administered through the Division of Special Programs. Students are referred to the Tile for all administrative matters, and this is where major students will file their study lists. A student may elect to follow one of three distinct areas in the group major in environmental studies, namely physical science, biological science, or social science.

Details of course listings appear below. In each of the three areas, there is a substantial amount of common ground, so that students will be able to talk with one another and to work together. Each program emphasizes the following areas: environment/life science, social science, and the humanities. Environmental studies is currently offered at all three levels: freshman, junior, and senior. Students should consult their advisers and the Department's Announcement of Courses for offerings in the current academic year.

NOTE: For key to symbols, see page 36.
environ\vment Studies 123, 124, 125; Geology 10, 106; Interdepartmental Studies 180; Public Health 150 or Civil Engineering 180. The topics for the class will change; the student should consult the departments to see which courses may be repeated and the program office to determine which requirement a particular course meets.

Honors Program. To be eligible for admission to the honors program in film, a student must have attained senior standing with a grade-point average of 3.3 or higher on all University work and a 3.3 grade-point average or higher in courses in the major. Students in the honors program must complete either Film H195A-H195B for letter grades to complete a senior honors thesis. Although the production of a film may be part of the preparation of the thesis and the film submitted as a documentation or example, it is expected that the thesis will consist of a substantial piece of writing on film criticism or film history.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Lower Division Courses. Mathematics 1A–1B, 1C or Mathematics 16A–16B; Computer Science 1; Physics 5A–5B or Physics 6A–6B–6C; Chemistry 1A–1B, 8A–8B; Biology 11A–11B; Economics 1; Geology 5C, 5D.

Upper Division Courses. Biology 150; a suitable course in demography recommended by the adviser; Environmental Studies 196A–196B; Chemistry 109A–109B; Geography 103.

20 units from the following list of courses: Anthropology 148; Civil Engineering 144, 167; Environmental Studies 123, 124, 151; Geography 144, 145, 188; Economics 100A; Geology 117, 144, 150; Physics 124; Public Health 150; Soil Science 100, 101, 103.

Area II: Biological Science

Lower Division Courses. Mathematics 16A–16B; Physics 6A–6B–6C; Biology 1A–1B; Chemistry 1A–1B; Economics 1. Strongly recommended: Chemistry 8A; Biology 8B; Computer Science 3.

Upper Division Courses. Anthropology 148 or Geography 103 or Sociology 160; Biology 150; a suitable course in demography recommended by the adviser; Environmental Studies 196A–196B.

Seven courses (26 units to be selected with the adviser’s concurrence from the following list: Anthropology 110, 111; Biology 151, 167; Botany 115, 124, 125, 154; Civil Engineering 143, 144; Entomology 103 and 105, 105, 110, 113; Environmental Studies 122, 123A, 123B, 123C, 124, 144, 170, 173, 175, 177, 178; Geophysics 130, 131, 139, 148, 188; Nutrition Science 160; Physical Education 105A–105B; Physiology 132; Pest Management 151; Plant Pathology 20; Public Health 150, 156 and 156L; Soil Science 100, 101, 103; Zoology 107A–107B, 131 and 131L, 138, 139, 140, 141, 142.

Recommended electives: Economics 100A; Environmental Studies 123, 124; Geography 132; Geology 5A or 5B; Biology 100, Interdepartmental Studies 180.

Area III: Social Science

Lower Division Courses. Mathematics 16A–16B or Mathematics 1A–1B–1C–5C; Computer Science 3; Physics 6A–6B–6C; Chemistry 1A–1B; Biology 11A–11B; Sociology 1A–1B.

Upper Division Courses. Biology 150; a suitable course in demography recommended by the adviser; Sociology 140; Geography 130; Environmental Studies 196A–196B; Economics 100A.

Fifteen units from the following list of courses: Anthropology 148; Economics 100B, 125; Environmental Studies 102; Geography 100, 101, 103, 131, 132, 188; PENR 100A; Sociology 1A, 160.

Recommended electives: Economics 121, 175, Environmental Studies 123, 124, 125; Geology 10, 106; Interdepartmental Studies 180; Public Health 150 or Civil Engineering 180. The topics for the class will change; the student should consult the departments to see which courses may be repeated and the program office to determine which requirement a particular course meets.

Honors Program. To be eligible for admission to the honors program in film, a student must have attained senior standing with a grade-point average of 3.3 or higher on all University work and a 3.3 grade-point average or higher in courses in the major. Students in the honors program must complete either Film H195A–H195B for letter grades to complete a senior honors thesis. Although the production of a film may be part of the preparation of the thesis and the film submitted as a documentation or example, it is expected that the thesis will consist of a substantial piece of writing on film criticism or film history.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Lower Division Course

1. Basic Film Techniques. (4) Two hours of lecture and two hours of discussion per week. Prerequisite: limited enrollment. A course for intended majors. The techniques of film editing will be integrated with the historical evolution of editing practices. Other topics include camera and lenses, film stock, lighting, sound, color. Examples chosen from American and documentary films. Ms. Fabe (F, Sp)

Upper Division Courses

101. Theory of Film. (5) Four to four and a half hours of lecture and two to four hours of Thursday laboratory per week. Prerequisite: Film 1 or equivalent. The study of major theorists of film such as Eisenstein, Bazin, Kracauer, semiotics, etc.

105. Special Topics In Film Genre. (5) Four to four and a half hours of lecture and two to four hours of laboratory per week. Prerequisites: May be repeated if topic changes. The study of film by "kind." Focus on a particular genre such as the documentary, the western, the animated film, film noir, the musical.

125A–**125B–125C. The History of Film. (5–6–5) Four to four and a half hours of lecture and two to four hours of laboratory per week. Prerequisite: Film 1 or equivalent. 125A–The Slav Film, 125B–The Italian Film, 125C–Contemporary Film (1960 to present) 125A: Mr. Dwoskin (F)

151. Auteur Theory. (5) Four to four and a half hours of lecture, discussion, and viewing per week. Prerequisite: Film 100 or equivalent. (4 quarters of foreign language relevant to the particu-
The Folklore Program

This program is designed to provide graduate students with a competent knowledge of both the materials of folklore and the various methods of studying these materials. The program is an interdisciplinary one in which faculty members from both the humanities and the social sciences participate. The scope of the courses is international. However, students may specialize in a particular genre, e.g., folktales; or in a particular area, such as Russian folklore.

The Major

There is no undergraduate major in folklore.

Preparation for Graduate Study

The best preparation for the graduate program in folklore is a strong undergraduate record in one of the broad fields with which folklore is closely affiliated. Since it is a study of the humanist expression which is handed down by tradition rather than by writing, it is related to all those departments that deal with literature, art, music. Since folklore also deals with the entire traditional culture of mankind as manifested in customs and beliefs, it has close affiliations with anthropology, design, history, linguistics, philosophy, psychology, and sociology. Consequently, a good undergraduate record in any of these disciplines is highly desirable though not necessarily required.

The Graduate Major

The requirements for the M.A. in folklore include 30 units of which at least 12 must be graduate level (200 number) in folklore, and an M.A. thesis based upon fieldwork or some other research project. (No course credits are allowed for the thesis.) Students must take at least one course in two of the following three areas: folk narrative, folk or ethnic music, folk or primitive art. As an introduction to the discipline, students must take 250A-250B, Folklore Theory and Techniques. 3-3 One 2-hour meeting per week. An interdisciplinary consideration of diverse topics related to fieldwork and research in folklore.

268A-268B, The Folktales and Allied Forms. 3-3 One 2-hour meeting per week. The study of folk narrative including motif and type classifications, theories of myth and folklore, and methods of analyzing prose narrative. Mr. Dunders (W, Sp)

298, Readings in Folklore. 3-6 Individual conferences to be arranged. The Staff (Mr. Bascom, Mr. Dunders in charge) (Su, F, W, Sp)

299, Directed Research. 3-6 Individual conferences to be arranged. The Staff (Mr. Bascom, Mr. Dunders in charge) (Su, F, W, Sp)

Related Courses in Other Departments

American Material Culture (Anthropology 121)
The Forms of Folklore (Anthropology 159)
Folklore Seminars (Anthropology 290)
260A, Problems of folklore
260B, Psychology and folklore
260C, North American Indian folklore
260D, Additional seminars on special topics to be announced

Mythology (Classics 178)
Myth and Literature (Comparative Literature 165)
Children’s Literature. Oral Interpretation (Librarianship 225C)
Theory of Dance. Ethic and Social Dance (Physical Education 160A)

History of Oral Tradition and Oral Interpretation (Rhetoric 210A, 210B)
Oral Tradition in Poetry (Rhetoric 225)
Scandinavian Mythology (Scandinavian 160)
Scandinavian Folklore (Scandinavian 165)
The Scandinavian Ballad (Scandinavian 225)
Folk Music of Europe and the Americas (Music 29A-29B)

Afro-American Music (Music 130)
Music of the South Asian Tradition (Music 133A)
Music of India (Music 133B)
Music of the East Asia Tradition (Music 134A)
Music of Japan (Music 134B)

Field Methods in Ethnomusicology (Music 203)
Theory and Methodology of Ethnomusicology (Music 234A-234B)

Russian Oral Tradition (Slavic 229)

Slavic Folklore (Slavic 147)

Folklore and Society (Sociology 164)

Introduction to the Ballad (Spanish 108)

The Ballad (Spanish 208A, 208B, 208C)

French

Department Office, 4125 Dwinelle Hall

Professors: Leo Bersani, Ph.D. (Chairman)
Alexandre E. Calame, Docteur es Lettres
Jacqueline de la Harpe, Docteur de Lettres
Joseph J. Duosan, Ph.D.
Marie-Hélène Huot, Docteur de 3ème cycle

Associate Professors: Bertrand P. Augst, Ph.D.
Therese G. Garnier, Ph.D.
Avis M. Smock,* Ph.D.

Assistant Professors: Suzanne Fieischman,* Ph.D.
George Longree, Ph.D.

Senior Lecturer: Gérard Jan, M.A.

Lecturer: Bernard Carcuignin, Agrégation (Visiting)

Linguistics: Esther Adler, Ph.D.
Ulysse Dutou, Licence de Pedagogie et Beaux-Arts

Francoise Lapierre, Diplome d’études superieures

The Department places primary emphasis on instruction in French at all levels, and the majority of its upper division courses are conducted entirely in that language. Non-majors, however, may write in English in any upper division course.

Please Note: For courses in which topics vary from year to year, students should consult the departmental Announcement of Courses.

The Major

Courses 1, 2, 3, 4, 5, 6, and 35 or their equivalents; 44 upper division units in French (of which 18 units must be taken in residence)

NOTE: For key to symbols, see page 36.
There are two options in the major, which share a common base in language study and the acquisition of competence in spoken and written French. Option A (Literature) offers, in addition, a strong concentration in its historical, social, and artistic dimensions; it further literary study. Option B (Civilization) aims to ground for careers other than the teaching of French one must be from 1G3A-103B-103C. Four courses in the series 112-120 covering three centuries, and one additional course from 121A-121B-121C, 122A-128D-126C, or H198A-H198B. Four elective upper division French courses. Courses 140 and 145 do not count for the major.

Option B: Two courses from the 103 series; at least one must be from 103A-103B-103C. Four courses in the series 112-120, covering three centuries, and one additional course from 121A-121B-121C, 122A-128D-126C, or H198A-H198B. Four elective upper division French courses. Courses 140 and 145 do not count for the major.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Sciences for courses on the List.

Graduate Study

The M.A. Program. A minimum of 36 units in French is required, including at least 18 units of graduate courses. With permission of the graduate adviser a maximum of 6 units of upper division or graduate work in other languages may be substituted for work in French, but the minimum of 18 units of graduate French courses remains the same. The aim of the program is to provide a comprehensive historical knowledge of French literature and culture. At the end, candidates will be asked to familiarize themselves with the works on a departmental reading list. For purposes of study and testing, French literature is divided chronologically as follows: (1) beginnings to 1500; (2) 1500-1650; (3) 1650-1789; (4) 1789-1870; (5) 1870 to present. The development of a good prose style and an awareness of the nature and function of criticism at certain periods of French literary history. Specific topics will vary from year to year.

Mr. Hollier (F)

The M.A.T. Program. A program leading to the Master of Arts in Teaching (French) degree. Course work will consist of twenty-four units in French and twenty-four units in Education and includes a written project. The program is completed during the second year. For a complete description please refer to the Announcement of the School of Education.

The Ph.D. Program. The program asks students to choose three defined areas of study within French literature and culture. Courses 112-120, covering three centuries, and one additional course from 121A-121B-121C, 122A-128D-126C, or H198A-H198B. Four elective upper division French courses. Courses 140 and 145 do not count for the major.

Language requirements: a reading knowledge of two foreign languages other than French is required. For further information, consult the graduate adviser and the Department guide to higher degrees.
A study of women as portrayed in French literature and from year to year. Mr. Putter (Sp)

132A–132B. History of the Language. (4–4) Three hours of lecture per week. Prerequisite: two quarters of French, or the equivalent.

133. Introduction to French Linguistics. (4) Three hours of lecture per week. Prerequisite: two quarters of French, or the equivalent. Ms. Fleischman (Sp)

135A. French Dialectology. (4) Three hours of lecture per week. Prerequisite: two quarters of French, or the equivalent, and French 133, or the equivalent. The varieties of French spoken in France as well as in French-speaking areas of Europe. Mr. Putter (Sp)

140. Readings in French Literature. (4) Three hours of lecture per week. Readings in French, class discussions and exercises in English. Topics offered will vary from year to year. Mr. Putter (Sp)


145A: Middle Ages to French Revolution (including Balzac, Hugo, Flaubert, Flaubert, Balzac, Baudelaire, Zola).

145C: The Twentieth Century (Mr. Putter (F, W))

160A–150B. Woman in French Literature. (4–4) Three one-hour lectures per week. Prerequisite: French 103 series, one of which must be 103D, 103E, or 103F, or the equivalent. Ms. Lasocki (W)

161A–161B. A Year in French History. (4–4) Three hours of lecture per week. Prerequisite: Two courses from 103, one of which must be 103D, 103E, or 103F, or the equivalent. Ms. Lasocki (W)

162. Perspectives on History. (4) Three hours of lecture per week. Prerequisite: Two courses from 103, one of which must be 103D, 103E, or 103F, or the equivalent. Mr. Calame (F)

166. Modern Notions of Utopia. (4) Three hours of lecture per week. Mr. Johnson (W)

170A–170B. French Films. (4–4) Three hours of lecture and 1 hour of laboratory per week. Prerequisite: Two courses from 103, one of which must be 103D, 103E, or 103F, or the equivalent. The development of French cinema. Discussions, oral and written reports will be based on the viewing of movies from the work of major French film directors. Mr. Johnson (F); Mr. Dutoit (W)

171. A Concept In French Cultural History. (4) Three hours of lecture per week. Prerequisite: Two courses from 103, one of which must be 103D, 103E, or 103F, or the equivalent. An examination of major cultural concepts from a double point of view. The manifestations of, for example, the baroque or romanticism in the different arts of a single period will be looked at. Attention will also be paid to the history of the concept itself.

172A–172B. Psychoanalytic Theory and Literature. (4–4) Three hours of lecture per week. Prerequisite: Two courses from 103, one of which must be 103D, 103E, or 103F, or the equivalent. The development of psychoanalysis into literary texts. Concepts of fantasy, of the self, and of desire applied to texts by Racine, Balzac, Lautreamont, Rimbaud, and Verlaine. Recent developments in French psychoanalytic thought.

173. Linguistics and Literature. (4) Three hours of lecture per week. Prerequisite: French 103 series, one of which must be 103D, 103E, or 103F, or the equivalent. The impact of linguistics on the theory of literature and the practice of literary criticism in recent years. Mr. Cerquiglini (F)

174. Music and Literature. (4) Three 1-hour lectures per week. Prerequisite: Two courses from the 103 series, one of which must be D or E, or the equivalent. A consideration of the ways in which certain writers, as well as some composers, have sought to relate what might be called the 'manifestations of language; song and poem, or musical score and literary text.

175. Literature and the Visual Arts. (4) Three 1-hour lectures per week. Prerequisite: Two courses from the 103 series, one of which must be D or E, or the equivalent. Using various works from the arts and the human sciences, this course will be an investigation into the relationship between literature, music, and art.

180A–180B–180C. French Civilization. (4–4) Three one-hour lectures per week. Prerequisites: Two courses from the 103 series, one of which must be D or E, or equivalent. The development of concepts of history in French thought. The Wars of Religion, the Fronde, the Commune, Louis XIV, and Napoleon. Ms. Smock (F); Mr. Genette (W)

181A. African Literature in French. (4) Three hours of lecture per week. Prerequisite: Two courses from 103, one of which must be 103D, 103E, or 103F, or the equivalent. A study of the African novel: traditional and French influences, structure, relationship between language and message.

185. French Historical Writing. (4) Three hours of lecture per week. Prerequisite: two courses from 103, one of which must be 103D, 103E, or 103F, or the equivalent. The concept itself.

186. Modern Notions of Utopia. (4) Three hours of lecture per week. Prerequisite: Two courses from 103, one of which must be 103D, 103E, or 103F, or the equivalent. The study of a significant year in French history from many points of view—political, sociological, intellectual, and artistic. Mr. Calame (F)

190. Supervised Independent Study and Research for Advanced Undergraduates. (2–5) Enrollment is limited to 20 students. Offerings vary from year to year. Relations with other literatures and the fine arts. Ms. Smock (F); Ms. Lasocki (W)

190. Supervised Independent Study and Research for Advanced Undergraduates. (2–5) Enrollment is limited to 20 students. Offerings vary from year to year. Relations with other literatures and the fine arts. Ms. Smock (F); Ms. Lasocki (W)

198A–198B. Honors Sequence. (2–4; 2–4) Prerequisites: Consent of instructor. Two courses from 103, one of which must be 103D, 103E, or 103F, or the equivalent. A study of the pressures of artistic, political and economic structures at moments of crisis in French history. Problems of continuity and discontinuity in esthetic and social history.

198. Literature and Colonialism. (4) Three hours of lecture per week. Prerequisite: two courses from 103, one of which must be 103D, 103E, or 103F, or equivalent. Studies in the literature developed in France at the height of the colonial era. The themes of travel, exoticism, neo-civilization: the exploration of European countries to the discovery of Africa. Ms. Hue (F)

205A–205B. Literary Criticism and Literary Scholarship. (2–5) Enrollment is limited to 20 students. Offerings vary from year to year. Concepts of fan studies. Ms. Sorgen (F); Mr. Hollier (W)

210A-210B-210C. Studies In Sixteenth Century Literature. (4–4–4) Two hours of lecture per week. Offerings vary from year to year. Students should consult the department’s Announcement of Courses for offerings in the current academic year. Mr. Johnson (F); Mr. Hollier (W)

213A–213B. Baroque Literature. (4–4) Two hours of lecture per week. Seminar study and discussion of baroque poetry, drama, and novel, treating one genre each year. Mr. Johnson (W)

220A-220B-220C. Studies in Sixteenth Century Literature. (4–4–4) Three hours of lecture per week. Prerequisite: Two courses from the 103 series, one of which must be 103D, 103E or 103F or the equivalent. The idea of social and sexual Utopia in France. Ms. Smock (F); Mr. Hollier (W)

225A–225B–225C. Nineteenth Century Fiction. (4) Two hours of lecture per week. Offerings vary from year to year. Ms. Smock (F); Mr. Hollier (W)

230A–230B–230C. Eighteenth Century Fiction. (4–4–4) Two hours of lecture per week. Prerequisite: two courses from the 103 series, one of which must be 103D, 103E or 103F or the equivalent. The idea of social and sexual Utopia in France. Mr. Johnson (F); Mr. Hollier (W)

231A–231B. Baroque Literature. (4–4) Two hours of lecture per week. Seminar study and discussion of baroque poetry, drama, and novel, treating one genre each year. Mr. Johnson (W)

232A–232B–232C. Eighteenth Century Fiction. (4–4–4) Two hours of lecture per week. Prerequisite: two courses from the 103 series, one of which must be 103D, 103E or 103F or the equivalent. The idea of social and sexual Utopia in France. Mr. Johnson (F); Mr. Hollier (W)

233. Nineteenth Century Fiction, (4) Two hours of lecture per week. Offerings vary from year to year. Ms. Smock (F); Mr. Hollier (W)

240A–240B–240C. Studies in Early Eighteenth Century Literature. (4–4–4) Two hours of lecture per week. Prerequisite: Two courses from the 103 series, one of which must be 103D, 103E or 103F or the equivalent. Mr. Johnson (F); Ms. Lasocki (W)

298. Special Study. (1–5) Variable hours of meeting. Designed for students engaged in exploration of a restricted field, involving the writing of a report. Ms. Smock (F); Mr. Hollier (W)

NOTE: For key to symbols, see page 38

L&S: French / 133
be substituted for available seminars or graduate courses. The Staff (F, W, Sp)

Lower Division Courses. Required: Biology 1A, 1B; Chemistry 1A, 1B; Geography 1A (or 12A-12B-112); Physics 6A-6B; Mathematics 16A-16B. Recommended: Physics 6C.

Upper Division Courses. A minimum of 40 units of upper division (graduate) courses is required. The courses must be in genetics, statistics, or from the list in Part II below and must meet the minimum requirements of Parts I and II below.

Part I. Required courses: Genetics 100 (5) or equivalent, 102 (4), 101 (2), and one of the following: Genetics 130 (4), 140 (5), or 159 (4). Note: Genetics 100 may be waived by the adviser for Honors Students who have had substantial laboratory work elsewhere.

Part II. A minimum of one course in each of the following five categories is required:

Biochemistry

Biology 1025 Biochemistry 100A-103B 100B-100C (4-4-4)
(2 1/2-2 1/2)

Cell Biology and Physiology

Bacteriology 100B (4) Nutrition 160 (6)
Bacteriology 103 (3) Physiology 101 (5)
Biology 153 (3) Physiology 152 (4)
Botany 130 (5) Plant Nutrition 115 (3)
Molecular Biology 110A Zoology 104 (4)
Molecular Biology 110B (5) Zoology 110A-110B (3-3)

Ecology

Biology 150 (4) Forestry & Conserv. 144
Biology 151 (4) Forestry & Conserv. 178
Botany 124 (10) Forestry & Conserv. 179
Botany 154 (3) Zoology 140 (3)
Entomology 105 (4) Zoology 142 (4)
Forestry & Conserv. 121A-121B-123C-123D (5-3-5-4)
Evolution

Anthropology 102 (5) Paleontology 101 (4)
Anthropology 108 (5) Zoology 109 (4)
Genetics 131 (5)

Organelar Diversity and Form

Bacteriology 100A (4) Forestry & Conserv. 170
Bacteriology 102 (4) Forestry & Conserv. 171
Botany 101 (5) Plant Pathology 100 (4)
Botany 102 (5) Plant Pathology 120 (4)
Botany 105 (5) Zoology 106 (4)
Botany 110 (5) Zoology 107A-107B (5-5)
Botany 120 (5) Zoology 107C (5)
Botany 124 (10) Zoology 108A-108B (5-5)
Entomology 100 (5) Zoology 143 (10)
Forestry & Conserv. 121 Zoology 143 (10)
Forestry & Conserv. 142 (4)
Note: Either Botany 124 or Zoology 143 may be used to fulfill simultaneously the Organismal Diversity and Form requirement and the Ecology requirement.

Honors Program. The program consists of a minimum four-term sequence taken in addition to requirements for the major. The sequence commences spring with Genetics H187, during which an honors thesis is written and submitted for review by a committee of three faculty members. A student in the program may elect to leave the program at any time prior to taking Genetics H187.

Students with an overall grade-point average of 3.0 and an average of 3.3 within the major are eligible to enter the honors program. Only students with an overall grade-point average of at least 3.3 at the time of graduation are eligible to be awarded honors.

Eligible students who complete the program may be awarded Honors, High Honors, or Highest Honors. Awarding of honors is made by the thesis review committee and is based solely upon the merits of the honors thesis.

Geography

Department Office, 501 Earth Sciences Building

Professors: James E. Vance, Jr., Ph.D.
Bernard Nietschmann, Ph.D.
Theodore M. Oberlander, Ph.D.
John E. Kessel, Ph.D.

Departmental Undergraduate Advisers: Mr. Byrne, Mr. Oberlander, Mr. Walker, Mr. Watts.

Departmental Graduate Advisers: Mr. Reed, Mr. Nietschmann.

Advising concerning requirements for undergraduate and graduate students is offered by the departmental advisers; guidance in the student's special field of interest is administered by the appropriate member of the staff. New students entering the Department at any level must consult with the departmental advisers until a specialty adviser has been selected or assigned to them.

The Geography Department aims to provide a broad-ranging perspective on man as an inhabitant and transformer of the face of the earth. The search for this kind of understanding involves thorough study of (a) the interlocking systems of the natural environment (climate, landforms, biota) and the evaluation of natural resources; (b) those diverse historical, cultural, social, economic, and political processes which affect the location and spatial organization of population groups and their activities; and (c) significant geographical units, whether described as cities, regions, nations, or landscapes, where integrated interpretation can be attempted, and a variety of problems thereby better understood.

The undergraduate major in geography therefore includes the study of various aspects of human, physical, and regional geography as well as cartography, quantitative methods, and field work. Backgrounds in the natural and social sciences, history, and statistical methods will be found useful to the geography major, the emphasis depending on the student's particular interests.

The Major

Lower Division. Geography 1, 4, and 7. (Transfer students who have had introductory courses elsewhere should consult with the Departmental Undergraduate Adviser in order to avoid repeating lower division work.)

Upper Division. A minimum of 40 units. The student must select one of four options. The order in which the courses are listed in each option does not imply a sequence.

Option I (Urban-Economic): Five courses from Geography 111-125; Geography 187.

Option II (Urban-Economic): Four courses from Geography 140-144 and 148; Geography 180.

Option III (Physical): Four courses from Geography 140-144 including Geography 140. 144 and 148; Geography 180, 187.

Option IV (General): One course from each of the following groups: Geography 100-104; Geography 110-125; Geography 130-137; Geography 140-149; Also Geography 180 and 183 or 187.

All geography majors must take Geography 189 and two regional courses numbered 150-171. Seniors with...
a grade-point average of at least 3.0 in the major may take graduate courses. Courses numbered 190–199 do not count toward completion of the major.

Honors Program. With the consent of the major adviser, a student with an overall grade-point average of 3.0 or higher and a grade-point average of 3.5 or higher for the last year in residence may apply for admission to the honors program. Application for acceptance in the program should be made by the beginning of the senior year. A senior in the honors program must complete Geography H195, in which a thesis is required, and at least one more graduate seminar.

Letters and Science List of Courses: 182 units from the List must be included in the 180 required for graduation. See the Announcement of College of Letters and Science for courses on the List.

Graduate Study

Geography deals with a broad spectrum of questions relating to society, environment, and spatial order. A variety of previous backgrounds may prove sound as a foundation for advanced study in the field. Entering the graduate program from fields other than geography should expect to take at least one upper division course in each of three areas—cultural, economic, and physical geography—during the first year of residence. Although the Department offers graduate training in physical, cultural, economic, and regional geography, it places strong emphasis on the interdisciplinary approach. Course specialists and related approaches in other disciplines.

The M.A. program involves completion of not less than one year of residence, at least four graduate seminars, and may take graduate seminars.

Graduate Study in Geography

Introduction to Physical Geography. (3) Three hours of lecture and one hour of discussion per week. Geographical and climatological aspects of physical geography.

Lower Division Courses

1. Introduction to Physical Geography. (3) Three hours of lecture and one 1/2 hour section per week. Origin of the Earth's major geological and climatological features and their influence on the characteristics of the surface of the Earth.

Natural Resource and Population, Population, and environment: processes in the formation of landscapes; gar. Mr. Reed (W).

2. Spatial Organization of Human Activity. (3) Three hours lecture and two 1-hour discussion sections per week. Quantitative and qualitative approaches to the localization of human activity. Typology of location and social and economic problems.

3. Primary Production: Major World Commodity Crops. (3) Three hours of lecture and one hour of discussion per week. Geographic aspects of production and trade in major food crops and mineral raw materials (including energy fuels).

Upper Division Courses

100. Principles of Cultural Geography: Culture and Urban Environments. (3) Three hours of lecture and one hour of discussion per week. Population, environment, and urbanization; religious geography and human settlement; cities as expressions of varying cultural traditions.

101. Principles of Cultural Geography: Culture and Regional Environments. (3) Three hours of lecture and one hour of discussion per week. Population, environment, and urbanization; religious geography and human settlement; cities as expressions of varying cultural traditions. Mr. Reed (W).

103. The Relations between Nature and Culture. (3) Three hours lecture per week. A history of the major ideas in Western thought, from antiquity to the present, concerning the relationship of humans to the natural environment. Mr. Glacken (Sp).

104. The City in the Third World. (5) Three hours of lecture and one hour of discussion per week. Major themes of urbanization in Third World cities; history of urbanization in non-Western cities; the genesis and impact of colonial urbanism; the contemporary city in the Third World. Mr. Reed (F).

107. Religious Geography. (3) Three hours of lecture per week. Impact of belief systems on landscapes and environments; distribution of religions; sacred places and spaces; pilgrimages; religious influences on people and place names. Mr. Reed (Sp).

110. Location Theory. (4) Three hours lecture per week. Location theory: location of productive and commercial activities in space. Pattern of agricultural activities, marketing, and business and service activities. The impact of non-optimal location decision-making on the world real estate market.

113. Systems of Cities and Regional Development. (5) Three hours of lecture and one hour of discussion per week. Processes of city-system development. Processes generating spatial hierarchy and regional economic and social inequalities. Regional development problems and policies in economically advanced and underdeveloped countries.

112. Historical Geography of Transportation. (4) Three hours of lecture per week. The influence of geographic factors on the development of transportation technologies and patterns: the shaping of patterns of settlement and economic development by transportation networks.

114. Industrial Localization. (3) Three hours lecture per week. Factors and trends in the geographic distribution of manufacturing and service industries.

120. Morphogenesis of the Western City: Pre-Industrial Urban Geography. (4) Four hours of lecture per week. Historical development of the physical structure and morphology of the pre-industrial city. Mr. Pred (Sp).

121. Morphogenesis of the Western City: Industrial Urban Geography. (4) Four hours of lecture per week. The development of the industrial city. Mr. Vance (F).

126. Social Geography. (4) Three hours of lecture per week. The interrelationships of social and physical space, with particular reference to migration and diffusion processes. Perception, attitudes, and behavior. Structure and process at the intrastateline and "urban field" scales of inquiry.

130. Natural Resources and Population. (5) A study of the interactions of population growth, technology, and natural resources, with emphasis on current literature. Focus on agricultural and non-agricultural energy use, world resource availability, and economic development.

142. Physiography of North America. (4) Three hours of lecture per week. An introduction to the physiography of the new world. Mr. Pred (Sp).
en satisfactory/unsatisfactory. May be repeated for credit. The Staff (F, W, Sp)

299. Individual Research. (1-8) Individual research for graduate students in consultation with staff member.

300. Seminar on the Teaching of Geography. (2) Two hours of seminar per week. The aims and methods of teaching geography at the college and university levels. All new teaching assistants are expected to enroll in all graduate students in the department. Grading will be on a satisfactory/unsatisfactory basis.

601. Individual Study for Master's Students. (1-8) Intended to provide an opportunity for qualified students who desire a general background in the field of study in consultation with the major field adviser. Units may not be used to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis.

602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examination requirements of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

Geology and Geophysics

Department Office, 301 Earth Sciences Building


Assistant Professors: George H. Bkimhoffs, Ph.D.; Ph.D.; Mark S. T. Bukowinski, Ph.D.

The Department of Geology and Geophysics offers the student excellent opportunities to pursue a broad background of knowledge and experience in the study of the structure and evolution of the earth. The undergraduate degree programs are offered, each leading to the A.B. degree in the College of Letters and Science or the B.S. degree in the College of Letters and Science for courses on the List.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

The Major in Earth Science

The major in earth science includes a broad spectrum of courses in natural science and is designed for students who desire a general background in the field of earth science. The upper division requirements are sufficiently flexible to serve a variety of special interests in the general field.

Lower Division Courses. Geology 5 or 10; Biology 7 or 11B; Chemistry 1A-1B; Mathematics 18A-18B; Physics 6A-6B-6C; Anthropology 1 or Astronomy 7.

Upper Division Courses. Six upper division courses in geology or geophysics, including Geology 101 (unless Geology 5 has been completed), Geology 150 (Geology 151 is strongly recommended); Paleontology 111, 112; three courses selected from the following list: Anthropology 100, 108; Biology 150, 160, 161; Chemistry 125-125A-125B-126; Forestry and Conservation 123A, 123B, 123C; Geography 130, 132, 135, 136, 137, 140; Interdepartmental Studies 211; Soil Science 100, 101, 102, 103, 110 (with Chemistry 13C).

Honors Program. Students with an overall grade-point average of 3.3 in the University, including 3.3 in the major, may apply 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 graduation with honors in earth science are required to take, in addition to the regular program, 6 units of Geology H195.

The Major in Geophysics

The major in geophysics is designed for students with facility in mathematics and an interest in geology; it provides a general background in the physical sciences, with emphasis on the physics of the earth.

Lower Division Courses. Geology 1; Geophysics 104A; Mathematics 1A-1B; Geology 101.


Honors Program. Students with an overall grade-point average of 3.3 in the University, including 3.3 in the major, may apply 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 graduation with honors in geophysics are required to take Geophysics 199 in addition to the regular program, and either write a research paper or take a comprehensive examination.

The Major in Engineering Geoscience

The College of Engineering with the cooperation of the Department of Geology and Geophysics offers a curriculum in engineering geoscience leading to the degree of Bachelor of Science (see section on Engineering Science in this Catalog).

Graduate Programs

The central objective of the graduate program is to encourage creative thinking and develop the capacity for independent and original research.

Student Background. The student is expected to have as a background:

1. Two years of college mathematics including at least one year of calculus at the level of Mathematics 1A, 51B, 51C and an introductory course in computer programming.
2. One year each of college chemistry and physics at the level of Chemistry 14 and Physics 5A-5B-5C.
3. For geology students, broad undergraduate training in geology, including paleontology, geophysics, and geology.
4. For geophysics students, additional mathematics and physics at the upper division level.

Students may be admitted with deficiencies in their prior training, but they are expected to correct these deficiencies during their first year of graduate work.

Geology. Students should plan to cover a broad spectrum of advanced courses, selected with the approval of the Graduate Adviser. Each program includes a minimum of eight formal upper division or graduate courses of which at least three are in related fields normally taken outside the Department of Geology and Geophysics. Courses taken within the Department of Geology and Geophysics should include several areas of study related to the student's major research interest. All incoming graduate students are encouraged to enroll in a course in field study.

Two Master's degree programs are offered. Requirements for the Master of Arts degree consist of 36 quarter units of upper division and graduate courses followed by a comprehensive oral examination. The Master of Science degree is granted upon completion of 30 quarter units of upper division and graduate courses and submission of a Master's thesis. The M.A. program requirements include at least 18 units in the graduate (200) series; for the M.Sc., at least 12 units must be in the 200 series. The Master's thesis should be completed within six quarters (two years).

Requirements for the Ph.D. degree include an oral qualifying examination given in the fourth or fifth quarter of graduate study and a thesis based on original scientific research, which should be submitted within four years of entry into the graduate program. In addition, Ph.D. students are required to demonstrate an ability to translate scientific literature in at least one foreign language (Chinese, French, German, Italian, Japanese, Russian or Spanish) during the first year of graduate work. A Master's degree is not prerequisite for a Ph.D.

Geophysics. The Master's degree is given by examination. Candidates must also complete a minimum of 36 units of upper division and graduate courses, of which at least 18 must be strictly graduate work. The degree usually requires between one and two years of full-time study. The examination must be taken before the end of the second academic year of studies.

Candidates for the Ph.D. degree must pass the examination for the Master's degree, satisfy the language requirement, and pass an oral qualifying examination covering a broad field of knowledge in the physical sciences. There is no formal course requirement for the degree, except that candidates are encouraged to complete a major course (3-5 units) in a physical science (geology, physics, geophysics, or mathematics) and a comparable number of units related to their field of interest (e.g., advanced dynamics, electromagnetism, etc.) in other departments. The qualifying examination is taken early in the third year of graduate work. By that time the language requirement has been satisfied and a research adviser selected. The preparation of a thesis requires at least a full academic year.

Seismographic Stations. The University operates 16 seismographic stations in northern California to study the seismically here and in adjacent parts of Nevada and Oregon and to conduct other research in seismology. Research includes the study of earthquake wave propagation, the nature of the waves, their relation to earth structure, the nature of earthquake sources, eigenvalues of the earth, and the theory of seismograph. Offices are housed in the Earth Sciences Building; seismographs and laboratories are in Havidall Hall and in an underground vault in Strawberry Canyon.

NOTE: For key to symbols, see page 35.
Geology

Lower Division Courses

Lower division courses in geology are designed to serve both general and specific interests in earth science, and they may be taken in any order. Credit is not allowed for both 5 and 10, which are alternative presentations of classical geology; enrollment is limited to 5.

101. Field Geology. (4) Two 1 1/2-hour lectures and one 2-hour laboratory per week. Introductory geology through laboratory study with at least one field trip. Minerals, rocks and structure of the earth. Internal and surface processes which change the earth.

Mr. Leopold (W); Mr. Weiss (Sp)

Upper Division Courses

Courses 106 and 110 are general interest courses with minimum prerequisites and are appropriate for non-science majors. Geology 110 is in Letters and Science.

101. Field Geology. (4) Two 1 1/2-hour lectures and two 2-hour laboratory periods per week. Basic crystallography, crystal symmetry, optical mineralogy and use of the petrographic microscope. Systematic mineralogy and crystal chemistry. Laboratory in mineralogy and petrography. Mr. Weiss (F); Mr. Carmichael (W)

102. Mineralogy. (5) Two 1 1/2-hour lectures and two 3-hour laboratory periods per week. Basic crystallography, crystal symmetry, optical mineralogy and use of the petrographic microscope. Systematic mineralogy and crystal chemistry. Laboratory in mineralogy and petrography. Mr. Weiss (F); Mr. Carmichael (W)

103. Igneous Petrology. (4) Two hours of lecture and three 2-hour laboratory sessions per week. Prerequisite: courses 150 and 102. Introduction to problems of origin and evolution of igneous rocks. Study of igneous rocks using petrographic microscope. Mr. Carmichael (F)

104. Metamorphic Petrology. (4) Two hours of lecture and two 3-hour laboratory periods per week. Prerequisite: course 150 and 102. Introduction to problems of origin of metamorphic rocks. Study of metamorphic rocks using the petrographic microscope. Mr. Weiss (F); Mr. Carmichael (W)

105. Sedimentology. (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: courses 106 and 101 or consent of instructor. Laboratory in processes of sedimentation; sedimentary structures and processes. Mr. Hay (F)

106. Mineral Resources. (4) Four hours of lecture per week, plus one 1-day laboratory. Prerequisite: a former course in mineralogy or consent of instructor. Non-renewable resources. Geologic environments, economic mineral resources, exploration techniques. Glacial geology and factors on history and human affairs. Mr. Meyer (Sp)

107. Plate Tectonics. (4) Two hours per lecture per week. Prerequisite: senior standing. Kinematics, dynamics and geological consequences of global tectonics. Mr. Alvear (W)

108. Geology of California. (4) Three hours of lecture and one hour of discussion per week; occasional field trips. Prerequisite: a college course in geology. Geologic framework and history of California; the geology of California in relation to man.

112. Stratiography and Structure. (4) Two 2-hour lectures per week. Prerequisite: consent of instructor. Interpretation of the stratigraphic record of various aspects of earth history (evolution, geomagnetism, climate, plate movements, etc.); geologic time and the geologic time scale. Mr. Alvear (F)

116. Geologic Structures and Maps. (4) Two 1 1/2-hour lectures and one 1 1/2-hour laboratory per week. Prerequisite: consent of instructor. Solution of structural problems and interpretation of geologic maps. Mr. Weiss (W)

117. Geomorphology. (4) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisite: consent of instructor. Interpretation of the stratigraphic record of various aspects of earth history (evolution, geomagnetism, climate, plate movements, etc.); geologic time and the geologic time scale. Mr. Alvear (F)

118. Senior Field Course. (12) Prerequisite: Geology 5 or 101, 150 or 160, and 116. A detailed investigation of one or more selected field areas with up to 8 weeks in the field and a final report prepared. Mr. Wahrhaftig (Sp)

119. Geologic Field Studies. (6) One or two week-end field trips to localities of geological interest. Prerequisite: course 5 or 101, 150, or consent of instructor. Can be repeated for credit. Mr. Meyer (F), Mr. Brimhall (Sp)

124. Geochronology. (3) Three 1-hour lectures per week. Radioactive dating of the origin of the earth and solar system; evolution of continents; problems in developing a geologic time scale; dating the evolution of man. Mr. Curtis (W)

131. Introduction to Geochronology. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: Chemistry 1A, 1B, 1C. Principles of thermodynamics in a geological context. Mr. Helgeson (F)

135L. X-Ray Crystallography Laboratory. (2) Formerly 125. Three 1-hour lab per week plus independent lab projects. Introduction to laboratory methods in X-ray crystallography. Elementary methods of X-ray analyses with emphasis on the powder method to identify crystalline substances and lattice parameters. Mr. Wink (F)

144. Fluidal Processes in Geomorphology. (4) Three hours of lecture and one hour of laboratory per week. Prerequisite: Geology 102. Radioactive dating of the origin of river systems, hillslope processes, river morphology and pattern, hydraulic geometry, concept of entropy, sediment transport theory and measurement, river mechanics. Mr. Wahrhaftig (F)

145. Photogeology. (2) One hour of lecture and three hours of laboratory per week. Prerequisite: Geology 5, 101, or 210. One-semester introduction to interpretation of aerial photographs. Photogeologic mapping. Photographic techniques for geological mapping in: satellite, air, and terrestrial photography. Mr. Wahrhaftig (F)

150. Minerals and Rocks. (4) Two 1-hour lectures and two 3-hour laboratory periods per week. Prerequisite: Chemistry 1A; Geology 5 or 10 or equivalent. Laboratory study of minerals and rocks. Mr. Brimhall (F)

151. The Earth. (4) Three 1-hour lectures and one 2-hour discussion period per week. Prerequisite: one year each of college calculus and physics; course 5 or 101. The earth as a whole; its internal constitution and evolution. Mr. Wang (F)

150. Petrology. (4) Two one-hour lectures and two three-hour laboratory periods per week. Prerequisite: Geology 102. Nature, distribution and origin of rocks. Mr. Hay (W); Mr. Weiss (Sp)

218. Environmental Analysis of Pleistocene Sedimentary Rocks. (3) Two hours of lecture and one hour of laboratory per week. Two-day weekend field trips. Prerequisite: an elementary course in geology and consent of instructor. Seminar course devoted to current research in environmental interpretation of non-marine Pleistocene sediments, primarily for paleontologists and archeologists who intend to do field work in Pleistocene rocks.

Mr. Hay (Sp)

225. Current Literature in Geomorphology. (3) Three hours of lecture per week. Prerequisite: consent of instructor. Review and discussion of current literature in geomorphology. Field work in Pleistocene sediments. Laboratory in classical interpretation, hillslope development, and environmental geology. Written and oral presentations. May be repeated for credit. Mr. Leopold (W)

231. Mineral-Solution Equilibria. (4) Three hours of laboratory per week. Prerequisite: Geology 231 or equivalent. Mathematical and physical basis of the study of geologic processes including large numbers of components, phases and reactions with emphasis on numerical prediction of the rate and extent of mass transfer resulting from weathering, diagenesis, metamorphism, abiotic expansion of vein fluids, hydrothermal metasomatism, etc. Mr. Heigeson (F)

232. Mass Transfer and Kinetics in Geochemical Processes. (4) Three hours of lecture per week. Prerequisite: Geology 231 or equivalent. Computer modeling of geochemical processes including large numbers of components, phases and reactions with emphasis on numerical prediction of the rate and extent of mass transfer resulting from weathering, diagenesis, metamorphism, abiotic expansion of vein fluids, hydrothermal metasomatism, etc. Mr. Heigeson (F)

235. X-Ray Crystallography. (2) Two hours of lecture per week. X-ray diffraction techniques, both powder and single crystal methods, and their use in identification and evaluation of theories of crystal structure and group and crystal structure. Application to basic problems of crystal chemistry. Mr. Wink (F)

233L. X-Ray Crystallography Laboratory. (2) Formerly 215A. Three 1 hour labs per week. X-ray diffraction laboratory with instruction in the use of all important techniques. To be taken concurrently with 235.

Mr. Wink (F)

236. Advanced Mineralogy. (4) Two 1-hour lecture and one 2-hour laboratory per week. Basic concepts of X-ray crystal structure determination and application to crystal chemistry. Structure refinement and determination of site occupancies of microcrystals and impurities (planar, linear and point defects; imaging techniques with the transmission electron microscope). Geologic significance of crystal structure and structural defects.

Mr. Wink (W)

280. Research. (2-12) The Staff (F, W, Sp, Su)

290. Seminar. (2-6) Topics will be announced each quarter. The Staff (F, W, Sp)

401. The Use of the Electron-Microscope. (3) Eight hours of laboratory per week. Prerequisite: graduate standing and consent of instructor. The operation of an electron microscope, and ancillary equipment, for the analysis of crystalline solids. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis.

Mr. Carmichael (F, W, Sp)

401. Individual Study for Master's Students. (1-8) For students with permission of instructor. Supervised study leading to the completion of a thesis. May be repeated for credit. Units may not be used to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)
602. Individual Study for Doctoral Students. (1-8)

In consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirement for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. 

[The Staff (F, W, Sp)]

Geophysics

Upper Division Courses

104A. Mathematical Methods in Geophysics. (4)

Three hours of lecture per week. Prerequisite: Mathematics 5A–5B–5C. Fourier and time-series analysis; spherical harmonics; transforms; fast-Fourier transform computing; Fourier transforms of a student's participation in the Honors program. The honors program involves two senior seminars (H195A-H195B) and an honors thesis (H198B for two units). The H198 courses are open to students qualified to participate in the honors program. Normally these courses will be offered in the fall and winter quarters, with the thesis to be written in the spring quarter, however, the thesis may be written at any time during the student's participation in the honors program. The Honors Committee, which consists of the major adviser and the two H195 instructors, approves the thesis topic and evaluates the thesis itself.

Letters and Science List of Courses: 162 units from the List must be included in the total units required for the degree. See the Statement of the College of Letters and Science for courses on the List.

Graduate Study

Aims of the Graduate Program. The graduate program of the Department of German is designed for future scholars and teachers in the fields of German language, literature, and linguistics. It aims at a comprehensive historical knowledge of German literature and/or linguistics and is designed to encourage the student to develop intellectual independence and creative initiative. The program leads to the Master of Arts and Doctor of Philosophy degrees in literature and/or Germanic linguistics and to the Master of Arts in Teaching (M.A.T.). Graduate students in German may wish to pursue Dutch studies as their secondary field of study.

Degree Programs:

M.A.T. Students learn to teach German at the high school level through advanced studies in German language, literature, and linguistics. These studies include, among other things, proficiency in German and practical training in the field of education.

M.A. The study of essential aspects of German literature and/or linguistics is designed to encourage the student to develop intellectual independence and creative initiative. The program leads to the Master of Arts and Doctor of Philosophy degrees in literature and/or Germanic linguistics and to the Master of Arts in Teaching (M.A.T.). Graduate students in German may wish to pursue Dutch studies as their secondary field of study.

NOTE: For key to symbols, see page 36.
Ph.D. in Literature. Various directions of study are explored, including literary history, literary theory, methodology, genres, periods and related disciplines such as other literatures, aesthetics, sociology, linguistics, psychology and folklore.

Ph.D. in Linguistics. The study of language, especially of modern German and its earlier phases, is emphasized. Areas of specialization include linguistic theory and method, dialectology, sociolinguistics, textual linguistics (linguistics and literature), applied linguistics and German philology.

Prerequisite for admission to full graduate standing. A Bachelor of Arts degree (or its equivalent) with an undergraduate major in German. Students admitted on the basis of their overall scholarship records, but with deficiencies in their preparation in German, are expected to make these up by additional coursework. All graduate students are expected to enroll in at least three graduate courses or seminars per academic year.

Master of Arts: Literature

Requirements: Nine courses (40 units) with a B grade or better. Six of these courses (24 units) must be on the graduate plane, four of these six must be in literature (16 units), and one in linguistics (4 units). The student is expected to do work in three periods of German literature (Middle Ages, 1500–1750, 1950–present), and to carry a normal course load of 8–12 units per quarter.

Required Courses:
1. at least one seminar in literature
2. at least one seminar in linguistics
3. one additional graduate course in linguistics, or 103A and 103B
4. Middle High German (203)
5. German Oral and Written Style (202).

Recommended Courses:
1. the prosession (200)
2. major periods in German literature (201A, 201B, 201C).

Examinations:
1. a test of the candidate's proficiency in the German language or successful completion of course 202
2. M.A. examination.

This will be given after the completion of four quarters of graduate study. Time extensions may be granted by the Graduate Committee in exceptional cases. The examination will be based upon the student's work in literature courses taken.

An M.A. reading list must be submitted to the Graduate Adviser during the fourth quarter of study. This should include the required texts of the literature courses taken, as well as some titles reflecting each of the major literary periods.

The examination will be administered by a committee of three. Candidates may choose one of the following formats:
1. a three-hour written examination
2. a two-hour oral examination
3. a two-hour written and a one-hour oral examination.

Initial course work in the complementary language(s) required for the Ph.D. should be undertaken as early as possible.

Master of Arts: Linguistics

Expected course load 8-12 units per quarter.

Requirements: 40 units in German with a B grade or better, including at least 24 graduate units, 4 of which may be in German literature. A knowledge of Middle High German and of the structure and history of the German language, as well as proficiency in modern German (202), is required. These requirements may be fulfilled by courses 103A, 103B, 203, 270, 271, or their equivalents taken at another university.

When these requirements have been met, the student will be given a written examination with emphasis on the descriptive grammar (phonology, morphology, and syntax) of German and the history of the German language in all its aspects. A reading list is available for general guidance.

Master of Arts in Teaching (M.A.T.)

The program encompasses seven quarters consisting of an advanced study in Germanic language and literature, as well as theoretical studies and practical training in education, plus a summer quarter in Germany. The program is administered by a joint committee of the Department of German and the School of Education. Candidates for the degree must have fulfilled the requirements for a major in German or its equivalent and the requirements for admission set by the Graduate Council. The candidate's program for the MAT degree will satisfy certification requirements for teaching in the state of California. Candidates who have satisfied the requirements for the degree, will be recommended by the faculty of the School of Education to the Graduate Council.

Academic credits for the degree in both departments consist of 56 quarter units: 24 in German, 18 in Education, 12 in literature. All other units will be in the seminar in methods of teaching German (301A–301B–301C) accompanying the year of teaching.

The student's work in German will be planned on the basis of an examination to determine the candidate's competence in speaking, listening comprehension, writing, and linguistics. The residence program in Germany is provided for those candidates who have not already had equivalent study and a period of residence in Germany.

The following graduate courses in German are required:
1. 202. German Oral and Written Style (4 units); 250. Aspects of German Literary and Cultural History (4 units);
2. 285. Descriptive German Grammar (4 units); 300. The Teaching of German (4 units).

Candidates should consult the School of Education for course requirements of that School.

Doctor of Philosophy: Literature

The Program. An M.A. in German or its equivalent is a prerequisite for admission to the doctoral program. There are no required courses. Upon acceptance, the student may work on a program in German literature in terms of a specific perspective, approach or problem of his/her own choice. In the second quarter of the doctoral program the student will submit an advisory committee of three faculty members from the German Department. Faculty from other departments may be added to the committee. After consulting with the advisory committee, the student will submit a written proposal of study for committee approval plus a projected reading list. The committee approval plus a projected reading list. The committee must support the student's course of study until he/she has passed the Qualifying Examination and endorses him/her to do preliminary research for his/her dissertation.

Complementary Studies. It is considered essential to the Ph.D. program that students think broadly and take courses in a variety of subjects. A student in the program is advised to take courses in literature, the history of the German language, and related fields that are of special interest to him/her.

The College of Letters and Science requires that each student who is to be considered for the degree of Doctor of Philosophy in German must demonstrate competence in at least one European language, other than German or English. The proficiency will be tested either by passing the examination administered by the German department (or its equivalent) or by successful completion of French 5. If other foreign languages can be justified as more useful to the individual doctoral program, the graduate adviser will arrange for an examination in that language or in its equivalent, and the student must satisfy this requirement by successful completion of the fifth quarter of that language.

2. Demonstration of an exceptionally thorough knowledge of and fluency in one European language other than German or English. The proficiency will be tested either by passing the examination administered by the German department (or its equivalent) or by successful completion of French 5. If other foreign languages can be justified as more useful to the individual doctoral program, the graduate adviser will arrange for an examination in that language or in its equivalent, and the student must satisfy this requirement by successful completion of the fifth quarter of that language.

The Examination. The Ph.D. qualifying examination emphasizes the initially approved (and amended) program of study and consists of:
1. a written examination in two three-hour periods, to be taken within two weeks; each period may be extended by 3 hours for revisions;
2. a three-hour oral examination which is to be taken within one month of the written examination and which will emphasize, in addition to the approved program of study, the preliminary work done on the dissertation.

Doctor of Philosophy: Linguistics

An M.A. in German linguistics or its equivalent is a prerequisite for admission to the doctoral program. There are no required courses. However, the student is expected to consult with the graduate adviser regarding the best sequence of courses to be taken. A limited program of study in the area of German literature can be included.

The student must demonstrate fluency in at least one European language, other than German and English. For details see requirements for the Ph.D. in Literature.

The Ph.D. Qualifying Examination for students specializing in German linguistics consists of a written examination of two periods of three hours each and an oral examination (three hours). The examination will deal primarily with the descriptive (synchonistic) and historical (diachronic) aspects of German, its dialects and periods, and of the Germanic language family, one complementary field can be selected by the students.

Waiver Program in German (for future teachers of German)

Adviser: Klaus A. Mueller

Successful completion of the Waiver Program in German exempts the student from taking the examination required for the single subject credential with a teaching specialization in German.

The program is based on requirements for the German major at Berkeley as modified for additional work in special areas. The Waiver Program in German requires completion of a minimum of sixty-five (65) units of course work as listed below:
1. German 1–5 (25 units)
2. 36 units from Group I as listed herein including: German 100 (4), 101 (8), 102 (8), 103 (4), 104 (4), 112 (4)
9 units taken from literature courses
3. German 300 (4)

Dutch Studies

For a description of the group major in Dutch studies see alphabetical listing under College of Letters and
Science. Descriptions of the courses presenting the language, literature, history, and culture of the Netherlands, offered by the Department of German, follow German courses.

**German**

**Lower Division Courses**

1. **Elementary German.** (5) Five 1-hour class meetings and two 1-hour sessions in the language laboratory per week. Not open to students who have completed German 1A or 14A. Mr. Mueller in charge (F, W, Sp).

2. **Elementary German.** (5) Five 1-hour class meetings and two 1-hour sessions in the Language Laboratory per week. Prerequisite: course 1 or its equivalent. Not open to students who have completed German 14B. Mr. Mueller in charge (F, W, Sp).

3. **Elementary German.** (5) Five 1-hour class meetings and two 1-hour sessions in the language laboratory per week. Prerequisite: course 2 or its equivalent. Not open to students who have completed German 14C. Mr. Mueller in charge (F, W, Sp).

4. **Intermediate German.** (5) Five 1-hour class meetings and two 1-hour sessions in the language laboratory per week. Prerequisite: course 3 or the equivalent. Not open to students who have completed German 14D, and 4R. Mr. Mueller in charge (F, W, Sp).

*4R. Intermediate German (Emphasizing Reading).* (5) Five 1-hour class meetings per week. Prerequisite: course 3, or the equivalent. The purpose of this course is to serve those students who want to develop their reading ability rapidly so that the study of literature or the translation and analysis of scientific or other German prose texts can be carried out as soon as possible. Mr. Mueller in charge (F, W, Sp).

5. **Advanced German.** (5) Five 1-hour class meetings per week. Prerequisite: course 4, or the equivalent. Grammatical review and selected reading in German literature. Mr. Millec in charge (F, W, Sp).

14A–14B–14C–14D. **Individualized Instruction.** (1–5; 1–6; 1–5; 1–5) This series covers the material of German 1–4, for a total of 20 units. Students must enter at any level, and must enroll for a minimum of two units. Open to any student whose program including this course, meets the minimum study list requirement. It is incumbent upon the student to read the program instruction sheet which may be obtained from the department. Mr. Mueller in charge (F, W, Sp).

10. **Women In German Literature.** (4) Three hours of lecture/discussion per week. A study of women writers and the portrayal of women in various genres, including literary, philosophical and aesthetic writings. Ms. Goldstein (F).

11A–11B. **Advanced German Grammar and Composition.** (3) Three hours of lecture/discussion per week. Prerequisite: unless otherwise stated, five lower division German courses (25 units), or their equivalent. Ms. Goldstein (Sp).

101A–101B. **Advanced German Grammar and Composition.** (3) Three hours of lecture/discussion per week. Prerequisite: unless otherwise stated, five lower division German courses (25 units), or their equivalent. Ms. Goldstein (Sp).

102. **Advanced German Conversation.** (3) Three hours of meeting per week. May be repeated for credit three times. Total number of credits not to exceed nine. Required for all majors. Not open to native speakers. Staff (F, W, Sp).

103. **Introduction to Descriptive German Grammar.** (2–5) Two hours of lecture/discussion per week. Credit and grade will be given after completion of the sequence. Staff (F, Sp).

103A. **Phonetics and Phonology.** Mr. Penzl (F).

103B. **Morphology and Syntax.** Mr. Penzl (W).

104. **Introduction to the Linguistic Study of German.** (4) Four hours of lecture per week. Staff (F, Sp).

105. **Middle High German for Undergraduates.** (4) Three hours of lecture per week. Basic grammar and selected readings in Middle High German. Exempts from the Requirement. Not open to graduate students for credit. Ms. Tennant (F).

106. **Readings In Middle High German.** (4) Three hours of lecture/discussion per week. Designed to impart a thorough reading knowledge of Middle High German. Ms. Tennant (W).

110A. **The Drama of Revolution and Revolt in German Literature.** Mr. Hobbs (F).

110B. German Fascism. Study of literature, and other forms of communication and of forms of culture about which the development and state of fascism in relation to the political, social, economic, and cultural situation in pre-war and Nazi Germany. When possible, films and tapes will be used. Ms. Goldstein (W).


111. **The Historical Folk-Narrative of Europe.** (4) Three hours of lecture per week. Prerequisite: reading knowledge of one European language desirable. Various methods (geographic-historical, sociological, mythological, psychological, structural) will be applied to the analysis of European folk-narratives (Märchen). Mr. Tubach (Sp).

112. **Contemporary German Culture and Political Institutions.** (4) Three hours of lecture-discussion per week. Main trends in the cultural history of Germany since World War II, with particular emphasis on the post-war division of Germany and its impact on cultural and literary development in the Federal Republic of Germany and the German Democratic Republic. Mr. Muller (Sp).

114. **Yiddish Literature in Translation: Culture of the Old Country and the New World.** (4) Three hours of lecture and one 2-hour discussion section per week. Literary works will be studied as aesthetic, social and historic documents to illuminate the societies and cultures in which they were created—the Jewish communities in Eastern Europe and the U.S. When possible, films will supplement the readings. Ms. Goldstein (F).

**Group II**

1. **Philosophical Approaches to German Literature.** (4) Three hours of lecture per week. Prerequisite: German 100 and at least one literature course each from Groups C, D, E. Mr. Seeba (W).

2. **Sociological Approaches to German Literature.** (4) Three hours of lecture per week. Prerequisite: German 100 and at least one literature course each from Groups C, D, E. Mr. Seeba (W).

3. **Psychological Approaches to German Literature.** (4) Three hours of lecture per week. Prerequisite: German 100 and at least one literature course each from Groups C, D, E. Mr. Seeba (W).

**Upper Division Courses**

**Group I**

All courses in this group are given in English and all texts are in English translation. Open to undergraduate and graduate students. Units may not be applied toward the major in German.

160. **Issues and Problems In German Literary and Cultural History.** (4) Three hours of lecture and a 1 to 2-hour discussion per week. May be repeated for credit when topic changes. 1979/80 topics: *160A. The Drama of Revolution and Revolt in German Literature. Ms. Tennant (F).*

*160B. German Fascism. Study of literature, and other forms of communication and of forms of culture about which the development and state of fascism in relation to the political, social, economic, and cultural situation in pre-war and Nazi Germany. When possible, films and tapes will be used. Ms. Goldstein (W).*


161. **The Historical Folk-Narrative of Europe.** (4) Three hours of lecture per week. Prerequisite: reading knowledge of one European language desirable. Various methods (geographic-historical, sociological, mythological, psychological, structural) will be applied to the analysis of European folk-narratives (Märchen). Mr. Tubach (Sp).

162. **Contemporary German Culture and Political Institutions.** (4) Three hours of lecture-discussion per week. Main trends in the cultural history of Germany since World War II, with particular emphasis on the post-war division of Germany and its impact on cultural and literary development in the Federal Republic of Germany and the German Democratic Republic. Mr. Muller (Sp).

164. **Yiddish Literature in Translation: Culture of the Old Country and the New World.** (4) Three hours of lecture and one 2-hour discussion section per week. Literary works will be studied as aesthetic, social and historic documents to illuminate the societies and cultures in which they were created—the Jewish communities in Eastern Europe and the U.S. When possible, films will supplement the readings. Ms. Goldstein (F).

**Group II**

1. **Philosophical Approaches to German Literature.** (4) Three hours of lecture per week. Prerequisite: German 100 and at least one literature course each from Groups C, D, E. Mr. Seeba (W).

2. **Sociological Approaches to German Literature.** (4) Three hours of lecture per week. Prerequisite: German 100 and at least one literature course each from Groups C, D, E. Mr. Seeba (W).

3. **Psychological Approaches to German Literature.** (4) Three hours of lecture per week. Prerequisite: German 100 and at least one literature course each from Groups C, D, E. Mr. Seeba (W).

**H. Honors and Special Studies Courses**

**H195A**–**H195B. Honors Seminars for Undergraduates.** (4–4) Three hours of seminar per week. Prerequisites: 3.5 GPA in at least 20 units of upper division German; 3.3 overall GPA. Course normally open only to students participating in the Honors program; however, enrollment warrants and instructor consents, other students may be admitted. Topics vary from year to year.

H195A. Mr. Hillen (F).

H195B. Ms. Goldstein (W).

NOTE: For key to symbols, see page 38.
249. Franz Kafka. (4) Three hours of seminar per week. Mr. Kudszus (Sp)

198. Directed Group Study, (2–4) Group study of selected topics which will vary from quarter to quarter. Staff (F, W, Sp)

199. Supervised Independent Study and Research in German. Enrollment is restricted by regulations listed on page 36. Additional limitation: overall grade-point average of at least 3.0. Must be taken on a passed/not passed basis. Staff (F, W, Sp)

Graduate Courses

200. Prosseminar in German Literature. (5) Three hours of seminar and one hour of tutorial per week. Introduction to the bibliography, history, and methods of German studies (Germanistik). Strongly recommended for all M.A. candidates. Mr. Holub (W)

201A–201B. Major Periods in German Literature. (4–4–4) Three hours of lecture/discussion per week. Strongly recommended for all M.A. candidates.
*201A. Middle Ages
Mr. Tubach (W)
201B. From Luther to Lessing
Mr. Hillen (W)
201C. 19th Century
Mr. Seeba (Sp)

202. German Oral and Written Style. (4) Four hours of lecture/discussion per week. Conducted entirely in German with intensive practice in speaking and understanding the language. Required for all M.A.T. and M.A. candidates.
Mr. Hillen (F), Mr. Mueller (Sp)

203. Middle High German for Graduates. (4) Three hours of lecture per week. Required preparation for 205. This course is not a continuation of 106. Basic grammar, extensive readings in Middle High Ger-

man. Not open to undergraduate students for credit.
Mr. Spahr (F)

Graduate Seminars

*205. Studies in Medieval German Literature. (4) Three hours of seminar per week. Prerequisite: German 106 or 203. May be repeated for credit when topics change.
1979/80 topics:
Wolfram v. Eschenbach.
Mr. Spahr (W)
Gottfried v. Strassburg.
Mr. Tubach (Sp)

206. German Literature of the Renaissance and Reformation. (4) Three hours of seminar per week. Ms. Tennant (W)

*209. German Literature of the Seventeenth Century. (4) Three hours of seminar per week. Topics include: Gottsched, Lohenstein, Grimm, Tieck, von der Marck, Baroque poetry.
Mr. Spahr (Sp)

*212. Lessing. (4) Three hours of seminar per week.
Mr. Hillen (F)

*215A–215B. Goethe. (4–4) Three hours of seminar per week.
215A. Goethe to 1808.
215B. Goethe 1808 to 1832.

*224. Schiller. (4) Three hours of seminar per week.
Mr. Weisnger (Sp)

*227. German Romanticism. (4) Three hours of seminar per week.

*230. Heine. v. Kleist. (4) Three hours of seminar per week. Mr. Jachow (Sp)

*238. German Realism. (4) Three hours of seminar per week. Changing topics include: Keller, Meyer, Fontane, Storm, Reaue.

239. German Naturalism. (4) Three hours of seminar per week.

*242A–242B. Bildungsgroman. (4–4) Formerly 28A–28B. Three hours of seminar per week. Credit and grade to be given upon completion of the sequence.
Ms. Spahr (F, W)

245. Interpretation and Criticism of German Poetry. (4) Three hours of seminar per week.
Mr. Jaszi

247. Herrmann Hesse. (4) Three hours of seminar per week.
Mr. Mickle (F)

*248. Thomas Mann. (4) Three hours of seminar per week.
Mr. Mickle (W)

249. Franz Kafka. (4) Three hours of seminar per week.
Mr. Kudszus (Sp)

250. Aspects of German Literary and Cultural Histor-
y 1979/80.
Mr. Tubach (Sp)
260. Seminar in German Literature. (4) Two to three hours of seminar per week. May be repeated for credit when topic changes. Topics for 1979/80:
260A. German Romanticism. (4) Three hours of seminar per week. Mr. Weisnger (F)
260B. Theodor Fontane. Ms. Bonwit (F)
260C. Theory of Poetry. Mr. Kudszus (W)
260D. Literary irony from Goethe to Kafka. (W)
Mr. Hillen (W)

Graduate Courses in Linguistics

270. Introduction to the History of the German Language. (4) Three hours of seminar per week. Ms. Rauch (W)

271. Historical Phonology and Morphology of German. (4) Three hours of seminar per week. Recommended for all candidates for the M.A. with linguistic emphasis.
Ms. Rauch (Sp)

273. Gothic. (4) Three hours of seminar per week.
Ms. Rauch (F)

276. Old High German. (4) Three hours of seminar per week.
Mr. Penzl (Sp)

*282. Old Saxon. (4) Three hours of seminar per week.
Mr. Penzl (W)

*285. Descriptive German Grammar. (4) Three hours of seminar per week. Prerequisite: course 103A and 103B. Deals with the grammatical structure and the sounds of Modern German in contrast to the corresponding features of American English. Required of all M.A.T. candidates.
Staff (Sp)

290. Seminar in Germanic Linguistics. (4) Three hours of seminar per week. Topics will vary from year to year. May be repeated for credit when topic changes. Topics for 1979/80:
290A. Applied German Linguistics I: Linguistics and Literature.
Mr. Seeba (F)
290B. Applied German Linguistics II: Linguistics and Translation.
Mr. Penzl, Mr. Kudszus (W)
290C. Applied German Linguistics III: Linguistics and Language Instruction.
Mr. Penzl, Mr. Mueller (Sp)

299. Individual Study for Graduate Students in Literatu-
1979/80 topics:
299A. Course 110.
299B. Course 110 or consent of instructor. A thorough study of the language in the development of the oral language style.
Mr. Snapper (F, W, Sp)

120A. Advanced Grammar and Composition. (4) Three hours of lecture per week. Prerequisite: course 3 or consent of instruc-
tor. A thorough study of the language in the development of the oral language style.
Mr. Snapper (F, W, Sp)

120B. Advanced Dutch Conversation. (2–2) Two hours of lecture per week. Prerequisite: course 110 or consent of instructor. Course is designed to analyze Dutch texts from Middle Dutch to contemporary literature. Topics vary from quarter to quarter. May be repeated when topic changes.
Mr. Snapper (F, W, Sp)

150. Introduction to the Literature of the Nether-
slands. (4) Three hours of lecture per week. Prerequisite: course 110 or consent of instructor. A literary-historical survey of Dutch literature from the Middle Ages to the present. Selective readings in poetry, prose, and drama. Given in Dutch. Staff (W)

*160. Literature of the Lowlands in English Transla-
tion. (4) Three hours of lecture per week. Study of the major contemporary Dutch and Flemish writers and literature.
Mr. Snapper (W)

170. The Netherlands: Culture and Institutions. (4) Three hours of lecture per week. A historical study of the cultural contributions of the Netherlands and an analysis of the political system. Special emphasis on the social and political aspects of the contemporary scene. Lectures in English.
Staff (Sp)

*180. Middle Dutch. (4) Three hours of lecture per week. Prerequisite: reading knowledge of either Ger-
mament or Dutch. A linguistic analysis of Middle Dutch and reading of selected medieval Dutch texts.
Mr. Snapper (F, W, Sp)

190. Senior Thesis. (4) Two hours of meeting per week. Prerequisite: course 103A or 103B. Pre-
106 or 203. May be repeated for credit when topic changes.
Mr. Snapper (F, W, Sp)

H196. Honors Studies in Dutch. (1–9) Supervised independent study and research course for honors stu-
dents who are writing their theses for completion of the requirements for the Honors Program. Pre-
requi
106 or 203. May be repeated for credit when topic changes.
Mr. Snapper (F, W, Sp)

198. Directed Group Study, (1–4) One to four hours of meeting per week.
Mr. Snapper (F, W, Sp)

199. Supervised Independent Study and Research in German. Enrollment is restricted by regulations listed on page 36. Additional limitation: overall grade-point average of at least 3.0. Must be taken on a passed/not passed basis.
Mr. Snapper (F, W, Sp)

240. Graduate Readings in Dutch. (4) Three hours of lecture/discussion per week covering various peri-
ods and genres in Netherlandic literature from the Middle Ages to Modern times. Offerings vary from quarter to quarter. May be repeated for credit when topics change. Prerequisite: graduate standing.

Mr. Snapper (F, W, Sp)

289. Individual Studies In Dutch for Graduate Students  
1. (F) Prerequisite: graduate standing. Intended for graduate students engaged in exploration of a restricted field, involving the writing of a research paper.

Mr. Snapper (F, W, Sp)

Related Courses in Other Departments

Linguistics 233: Germanic Linguistics

Comparative Literature 210A—210B: Studies in Medieval Literature.

History

Department Office, 3229 Dunnell Hall

Professors:

Richard M. Abrams, Ph.D.

Thomas N. Bisson, Ph.D.

Ricard M. Abrams, Ph.D.

Thomas Q. Barnes, O.Phil.

Linguistics 233: Germanic Linguistics.

Professors:

Ricard M. Abrams, Ph.D.

Thomas N. Bisson, Ph.D.

Department Office, 3229 Dunnell Hall

Related Courses in Other Departments

History

Professor:

Dr. John E. Lesch, Ph.D.

Associate Professors:

Thomas W. Laqueur, Ph.D.

Robert L. Middlekauff, Ph.D.

Nicholas V. Riasanovsky, Ph.D.

D. Philip Rome (Koenig-Ehmann Professor)

Associate Professors:

Diane G. Cloud, Ph.D.

Pamela Buczek, Ph.D.

Lynn A. Hunt, Ph.D.

Dr. John E. Lesch, Ph.D.

Assistant Professors:

Mary E. Barry, Ph.D.

Tony R. Judt, Ph.D.

Robert L. Middelfauth, Ph.D.

D. Philip Rome (Koenig-Ehmann Professor)

Nicholas V. Riasanovsky, Ph.D.

D. Philip Rome (Koenig-Ehmann Professor)

Departmental Major Advisers: Consult Undergraduate Office.

The Major

The major program in history shall total at least 60 quarter units or the equivalent (usually 12 courses), one of which must be chosen from the following: History 103A, 103B, or 103C. History 103A, 103B, and 103C are not recommended for the first quarter of upper division work or the first quarter at Berkeley; preparation through upper division lecture courses in history is often assumed by students.

Upper Division Honors Program. The program is intended for students of high ability in history who have the necessary grade point averages (at least 3.3 in the major and 3.3 overall) which are required for admission to the program and for the awarding of honors at the time of graduation. Option A: The departmental Honors Committee will select qualified students for the program on the basis of the research essay they have written in History 101A-B. This essay must be of honors quality to be accepted for the honors program. A student admitted for this option must complete, in addition to major requirements, (1) History H102, Colloquium on Historical Thought, and (2) an oral examination in one of four general fields and historical studies. The Honors Committee will determine if the essay, oral examination, and record in history courses fulfill the requirements for Honors, High Honors, or Highest Honors. The result will be noted on the student's transcript. In addition to major requirements, students will write an honors research essay under the supervision of a member of the Department who has consented to direct it. For this purpose students will be assigned, with consent of the instructor, a two-quarter graduate seminar, History 285. After completing their essays, they will receive a grade for these courses from the faculty supervisor of History H102. The Honors Committee will determine the degree of Honors based on assessment of the essay and the record in history courses. In both options, Honors will only be awarded if the student's work is of sufficient quality. Further information is available in the departmental office or from the head of the Honors Committee.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation.

History 103A, 103B, or 103C. History 103A, 103B, and 103C are not recommended for the first quarter of upper division work or the first quarter at Berkeley; preparation through upper division lecture courses in history is often assumed by students.

Lower Division Courses

European Civilization. Two 1-hour lectures and two 1-hour section meetings per week. Introductory study of periods of major historical significance in the course of European history. Emphasis on class discussions, readings in the sources, and writing of essays.

4A. Ancient. (5) Mr. Sealey (W)  
4B. Medieval. (5) Mr. Caspary (F)  
4C. Renaissance and Reformation. (5) Mr. Starn (Sp)

4D. Enlightenment and Revolutions. (5) Mr. T. L. Acquaro (W)  
5. Modern Europe. (5) Three hours of lecture and two hours of section per week. A survey of Europe from the Reformation to the present.

Mr. Rohrbaff (F)  

17. Introduction to the History of the United States. (5) Three hours of lecture per week.

Mr. Litwack (W)  

17A. From Colonial Settlement to the Civil War. (3) Three hours of lecture per week.

Mr. Sellers (Sp)

17B. From the Civil War to the Present. (3) Three hours of lecture per week.

Mr. Sellers (Sp)

17C. From Colonial Settlement to the Civil War. (5) Three hours of lecture and two hours of discussion per week.

Mr. Litwack (W)  

18A—18B. Latin-American History. (5—6) Three hours of lecture and one 1-hour section meeting per week. Prerequisite: sophomores standing.

Mr. King (F)  

18B.  

19A—19B. Asian History. (5—6) Two 1-hour lectures and one 2-hour section meeting per week. Prerequisite: sophomore standing.

Mr. King (F)  

39. Seminars for Lower Division Students. (5) One 3-hour meeting per week. Seminars in the various fields of history designed to introduce to undergraduates to problems of historical methods and interpretations. Work in the course will include research and a research paper. Limited to fifteen students per section. May be repeated once for credit but not with the same instructor. Prerequisite: prior consent of instructor. For preregistration schedule of seminars, see list of courses during pre-enrollment week each quarter. To be offered 1979/80 only.

19A—49B. Studies in Historical Thought. (5—6) Four hours of meeting per week. Intended to introduce students to the problems and methods of studying American history. Relies almost completely on the use of primary materials.

Mr. Levine (F)

Upper Division Courses

Group I—Unrestricted Courses

Open to students in the upper division; prerequisites as noted. Unless specified, courses need not be taken in sequence.

105. Introduction to American History and Culture, 1607 to the Present. (5) Four and one-half hours of lecture per week. Prerequisite: Upper division course in history.

Mr. Middlekauff (Sp)

5—6 hours of lecture and one hour required per section. Christianity as an institutional, social, and intellectual force in the development of western culture and as it has responded to changing social and cultural needs from antiquity to the present. 108A: beginnings to ca. 1000 A.D.; 108B: 1000 to ca. 1650, 108C: 1650 to 1900. Mr. Bimbaum (Sp)  

110A—110B—110C. Ancient Greece. (5—6) Three hours of lecture and one hour of optional discussion per week.

110A. Bronze Age — ca. 500 B.C. (F)

110B. Ca. 500 B.C. — 338 B.C. (Sp)  

1110C. 338 B.C. — 30 B.C.

1111A—111B. Ancient Rome. (5—6) Three hours of lecture and 1 hour of consultation per week.

Mr. Gruen (W)

112. The Age of Cicero. (5) Three hours of lecture and 1 hour of consultation per week. Prerequisite: Upper division European history.

Mr. Di Gregorio (Sp)  

NOTE: For key to symbols, see page 38.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Lectures/Week</th>
<th>Discussion/Week</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>114A-114B</td>
<td>Byzantium, (5-6) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Brown</td>
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<td>115A-115B</td>
<td>Medieval Europe, (6-6) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Feldman</td>
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<td>117A-117B</td>
<td>Medieval European Intellectual History, (5-6) Three hours of lecture per week.</td>
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<td>Mr. Caspary</td>
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<td><strong>119A</strong></td>
<td>Society and the Sexes in Early Modern Europe, (6) Three hours of lecture and one hour of discussion per week.</td>
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<td>Mr. Heilbron</td>
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<td>120.</td>
<td>The Renaissance, (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>121.</td>
<td>The Reformation, (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td><strong>122A</strong></td>
<td>Age of Absolutism and Enlightenment, (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>123.</td>
<td>Modern Europe (1780-1870), (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>124.</td>
<td>Modern Europe (1870-1914), (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Sauer</td>
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<td>125.</td>
<td>Modern Europe (1914-Present), (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<tr>
<td><strong>126A</strong></td>
<td>Economic History of the Medieval and Renaissance Economy, (6) Three hours of lecture and one hour of discussion per week.</td>
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<td>Mr. Heilbron</td>
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<td>128.</td>
<td>The Agricultural and the Industrial Revolution, (5) Three hours of lecture and one hour of discussion per week.</td>
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<td>129.</td>
<td>European Industrialization in an Age of Imperialism, (6) Three hours of lecture and one hour of discussion per week.</td>
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<tr>
<td><strong>130A-130C</strong></td>
<td>Development of Scientific Thought and Method, (13) Three hours of lecture per week.</td>
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<td>Mr. Zelnik</td>
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<tr>
<td>131.</td>
<td>Physics In the Twentieth Century, (4-5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>132.</td>
<td>Topics in the History of Biology, (4-5) Three hours of lecture per week.</td>
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<td>Mr. Lesch</td>
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<tr>
<td><strong>133A</strong></td>
<td>Astronomy and Astrology in Medieval and Early Modern Europe, (5) Three hours of lecture per week.</td>
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<td>Mr. Lesch</td>
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<tr>
<td>135A-135B</td>
<td>European Jewish History Since 1750, (5-5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Sauer</td>
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<tr>
<td>136A.</td>
<td>Russia, Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td><strong>137A</strong></td>
<td>Russian Intellectual History, (5-5) Two 1 1/2-hour discussion group meetings and one hour of consultation per week.</td>
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<td>Mr. Sauer</td>
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<td>138.</td>
<td>The History of Socialism: 1830 to the Present, (5) Three hours of lecture and one hour of discussion per week.</td>
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<td>Mr. Stampp</td>
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<tr>
<td><strong>140A-140B</strong></td>
<td>Hapsburg Monarchy and Succession States, (5-5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>141A.</td>
<td>Medieval France, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>142.</td>
<td>The Netherlands, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<tr>
<td><strong>143B-143C</strong></td>
<td>Modern Germany, (5-5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>144.</td>
<td>Modern Italy, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td><strong>147A</strong></td>
<td>Spain and Portugal, (5-5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>148.</td>
<td>The United States, 1787-1945, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>149.</td>
<td>The United States, 1945 to Present, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td><strong>150A-150B</strong>, <strong>150C</strong></td>
<td>Modern Britain, (5-5-5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>151A.</td>
<td>Britain, 1485-1503, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>151B.</td>
<td>Britain, 1503-1714, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>151C.</td>
<td>Britain, 1714-1832, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>151D.</td>
<td>Britain, 1832 to Present, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>152.</td>
<td>British Empire and Commonwealth, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>155.</td>
<td>Modern Ireland, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>156.</td>
<td>Social History of Latin America, (5-6) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td><strong>157A-157B</strong></td>
<td>The Central Andean Region, (5-5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>158A.</td>
<td>South America, (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>160A-160B</td>
<td>Mexico, (5-6) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<tr>
<td><strong>162A-162B</strong></td>
<td>Caribbean Area, (5-5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>163A.</td>
<td>Brazil, (5-6) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>164.</td>
<td>Argentina, (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<tr>
<td>165A-165B</td>
<td>The Colonial Period and American Revolution, (5-5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>166.</td>
<td>The United States, 1877-1914, (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<tr>
<td>167A.</td>
<td>Era of Sectional Conflict, (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<tr>
<td><strong>168A</strong></td>
<td>Reconstruction and the New Nation, (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<tr>
<td>170A-170B.</td>
<td>The West In United States History, (5-6) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>171.</td>
<td>California, (6) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<tr>
<td>174A-174B</td>
<td>Diplomatic History of the United States. (5-5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<tr>
<td>175A-175B.</td>
<td>Intellectual History of the United States. (5-6) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<td>176.</td>
<td>Religion In American Society, (5) Three hours of lecture and one hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<tr>
<td>177A-177B</td>
<td>The Age of the City, (5-5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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<tr>
<td>181.</td>
<td>Northwest and West Africa to 1900, (5) Three hours of lecture and 1 hour of consultation per week.</td>
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<td>Mr. Heilbron</td>
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</table>
Regional introductory course in history of an area whose thousand years. Emphasis will be placed on two important Arab conquests, the Islamic Empires, and the formation of Islam as a religion and culture. Three hours of lecture and 1 hour of consulta-
tion per week.

Arab conquests, the Islamic Empires, the successor states, and the formation of Islam as a religion and the Middle East from the 7th to the 13th centuries; the consequences as exemplified by the Mongol Empire; late medieval and early modern history of the Mongols and Turks; comparing Chinese and Ching; impact of modernization, nationalism and communism on Inner Asia. 188A not prerequisite to 188B.

Mr. J. Smith (F), Mr. Lapidus (Sp)

184A–184B–184C. China. (5–5–5) Three hours of lecture and one hour of discussion per week.

184A. Early China. Mr. Keightley (F)

184B. China: The Middle Period. Mr. Keightley (F)

184C. Modern China. Mr. Wakeman (Sp)

185A–185B–185C. Japan. (5–5–5) Three hours of lecture and one hour of discussion per week.

Mr. Berry (F), Mr. Scheiner (W), T. Smith (Sp)

186. Chinese Historical Texts: The Early Period. (5) Three hours of lecture and 1 hour of consultation per week. Prerequisite: 2 or 3 years of modern Chines.

Mr. Irschick (F), Mr. Metcalf (W)

187A–187B–187C. India. (5–5–5) Three hours of lecture and one hour of discussion per week. 187A: Mr. Keightley (W), 187B: Mr. Barnes (W)

188A. Inner Asia from the Second Millennium, B.C. to the Fourteenth Century, A.D. (5) Three hours of lecture and one hour of discussion per week. Dynamics of nomadic societies: comparisons of nomadism with cities; so some familiarity with classical texts, such as the Analects; an introduction to Han historical texts, grammar, classical commentaries, and modern scholarly aids. Emphasis is on rigorous translation and the use of the texts as historical sources.

188A–188B–188C. Social History of China and Japan. (5–5) Three hours of lecture and 1 hour of consultation per week. Prerequisite: consent of instructor.

189A. China.

189B. Japan. Mr. Schurmann (Sp)

190. Modern Chinese Intellectual History. (5) Three hours of lecture and one hour of discussion per week. The intellectual development of modern China from the Opium War to the People's Republic. Issues to be explored include "culturalism," nationalism, science and socialism. Mr. Tu (F)

Group II. Restructured Courses

Courses in Historical Method and Thought

(Designed primarily for students whose major subject is history.)

100. Historiography. (6) Three hours of lecture and/or seminar per week. The problems of writing history; the relation between historical method and the course is intended for history majors to enrich their studies and to enable them to establish a general framework for the presentation of history. Mr. Smith (F)

101A–101B. Introduction to Historical Method. (5–5) Lively independent research projects carried on in seminar sections in limited historical fields, with readings, discussions, etc., on general problems of historical inquiry. The two quarters must be taken consecutively. Credit and grade will be assigned only upon completion of the full sequence.

The Staff (F–W, W–Sp)

102. Colloquium on Historical Thought. (5) Consideration of the nature and function of history thought as manifested in major historical classics and selected historical problems. Required of honors pro-
gram junior. The nature and function of history thought as manifested in major historical classics and selected historical problems. Required of honors pro-
gram junior. The nature and function of history thought as manifested in major historical classics and selected historical problems. Required of honors pro-
gram junior. The nature and function of history thought as manifested in major historical classics and selected historical problems. Required of honors pro-
gram junior. The nature and function of history thought as manifested in major historical classics and selected historical problems. Required of honors program seniors upon completion of History 101A–101B. Mr. Scheiner (F), Mr. May (Sp)

Proseminars in History

103. Proseminar: Problems in Interpretation and Research in the Seven Fields of History. (5) One 2 to 3-hour meeting or two 1 1/2-hour meetings per week. Designed primarily to give major interest in history ele-
mentary training in historical criticism and research. Emphasis will be placed on writing and discussion. With consent of instructor, it may be repeated without duplication of credit. Prerequisite: prior consent of in-
structor. For precise schedule of offerings see depart-
ment catalog for pre-enrollment week each quarter. 103A, 103B, 103E; 103C, 103D; 103G, 103H, 103I; 103J, 103K, 103L, 103M, 103N, 103O, 103P, History of Science.

Limited Enrollment Lecture Courses

104. Special Topics in the Various Fields of History. (5) Three to four hours per week. Designed primarily to permit the student to work in a topic he is especially concerned, usually more restricted than the subject matter of a regular lecture course. A combination of reading assignments, written term papers, and examinations, with all grading by the instructor himself. Limited to 25 to 30 students. Instruc-
tors and subjects to vary. For precise schedule of offer-
ings see department catalog during pre-enrollment week each quarter.

Honor Courses

H108A–H108B. Senior Honors. (5–5) Limited to senior honors candidates. Directed study upon the preparation of an honors thesis. Supervisors will be assigned to each student for consultation with the honors committee. Credit and grade will be assigned upon completion of the full sequence.

Special Individual Study

190. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (F, W, Sp)

Group I. Bibliography and Historiography Courses


Graduate Courses
Humanities

Field Major Office, Division of Special Programs, 301 Campbell Hall
Major Adviser: Mr. William B. Stoltman, Associate Dean

Humanities Field Major

The field major in the humanities provides students with an opportunity to acquire a broad background in the study of the achievements of human beings as artists and as creators of values through the ages. The major is especially designed to combine such breadth by means of an interdisciplinary approach with an individual element tailored to each student's interests and educational needs. Students are primarily responsible for developing their own program of studies, but this should be done with the advice of a member of the faculty who agrees to act as the student's adviser in the major.

Lower Division Requirements. 1, one year of Western Civilization (Special Programs 44) or its equivalent; II, one year of an ancient or modern language appropriate to the individual program and in addition to the graduation requirement.

Upper Division Requirements. At least 45 units distributed among I: eight courses in three of the following fields or disciplines (two courses in the social sciences or the natural sciences may be substituted whenever they are appropriate): art, classics, comparative literature, dramatic art, film, history, history of art, languages and literature, music, philosophy, religious studies, rhetoric; II: a senior thesis for graduation. The thesis program undertakes study and course work in preparation for a comprehensive examination.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Study

Master of Arts in Italian. Requirements: 36 units of upper division and graduate courses in Italian of which at least 18 units must be in the 200 series. Italian 200A-200B are required. With the consent of the graduate adviser, a maximum of 4 units of course work outside the Department may be counted towards the over-all unit requirement. In the final quarter of residence candidates must pass the comprehensive written and oral examination. Further information may be obtained from the departmental office.

Doctor of Philosophy in Italian. The program for the Ph.D. degree in Italian is open to students holding an M.A. in Italian or in a program in which Italian was the major field of study. The student admitted to the program undertakes study and course work in preparation for: (1) a preliminary examination in Italian literature from the origins to the present which is to be taken within four quarters after admission to the program, (2) an Italian philosophy required to be satisfied by examination or by prescribed course work before (3) a comprehensive qualifying examination on a major period of Italian literature and a minor in a related humanistically-discipline. Before the qualifying examination can be taken, the student must also prove to have a reading knowledge of Latin and of a modern foreign language other than Italian (e.g., French, German, Spanish, Russian). For further information please contact the Department.

Doctor of Philosophy in Romance Languages and Literature. (For this program, consult the publication issued by the Graduate Division on Languages and Literature and the Fine Arts.)

Lower Division Courses

The first year of work in a foreign language in secondary school is considered to be equivalent to one quarter in college; each successive year in the same foreign language in secondary school is equal to one additional course in a sequence of four quarter courses in college.

1. Elementary Italian. (5) Five 1-hour meetings and one to two laboratory sessions per week.
2. Intermediate Italian. (5) Five 1-hour meetings and one to two laboratory sessions per week. Prerequisite: course 2 or the equivalent.
3. Intermediate Italian. (5) Five 1-hour meetings per week. Prerequisite: course 3 or the equivalent.
4. Intermediate Italian. (5) Five 1-hour meetings per week. Prerequisite: course 4 or the equivalent. Reading, composition, and grammar review.
5. Advanced Italian. (5) Five 1-hour meetings per week. Prerequisites: course 5 or the equivalent. Reading, composition, and grammar review.

Graduate Courses

101A–101B. Conversation. Three 1-hour meetings per week. Prerequisites: courses 9 or the equivalents.
102. Advanced Conversation. Three 1-hour meetings. Prerequisites: courses 9 or the equivalents.
103A–103B. Introduction to Italian Literature. Three 1-hour meetings per week. Prerequisites: courses 8 or the equivalents.
104A–104B. Italian Civilization (In English). Three 1-hour meetings. Prerequisites: courses 8 or the equivalents.
105A–105B. Italian Culture. Three 1-hour meetings. Prerequisites: courses 8 or the equivalents.
106A–106B. Italian Philosophy. Three 1-hour meetings. Prerequisites: courses 8 or the equivalents.
107A–107B. Italian Linguistics. Three 1-hour meetings. Prerequisites: courses 8 or the equivalents.
108A–108B. Italian Methods. Three 1-hour meetings. Prerequisites: courses 8 or the equivalents.
109A–109B. Dante's Divina Commedia. Three 1-hour meetings. Prerequisites: courses 8 or the equivalents.
110A–110B. Italian Literature of the Thirteenth and Fourteenth Centuries. Four 1-hour meetings per week. Prerequisites: courses 10 or the equivalents.
on Marino, Tassoni, Campanella, Galileo, and Sarpi.
Mr. Costa (Sp)

114. Italian Literature of the Eighteenth Century. (4) Three 1-hour meetings per week. Emphasis on the works of Vico, Goldoni, Parini, and Aliieri.
Mr. Costa (Sp)


**115A. From Neoclassicism to Romanticism. Mr. Perella (F)**

**115B. Romanticism. Mr. Perella (W)**

115C. Main trends in poetry and prose from 1850 to 1900.
Mr. Perella (F)

117A–117B–117C. Italian Literature of the Twentieth Century. (4–4–4) Three hours of lecture per week.

117A. Fiction. Mr. Costa (W)

117B. Poetry. Mr. Costa (Sp)

117C. Theatre. Mr. Costa (Sp)

H198. Special Study for Honors Candidates. (2–4) Individual conferences to be arranged. To be taken for two quarters in the senior year.
The Staff (Mr. Perella in charge) (F, W, Sp)

199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 35. Restricted to senior honor students with a 3.0 overall grade-point average or better. Must be taken on a passed or not passed basis.
The Staff (Mr. Perella in charge) (F, W, Sp)

Upper Division Courses in English

130. Dante’s Divine Comedy. (4) Three 1-hour meetings per week. An introduction to the thought and writings of Dante Alighieri with emphasis on a critical reading of the Divine Comedy.
Mr. Perella (W)

**140. Petrarch. (4) Three 1-hour meetings per week. Analysis and discussion of the Canzoniere and the Trionfi in translation, with reference to Medieval and Renaissance poetry.**
Mr. Moses (Sp)

Miss Berolini (Sp)

**150. Machiavelli. (4) Three 1-hour meetings per week. The political and literary works in the context of the thought and culture of his age.**
Mr. Ferruolo (Sp)

**160. Italian Culture during the Fascist Period (1922–45). (4) Three 1-hour meetings per week.**
Pre- requisite consent of instructor. This course, in which professors of several disciplines will participate, will examine the cultural climate of the Fascist regime through a study of the literature, plastic arts, movies, politics, economics, and the social life of that age.
Mr. Costa (W)

170. The Italian Cinema: History, Genre, Authors. (4) Three hours of lecture per week; two-three hours film viewing, analysis, and discussion per week. This course fulfills film-major requirement in one of history, genre, author. The development of Italian Cinema through its periods, or through the development of specific Film Genres such as Neorealism, Comedy, Self-Reflective Cinema. Occasionally the course will concentrate on a specific director to study his individuality through style, theme and personal development. May be repeated for credit when topic changes.
Mr. Perella (Sp)

175. Film and Literature. (4) Formerly 125. Two hours of film-viewing and three hours lecture per week. Two hours of video production workshops per week. This course may fulfill Film Major requirement in Theory. The interaction of film-style with literary and poetic structure, studied through film theories, film novels, and the work of outstanding Italian film directors. Literature shaped by film experience and films dealing with the essence of cinematic form will be studied. May be repeated when topic changes.
Mr. Moses (Sp)

Graduate Courses and Seminars

200A–200B. Studies In Italian Syntax, Lexicon, and Composition. (4–4) One 3-hour meeting per week. Stylistic analysis of Italian syntax and lexicon with exercises in critical language and exposition. Both 200A and 200B are required of all candidates for the M.A. in Italian.
Mr. Perella (Sp)

201A–201B. Historical Grammar. (4–4) One 3-hour meeting per week.
Mr. Stefanini (F, W)

**202. Minor Medieval Authors. (4) One 3-hour meeting per week. Lyric, religious, didactic, and satirical poetry; chronicles, novelle, and treatises.**
Miss Berolini (Sp)

**203. Bibliography and Methods of Research. (4) Three hours of lecture per week. Introduction to bibliographical research and library facilities. Required of all candidates for the M.A. in Italian.**
Mr. Costa (F)

**204. Literary Criticism. (4) Three hours of lecture per week. Topic changes from year to year.**
Check with the Departmental Office for current topic. May be repeated for credit as topic changes.
Mr. Moses (W)

**205. History of the Italian Language. (4) One 3-hour meeting per week.**
Mr. Stefanini (Sp)

**206. Seminar on Dante. (4) One 3-hour meeting per week.**
Mr. Stefanini (Sp)

**211. Seminar on Petrarch. (4) One 3-hour meeting per week.**
Mr. Ferruolo (Sp)

**213. Seminar on Boccaccio. (4) One 3-hour meeting per week.**
Mr. Stefanini (Sp)

217. Studies in the Renaissance. (4) One 3-hour meeting per week.

**217A. Humanism. F**

217B. The Theatre.

217C. Ariosto.

**217D. Tasso.**

**218. The Age of the Baroque. (4) One 3-hour meeting per week.**

219. The Age of Enlightenment. (4) One 3-hour meeting per week.

221. Studies in the Nineteenth Century. (4) One 3-hour meeting per week.

221A. Romanticism.

**221B. Leopardi.**

**221C. Manzoni.**

223. Studies in the Twentieth Century. (4) One 3-hour meeting per week.

223A. Poetry and Theater.

**223B. Prose.**

224. Studies in Literary Genres. (4) Three hours of lecture per week. A synthesis of the development of the most significant literary genres. May be repeated for credit when topic changes.
Mr. Moses (W)

299. Special Study for Graduate Students. (2–6) Individual conferences to be arranged, 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.

The Staff (Mr. Costa in charge) (F, W, Sp)

601. Individual Study for Master’s Candidates. (1–8) Individual study for the comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a master’s degree. Must be taken on a satisfactory/unsatisfactory basis.
The Staff (Mr. Costa in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Costa in charge) (F, W, Sp)

16. Beginning Italian for Graduate Students. (No credit)

26. Advanced Italian for Graduate Students. (No credit)

Mrs. Ross (W)

Latin American Studies

Group Major Office, 4309 Dwinelle Hall
Advisers: Mr. G. Arnold Chapman (Department of Spanish and Portuguese), Head Adviser and Coordinator; Mr. Stanley H. Brandes (Department of Anthropology); Mr. Arthur L. Askins (Department of Spanish and Portuguese). Head Adviser; Mr. Stanley H. Brandes (Department of Anthropology); Mr. Woodrow W. Borah (Department of History); Mr. Arthur L. Askins (Department of Spanish and Portuguese).

**NOTE: For key to symbols, see page 36.**
Group Major in Latin American Studies

The group major in Latin American studies is designed to present a balanced curriculum of the history, culture, and environment of Latin America for students wishing to broaden their perspective of the area than is usually available through regular courses. The program may be of particular interest to (1) students desiring a general education focused on the Latin American cultural regions; (2) students planning to enter business, government, or international agency service; and (3) students preparing to teach social science or languages.

Lower-Division. Spanish 1, 2, 3, 4, 5, 25 (or the equivalents; History 18A–18B.

Upper-Division. A minimum of 45 upper-division units, but not more than 54, distributed as follows: Portuguese 101 (or the equivalent); Spanish 104A–104B or Portuguese 123A–123B; History 156A–156B; seven upper-division courses divided among a maximum of four areas, as appearing on the list of approved courses (given below), selected in consultation with a group major adviser (with a minimum of two in each of the chosen fields) from anthropology, economics, geography, history, political science, Spanish and Portuguese language and literatures, and sociology.

List of Approved Courses: Anthropology 124, 125, 126, 178, 179, 160; Geography 141, 154, 155, 156, 157A, 157B, 158, 171; History 103E, 160A, 160B, 161A, 161B, 162A, 162B, 163A, 163B, Portuguese 148A, 148B; Portuguese 102, 114, 123A and 123B (if not included in requirements), 135 (when topic is appropriate), 150; Sociology 135, Spanish 100, 101, 102, 104A and 104B (if not included in requirements), 113, 114, 129, 130, 131, 192 (when topic is appropriate), 193; in any department, any special topics course other than 199 when the subject matter is appropriate.

Honors Program. With consent of a group major adviser, a student with an overall grade-point average of 3.3 or higher both in courses in the group major and in the higher incourses completed in the major may apply for admission to the honors program. Students accepted in the honors program will enroll in Latin American Studies H195 for the preparation of a senior thesis.

Course

H195. Honors in Latin American Studies. (5) Prerequisite: senior standing with a grade-point average of 3.3 or higher both in courses in the group major and in the higher incourses completed in the University for all work completed in the University. Consent of the group major adviser. The honors student is required to write a thesis, to be performed in the major course. The thesis will be prepared under the supervision of a member of the faculty committee of the group major and will be approved by a selected group of the same committee.

Graduate Programs

Graduate Group Office, 3120 Dwinelle Hall

Graduate Group Office, 3120 Dwinelle Hall

Advisers: Head Adviser and Director of the Sponsorship Committee, Mr. Woodrow Borah (Department of History), Mr. Stanley H. Brandes (Department of Anthropology), Mr. G. Arnold Chapman (Department of Spanish and Portuguese), Mr. James J. Parsons (Department of Geography).

Preparation for Graduate Study. Applicants should have a Bachelor's degree, with a grade point average appropriate for admission to Graduate School, and a reading knowledge of Portuguese or Spanish. They should be prepared to pass the required language examination early in their graduate career.

Master's Degree. The program follows Plan I for the master's degree, as specified by the Graduate Division. Plan I requires at least 30 units of course work, following the guidelines set by the Graduate Division. Course work must be taken in at least two departments and not more than three. A minimum of two graduate courses in each of two departments is required: graduate credit courses taken for the preparation of the thesis may not count as part of these minima. All work must emphasize one or two major aspects of Latin America.

Upon completion of course work, a thesis committee is appointed for direction of the writing. In the thesis, the student must make an original contribution to the field. No final examination is required.

Doctor's Degree. The program follows Plan B, as specified by the Graduate Division. The doctoral program is independent of any, that a student may only be admitted directly to doctoral work, following a B.A. degree, and a student completing an M.A. degree may only proceed to doctoral work by new application.

Program: The student will undertake readings and course work in at least three departments and not more than four, under the guidance of an adviser appointed from each of the departments concerned. There are no specific unit or course requirements, beyond the general university resident requirements for graduate students. In the first year, the student must prove reading competence in Spanish, Portuguese, French, and German by examination. For either Spanish or Portuguese, the student must further demonstrate conversational competence. If the student has completed satisfactory preparation in the departments selected, upon certification of the advisers, an oral qualifying examination will be arranged. Following successful completion of the oral qualifying examination, the student will be recommended for formal candidacy for the doctorate. An advisory committee consisting of three faculty members will then be appointed to guide and supervise the doctoral dissertation.

Further details on both the M.A. and the Ph.D. programs are available from the Graduate Group Office, 3120 Dwinelle Hall.

Legal Studies

Program Office, 2224 Piedmont Avenue

Program Coordinator: Charles J. McClain, Jr.

The undergraduate program in Legal Studies adds a new dimension to Berkeley's liberal arts curriculum. Its purpose is to make the study of law a vital option in social and economic thought, e.g. natural right, law and science, legal reasoning and administration. Approved for 1979/80 only.

Program

Courses

100A–100B. Foundations of Law and Society. (4–4–4) Three hours of lecture and one hour of discussion section per week. First quarter is prerequisite to second; second quarter is prerequisite to third. Introduction to law for the liberal arts student. The purpose is to familiarize students with major legal ideas, legal reasoning, and legal processes; to provide a comparative and historical perspective on law; and to highlight basic differences between the United States and other regimes in the quest for justice. Approved for 1979/80 only.

107. Theories of Justice. (4) Three hours of lecture, one hour of discussion per week. Major perspectives in social and economic thought, e.g. natural right, laissez faire, "possessive individualism," contractualism, pluralism, and social equality, as they affect contemporary issues of reverse discrimination, property rights, distributive justice. Approved for 1979/80 only.

109. Aims and Limits of the Criminal Law. (4) Three hours of lecture and one hour of discussion section per week. Analysis of the capacity of criminal law to fulfill its aims. What are the aims of criminal law? How are they measured? Relative priorities may be identified for evaluating the effort to control disapproved activities through criminal law? Approved for 1979/80 only.

170. Society and the Criminal Sanction. (4) Three hours of lecture, one hour of discussion section per week. The theory and application of formal sanctions; the deterrent effect of sanctions, especially upon the behavior of criminal law—marijuana, homosexuality, prostitution, gambling; the decriminalization and regulation of deviant behavior; law reform. Approved for 1979/80 only.

175. Comparative Judicial Process. (4) Three hours of lecture, one hour discussion section per week. Pre-eminent courts in the common law traditions and in American and/or comparative politics; 3 courses in American, European, Near Eastern and/or Far Eastern history. Political Science majors may offer this course for the major as the equivalent of the political science 153 — Legal Institutions. Legal Studies 100A–100B may be substituted for either the history or political science prerequisite. A comparative study of courts in various societies emphasizing such themes as the function of courts in the establishment of new regimes, the place of judges within political hierarchies and the similarities and differences between mediation, arbitration, judicial and administrative decision. Approved for 1979/80 only.

180. Mental Health, Law, and Social Policy. (4) Four hours of seminars meeting per week. Enrollment preference given to students with advanced upper division standing with some relevant background in psychology, sociology, law, or behavioral or health sciences. Seminar on selected current controversies of the social policy issues of mental health involuntary commitment, prediction of dangerousness, right to treatment, right to refuse treatment, social class and mental illness, confidentiality, and similar topics. Approved for 1979/80 only.

Advisory Committee:

Leanne L. Hinton, Ph.D.
Carol F. Justus, Ph.D.
Senior Lecturer:
Jesse O. Sawyer, Ph.D.

Department Major Advisers: Ms. Justus, Mr. Mat- isoff, Mr. Ohala (F)

Graduate Advisers: Mr. Chaile, Ms. Hinton, Mr. Ohala (W, Sp), Mr. Zim (F).

The Major

Required: Linguistics 20, 110, 120, 145, plus 26 additional units of which at least 22 must be upper division. The following combinations of courses are suggested as ways of pursuing specialized interests. They are meant to be suggestive rather than restrictive, and by no means mutually exclusive. Other combinations may be arranged in consultation with the major adviser. In each case electives must be added to produce the required unit totals.

Linguistic theories and methods: Linguistics 116, 120, 121, 122, 126.

Data collection and analysis: Linguistics 115, 122, 127, 128, 157, 175.

Indo-European studies: Linguistics 165, 167, Sanskrit 100A–100B–100C—courses in Latin and/or Greek.

The structure of a particular language: courses dealing with the structure of one language selected from Linguistics and/or a foreign language department (including German, French, Italian). The ties between linguistics and a related discipline: courses dealing with language selected from a single department such as Anthropology, Philosophy, Psychology, or Rhetoric.
152. Introduction to Applied Linguistics. (4) Three 1-hour lectures per week. Applications of linguistics to language teaching, the teaching of reading and writing, lexicography, and other practical concerns.

Mr. Sawyer (Sp)

153A–153B. Introduction to Sociolinguistics. (5–6) Three 1-hour lectures per week. Prerequisite: Linguistics 20 or consent of instructor. A two-quarter introduction to the principles of sociolinguistics. Topics to be covered include: linguistic pragmatics, variation theory, social and regional dialectology and oral stylistics is restricted by the instructor. Credit and grade will be awarded on completion of sequence.

Ms. Hinton, Ms. Lakoff (F, W)

154. Language and Cognition. (5) Two 1-hour lectures and one 1 1/2-hour section meeting per week. Prerequisite: course 20. The relation between language and such cognitive phenomena as perception, conceptualization, thought, and memory.

Mr. Chafe (Sp)

155. Indo-European Comparative Linguistics. (5) Three 1-hour lectures and 1 1/2-hours of section meeting per week. Prerequisite: course 110 (may be taken concurrently). Group study of a linguistic topic not included in the regular department curriculum. The Staff (F, W, Sp)


The Staff (F, W, Sp)

199. IDS 170. Lexical Semantics. (5) See Interdepartmental Studies for the complete description of this course.

200. Problems in Diachronic Analysis. (4) Two 1-hour lectures per week. Prerequisite: course 145 or consent of instructor. Practice in the analysis of diachronic data.

Mr. Benveniste (Sp)

211A–211B. Linguistic Field Methods. (4–4) Two 2-hour section meetings per week. Sequence beginning in the fall and winter. Prerequisite courses 115, 120. Credit and grade will be awarded on completion of sequence. Mr. Malafos (F, W); Mr. Chafe (Sp)

214A–214B. Workshop in Biological Linguistics. (5–5) Four hours of lecture per week. Prerequisites: consent of instructor. Selected topics on biological basis of language will be examined in depth. Students are encouraged to do an original research project in the context of the workshop. Topics will vary from year to year. May be repeated for credit.

220. Physiological Phonetics. (4) Two 1-hour lectures per week. Prerequisite: consent of instructor. Introduction to modern theories of speech production and perception. The role of automatic and feedback control of the speech production process. Physiological and acoustic methods in speech production. Phonological questions in physiological phonetics.

222. Acoustic Phonetics. (4) Two 1-hour lectures per week. Prerequisite: course 110 or its equivalent.

Mr. Malafos (F, W)

223. Advanced Phonetic Analysis. (4) Two 1-hour lectures per week. Prerequisite: course 110.

Mr. Malafos (F, W)

224. Advanced Grammatical Analysis. (4) Two 1-hour lectures per week. Prerequisite: course 120.

Mr. Malafos (F, W)

226. Workshop in Syntax and Semantics. (4) Two 2-hour section meetings per week. Prerequisite: course 121 or its equivalent. Practice in constructing examples and counter-examples to verify or disprove hypotheses in the theory of grammar. Both

NOTE: For key to symbols, see page 36.
281. History of Linguistics. (4) Two 1 1/2-hour sec-

tion meetings per week. Prerequisite: course 132 or consent of instructor.

285. Major Schools of Structural Linguistics. (4) Two 1 1/2-hour lectures per week. The linguistic
theories of Saussure, the Prague School, Glossemats,
and American linguistics. (No auditors.)

286. History of Generative Grammar. (4) Two 1 1/2-hour lectures per week. Prerequisite: course 120.
The development of generative grammar from 1956 to the present. Topics: early and classical transformation-
grammar; abstract syntax; lexicalism; generative sem-
antics.

290. Current Topics in Linguistic Research. (2) One 3-hour lecture per week. Must be taken on a satis-
factory/unsatisfactory basis.

295. Proseminar in Syntax and Semantics. (4) Two 1 1/2-hour lectures per week. Prerequisite: con-
sent of instructor. A discussion of current research and
background issues, primarily for first-year graduate stu-
dents.

298. Special Group Study. (2–8) Prerequisite: one full year of graduate work at Berkeley or consent of
graduate adviser.

299. Special Individual Study. (2–8) The Staff (F, W, Sp)

356. Teaching English as a Second Language. (4)
Formerly 156. Three 1 1/2-hour lectures per week. Prerequisite: Linguistics 110, 115 or 120. Principa-
lems and in inventorying, through dictionaries, a whole
textual illustration from foreign languages.

601. Individual Study for Master's Students. (1–6)
Individual study for the comprehensive or language
requirements in consultation with the field adviser. Units may not be used to meet either unit or residence
requirements for a master's degree. Must be taken on a
satisfactory/unsatisfactory basis.

602. Individual Study for Doctoral Students. (1–6)
Prerequisite: one full year of graduate work at Berkeley
or consent of graduate adviser. Individual study in con-
sultation with the major field adviser, intended to pro-
vide an opportunity for qualified students to prepare
themselves for the various examinations required of
candidates for the Ph.D. May not be used for unit or
residence requirements for the doctoral degree. Must be
taken on a satisfactory/unsatisfactory basis.

IDS 272. Neuropsychology of Language. (4) See Inter-
departmental Studies for the complete description of
this course.

Logic and the Methodology
of Science

Group Major Office, 731 Evans Hall

Professors:

Ernest W. Adams, Ph.D. (Philosophy)
John W. Addison, Jr., Ph.D. (Mathematics)
David Blackwell, Ph.D. (Statistics and of
Mathematics)
Manuel Blum, Ph.D. (Electrical Engineering and
Computer Science)
Charles S. Chihara, Ph.D. (Philosophy)
William Craig, Ph.D. (Philosophy)
Lester E. Dubins, Ph.D. (Mathematics and of
Statistics)
John C. Harsanyi, Ph.D. (Business Administration
and of Economics)
Leon A. Horne, Ph.D. (Philosophy)
Richard M. Karp, Ph.D. (Electrical Engineering and
Computer Science)

Associate Professors:

Alan Cood, Ph.D. (Philosophy)
Leo H. Harrington, Ph.D. (Mathematics)

Chairman: Mr. Silver.

Graduate Adviser: Mr. Sluga.

The Group in Logic and the Methodology of Science
search leading to the Ph.D. degree. Although the De-
partment of Mathematics and the Department of Philos-
ophy each offers a Ph.D. degree toward which a stu-
dent may write a dissertation in logic, the inter-
disciplinary program is designed for those with a broad
interest in logic and the methodology of science who
wish to explore the subject in both dialectical and philo-
osophical aspects. "Methodology of science" is here
understood to mean "metascience," the study of the
methods of the sciences by logical and mathemati-
cal means. The program is administered by an inter-
departmental group which cooperates closely with
both the Department of Mathematics and the Depart-
ment of Philosophy.

Preparation. For admission to the graduate pro-
gram, students shall have completed an undergradu-
ate major in philosophy, or in mathematics, or a joint
major in both, including at least one full-year upper
division course in logic. In addition, they shall have
completed (a) at least one upper division course in
some science, and (b) at least one full-year upper divi-
sion course in mathematics (other than logic) if the
undergraduate major was philosophy, or in philosophy
(other than logic) if the undergraduate major was math-
ematics. Exceptions to these requirements are permit-
ted only at the discretion of the graduate adviser.

Before advancement to candidacy, and preferably early
in the student's doctoral career, written examinations
in two foreign languages must be passed; students
may choose from the following: French, German, or
Russian. Students should prepare themselves for the
language requirement in their undergraduate years.

Further information about the program, including a full
statement of the requirements for advancement to can-
idancy, is given in the Announcement of the Group in
Logic and the Methodology of Science, which is avail-
able upon request from the Group Office.

Courses. Courses are chosen with the advice of the
graduate adviser from among the offerings of the vari-
ous departments of the University. In order to satisfy
the requirements of the Interdepartmental Group in
Mathematics and Philosophy, attention is especially
directed to courses in the various science
departments, in statistics, and in linguistics.

Logic Colloquium. (No credit) Reports on current
research by students and members of the staff, visitors,
and graduate students.

Other Departments with Related Programs

Department of Mathematics and Department of Philos-
ophy.

Mass Communications

Group Major Office, Division of Special Pro-
grams, 301 Campbell Hall

Major Advisers: Mr. Todd Gilpin, Head Adviser (Soci-
ology), Mr. Bertrand August (Comparative Literature),
Mr. Jack Gilpin (Political Science), Mr. Donald Hansen
(Education), Mr. Karl Jackson (Political Science), Mr.
Thomas Leonard (Journalism), Mr. Percy Tannenbaum
(Public Policy), Mr. Harold Wiltensky (Sociology), Mr.
Raymond Wolfling (Political Science).

Group Major In Mass Communications

The group major in mass communications is adminis-
tered by the Division of Special Programs. It applies a
range of disciplines in the social sciences and humani-
ties to the understanding of contemporary mass media,
their structure, history, content, consequences, and
policy implications.

Students majoring in mass communications will have to
take two lower division courses and ten upper division
courses.


Mathematics

Department Office, 970 Evans Hall

Professors:
John W. Addison, Jr., Ph.D.
William Z. Arveson,* Ph.D.
William G. Basse, Ph.D.
George W. Bergman, Ph.D.
Ewen D. Blackwell, Ph.D.
Hans J. Breuken, Ph.D.
Paul L. Chandrasekhar, Ph.D.
Alexandra J. Chorin, Ph.D.
Heinz C. Cordes, Ph.D.
Gerard Debreu, D.Sc.
René J. De Vogelaere,* Ph.D.
Stephen P. Dillen, Ph.D.
Lester E. Dubins, Ph.D.
Ingran Flury, Ph.D.
Jacob Feldman,* Ph.D.
David A. Freedman, Ph.D.
Miles E. Hazlett, Ph.D.
Robert C. Hetherone,* Ph.D.
Henry Helson,* Ph.D.
Leon A. Henkin, Ph.D.
Morris W. Hirsch, Ph.D.
Gerhard P. Hochstadt, Ph.D.
Wu-Yi Hsiao, Ph.D.
Isam Kahane,* Ph.D.
Toio Kato, D.Sc.
John L. Kelley, Ph.D.
Robion C. Kirby, Ph.D.
Shoshon Kobayashi, Ph.D.

(Chairman)
Tal-Yumin Lam, Ph.D.
Oscar E. Lange, Ph.D.
H. Blaine Lawson, Ph.D.
Lucien Le Cam, Ph.D.
R. Sherman Lehman, Ph.D.
Jerold E. Marsden, Ph.D.
Andrew J. Majda, Ph.D.
Andrew L. Nussbaum, Ph.D.
Ralph H. M'Cord, Ph.D.
Keith Miller, Ph.D.
Calvin C. Moore, Ph.D.
Andrew P. Ogg, Ph.D.
Benjamin Naimark, Ph.D.
Emund J. Pinney, Ph.D.

Associate Professors:
Paul R. Chernoff, Ph.D.
David M. Goldberg, Ph.D.
F. Alberto Grunbaum,* Ph.D.
I. Satake, Ph.D.
Ole H. Hald, Ph.D.
Leo A. Harrington, Ph.D.

Assistant Professors:
Jenny C. Harrison,* Ph.D.

Adjunct Professor:
Paul Concus, Ph.D.

Lecturers:
Nicole Arthaud-Kuhman, Math.
Steven Kerkhoff, Ph.D.
Christopher B. Croke, Ph.D.
David Goets, Ph.D.

Undergraduate Programs

The Department offers the undergraduate student a choice of majors leading to the A.B. degree. The basic major program in mathematics gives the student the opportunity to obtain a strong, well-rounded mathematical background. The faculty of the Department is strongly oriented toward research, and courses required for the major are oriented toward theory. For students with particular interest in the applications of mathematics, a special major program in applied mathematics is available. For prospective secondary school teachers there is a small, selective major program in mathematics for teachers.

General Major Requirements. Each of the three major programs requires a minimum of 36 units of upper-division units in the major in addition to a lower division base of 1A–1B–1C, 5A–5B–5C. Courses 111, 190A, 190B, and 190C are not applicable toward the upper division major requirements. Additional requirements for these programs are as follows.

Major In Mathematics. 113A–113B, 104A–104B or 185; 130 or 140 or 141 or 142; 135; three additional upper-division mathematics courses. Only one of courses 120A and 185 can be offered as part of the major.

The attention of students interested in logic is directed to Philosophy 12A–12B and Mathematics 125A–125B.

Courses in computer science, physics and Statistics 100A–100B–100C are of interest to mathematics majors.

With the approval of the major adviser, students may count not more than two mathematically theoretical courses in computer science, statistics, physics, mathematical economics, or other sciences toward their requirements for the major in mathematics.

Major In Applied Mathematics. Either 120A–120B or three courses from 104A, 104B, 105; 106; 113A and 112; at least one course from 128A, 128B; three additional upper-division units of which at least two must be from courses 128A, 128B (all subject to the approval of the major adviser). All or none of these three electives may be in the Mathematics Department.

Major In Mathematics for Teachers. Philoso-

phy 12A; Statistics 20; Mathematics 113A–113B, 115A, 130, 132, 136, and 160; two additional upper-division mathematics courses.

The major adviser must certify in writing that the student has the ability to write simple programs in BASIC, ALGOL, or FORTRAN. This certification will be given automatically if the student has passed a course which requires the student to write and run programs and which carries at least two units of credit. Current examples of such courses are Mathematics 128A–128B, Computer Science 1 or 101. With the approval of the major adviser, students may count not more than two mathematically theoretical courses in computer science, statistics, astronomy, physics, mathematical economics, or other sciences toward their requirements for the major in mathematics for teachers.

Honors Program. In addition to completing the re-

quirements for the major in mathematics or major in applied mathematics, students in the honors program must (a) earn a grade-point average of at least 3.3 in upper division and graduate courses in mathematics and in all courses taken in the University; (b) pass a graduate mathematics course with a grade of at least A- or C; (c) complete the course H196 in which they will write a senior thesis, or pass a second graduate course with a grade of at least A-; (d) receive the recommen-
dation of the major adviser; students interested in the honors program should consult with their major adviser at least two quarters before graduation.

Letters and Science List of Courses: 162 units from the List must be included in the 160 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Preparation for Graduate Study

Students preparing for graduate work in mathematics are strongly advised to acquire a reading knowledge of two foreign languages, as advised by the Department of Mathematics. This proficiency is required for most Ph.D. programs, but graduate programs do not leave much time for language study. There is usually no language requirement for an M.A. degree.

Course H117, designed to challenge the student's abil-

ity to do creative thinking, is useful for students prepar-
ing for graduate work. It is also desirable for such students to take some graduate courses while still in undergraduate status. Some of these courses, such as M202–205, C214, E250–256 are recommended.

Graduate Programs

The Department offers the M.A. degree in mathematics, covering both pure and applied fields. It also offers the Cand. Phil. and Ph.D. degrees in pure mathematics and applied mathematics. Detailed information concerning individual teaching and research fields and graduate programs, and degree requirements is given in the Graduate An-
nouncement of the Department of Mathematics, which is available upon request from the Graduate Secretary, Department of Mathematics.

Courses and Seminars

Courses and seminars are listed below. Statements of instructors commenting on their methods of teaching, NOTE: For key to symbols, see page 96.
emphasizing presentation material, and other characteristics of their courses are posted at the Department Office, 970 Evans, at the beginning of each quarter. Detailed descriptions of seminars and names of instructors offering them are also available.

Lower Division Courses

P. Algebra and Trigonometry. (2) Two units recorded credit, but recognized as four units of work load in computing study lists. Four hours of lecture per week. Intended only for prospective elementary school teachers. Students must preenroll and attend the first class meeting as for other courses.

Mr. Bergman (F, W, Sp)
Mr. Hunkin (each part offered each quarter)

1A-S. Calculus. (2-2-2) Two hours of lecture and two hours of discussion section per week. Prerequisite: at least three and one-half years of high school mathematics including algebra, geometry, and trigonometry, and some analytic geometry, and analytic trigonometry, and some analytic geometry, and analytic trigonometry. Lacks certain essential calculus concepts and a few key calculus concepts.

Mr. McKenzie (sequence beginning F)

1A-IB-1C. Calculus. (4-4-4) Two hours of lecture and two hours of discussion section per week. Prerequisites: at least two years of high school algebra and trigonometry, and one year of analytic geometry and trigonometry. Some topics at the high school level will be covered again.

Mr. Diliberto (F, W, Sp)

6. Elementary Mathematics for Teachers. (4) Formerly 51A-51B-51C. Three hours of lecture and two hours of discussion section per week. The number of hours of discussion section required will depend on the student's prior experience. Students may receive no credit for 51A if they have not received course 1A, 1B, 1C. A high school graduate is sufficient to assign at least one unit. Students may preenroll and attend the first class meeting as for other courses.

Mr. Cordes, Mr. Rosenlicht, Mr. Sarason, Mr. Trotter, Mr. Kirby (F, W, Sp)

51A. Introduction to Linear Algebra. (4) Two hours of lecture and two hours of discussion per week. Prerequisite: course 1C. Students may not receive credit for both 51A and 111. Matrix algebra, simultaneous linear equations, vector spaces, linear dependence, determinants.

Mr. Arthaud-Kuhman, Mr. Kirby, Mr. Rosenlicht, Mr. Sarason (F, W, Sp)

51B. Calculus of Vector Functions. (4) Two hours of lecture and two hours of discussion per week. Prerequisite: course 51A. Review of partial differentiation and multiple integration. Vector differential and integral calculus, including theorems of Green, Gauss, and Stokes. Implicit function theorem if time permits.

Mr. Cordes, Mr. Rosenlicht, Mr. Sarason (F, W, Sp)

51C. Differential Equations and Related Topics. (4) Three hours of lecture and three hours of discussion per week. Prerequisite: courses 1A--1B--1C. Ordinary differential equations of first and second order, series solutions and higher order equations. An introduction to Fourier series and separation of variables in simple partial differential equations with some applications.

Mr. Cordes, Mr. Rosenlicht, Mr. Sarason, Mr. Trotter, Mr. Kirby (F, W, Sp)

Note: Replacement of the sequence 51A--51B--51C by an essentially equivalent sequence 50A--50B--50C, effective in Fall Quarter 1976.

Consult the Mathematics Department for up-to-date information.

51SA--51SB-51SC. Linear Algebra, Calculus of Vector Functions. (5) Five hours of lecture per week. Prerequisite: one of the sequences 51A--51B--51C, 51A--51B--51D.

Mr. Diliberto (F, W, Sp)

52A. The Frechet derivative, chain rule, implicit function theorems and existence theorems for differential equations by the method of successive approximations, integration in several variables, and further topics in advanced calculus.

Mr. Klass, Mr. Feldman, Mr. Hochschwartz (F, W, Sp)

104A. The Frechet derivative, chain rule, implicit function theorems and existence theorems for differential equations by the method of successive approximations, integration in several variables, and further topics in advanced calculus.

Mr. Hirsch (F, W, Sp)

H104A-H104B. The Frechet derivative, chain rule, implicit function theorems and existence theorems for differential equations by the method of successive approximations, integration in several variables, and further topics in advanced calculus.

Mr. Hirsch (F, W, Sp)

104A-104B. Introductory and Intermediate Analysis. (4-4) Four hours of lecture and two hours of discussion per week. Prerequisite: courses 51B and 51C or consent of instructor.

Mr. Driver, Mr. Friedberg, Mr. Milnor, Mr. Serfios (F, W, Sp)

105. Integration. (4) Three hours of lecture per week. Prerequisite: course 104A. Null sets and the Riemann integral, continuous functions, uniform convergence, the elementary transcendental functions sin x, log x, integration of limit of functions, and some advanced topics in analysis. (F, W, Sp)

Mr. Klass, Mr. Feldman, Mr. Hochschwartz (F, W, Sp)

104B. The Frechet derivative, chain rule, implicit function theorems and existence theorems for differential equations by the method of successive approximations, integration in several variables, and further topics in advanced calculus.

Mr. Hirsch (F, W, Sp)

H104A-H104B. The Frechet derivative, chain rule, implicit function theorems and existence theorems for differential equations by the method of successive approximations, integration in several variables, and further topics in advanced calculus.

Mr. Hirsch (F, W, Sp)

105. Integration. (4) Three hours of lecture per week. Prerequisite: course 104A. Null sets and the Riemann integral, continuous functions, uniform convergence, the elementary transcendental functions sin x, log x, integration of limit of functions, and some advanced topics in analysis.

Mr. Hirsch (sequence beginning F)

111. Introduction to Linear Algebra. (4) Three hours of lecture per week. Prerequisite: two quarter courses in calculus and upper division algebra. Students may not receive credit for both 51A and 111.

Same mathematical content as 51A but intended for advanced students who did not have linear algebra in their lower division calculus sequence.

Mr. Rhodes, Mr. Nelson, Mr. Stallings (F, W, Sp)
112. Linear Algebra (4) Three hours of lecture per week. Prerequisite: course 51A or 111. Students may not receive credit for both 112 and 113C. For students in engineering or mathematical, natural, or social sciences who are likely to pursue more advanced courses in the physical sciences. Students who wish to prepare for advanced work in applied mathematics should take courses 112 and 113C. Course 112 has been combined with 110A to form 112A-112B-112C. For students in engineering or applied mathematics and those students in the physical sciences who wish to pursue further advanced work in the physical sciences. Students who wish to prepare for advanced work in applied mathematics should take course 112A-112B-112C rather than 121A-121B.

121A—121B. Mathematical Tools for the Physical Sciences. (4-4) Three hours of lecture per week. Prerequisite: courses 51B and 51C. Primarily for students in the physical sciences. Students who wish to prepare for advanced work in applied mathematics should take courses 121A-121B-121C rather than 121A-121B.

121A. Functions of a complex variable, Fourier series, finite-dimensional linear systems, introduction to infinite-dimensional systems.

121B. Infinite-dimensional linear systems, orthogonal expansions, special functions, partial differential equations arising in mathematical physics.

123. Ordinary Differential Equations. (4) Three hours of lecture per week. Prerequisite: course 104A. Some background in linear algebra is recommended. Existence and uniqueness of solutions, properties of solutions in simple cases, maximum principles, and a priori bounds, the Fourier transform.

128A. Numerical Analysis. (5) Three hours of lecture per week. Prerequisite: course 51B and 51C. Programming for numerical calculations, round-off error, approximation and interpolation, numerical solution of ordinary differential equations. Practice on the computer.

128B. Numerical Analysis. (5) Three hours of lecture and four hours of laboratory per week. Prerequisite: courses 112, 128A, or permission of instructor. Solution of nonlinear equations, direct and iterative methods; numerical solution of systems of linear equations, evaluation of eigenvalues and eigenvectors of matrices, applications to simple differential equations. Practice on the computer.

130. The Classical Geometries. (4) Three hours of lecture per week. Prerequisite: course 113B. Topics chosen from Euclidean geometry, hyperbolic geometry, and Lobachevskian geometry.

131. Mathematical Problems Seminar. (4) Three hours of lecture per week. Prerequisite: consent of the instructor. Recommended for exceptional students with strong mathematical background interested in problems calling for original thought and various mathematical approaches. May include advanced topics developed in the major fields of mathematics. Open enrollment; may be repeated for credit. 

132. Topology. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Topics selected from: set-theoretical topology, general topology, point-set topology, and the theory of manifolds.

133. Analysis for Applied Mathematics. (4-4) Three hours of lecture per week. Prerequisite: courses 113A-113B-113C. Analysis for Applied Mathematics and those students in the physical sciences who are likely to pursue more advanced work in applied mathematics. Students who wish to prepare for advanced work in applied mathematics should take courses 112A-112B-112C rather than 121A-121B.

134. Number Systems. (4) Three hours of lecture per week. Prerequisite: course 113B. Especially recommended for prospective teachers. Systems of natural numbers, integers, rational numbers, and real numbers developed both axiomatically and through set-theoretical construction. Proof by induction and definitions by recursion.


136. Boolean Algebras. (4) Three hours of lecture per week. Prerequisite: course 125A. Postulates, treatment as sets or lattices; relation to sentential calculus. Relational completeness of classical logic; subalgebras, ideals, direct products, representation theorem.


160. History of Mathematics. (4) Three hours of lecture per week. Prerequisite: courses 51B, 51C, and 105A. History of algebra, geometry, and calculus from ancient times through the seventeenth century and selected topics from more recent mathematics.

163. Tutorial in Upper Division Mathematics. (4) Four hours per week. Prerequisite: consent of instructor. Emphasis is placed on the individual's experience with and exploration of upper division mathematics. Examples of subjects which may be covered are game theory, category theory, differential topology, mathematical foundations of quantum mechanics, global theory of ordinary differential equations, and classical linear groups. Content varies; may be repeated for credit with consent of the instructor.

175. Calculus of Variations. (4) Three hours of lecture per week. Prerequisite: course 125A or equivalent knowledge of the calculus. Euler equations for variational problems, extremals, the variational problem of Cauchy in one dimension, generalizations of Cauchy's problem derived from integral principles; solutions of variational problems by direct methods.

185. Introduction to the Theory of Functions of a Complex Variable. (4) Three hours of lecture per week. Prerequisite: course 104A. No credit for 185 following 125B.

188. Mathematical Models in Physics and Engineering. (4) Three hours of lecture per week. Prerequisite: courses 10A and 10B or equivalent. The mathematics used for mathematics majors with little or no background in physical sciences. Study of the relationship between fundamental physical concepts, experimental observations, and experimental results. Examples of such problems as the study of dynamical systems and wave propagation.

190A—190B—190C. Survey of Algebra and Analysis. (4—4—4) Three hours of lecture per week. Prerequisite: upper division courses in number theory, linear algebra, and two credits specialization outside mathematics and physical science. Students receive no credit for 190A following 1A or 16A, two units credit for 190B following 18 or 16B, no credit for 190C following 18 or 16B.
190A. Analytic geometry, differential and integral calculus.
Mr. Satske (F)

190B. Calculus of several variables (partial differentiation, extremum problems), complex numbers and trigonometry, vectors and vector spaces.
Mr. Satske (W)

190C. Linear algebra.

**191. Experimental Courses in Mathematics.** The topics to be covered and the method of instruction to be used will be announced at the beginning of each quarter that such courses are offered. See departmental bulletin for details.

**195. Special Topics in Mathematics.** (4) Three hours of lecture per week. Prerequisite: consent of instructor. Lectures on special topics, which will be announced at the beginning of each quarter that the course is offered. May be repeated for credit.

H196. Honors Thesis. (4) Meetings to be arranged. Prerequisite: admission to the Honors Program in Mathematics. Introduction to an independent study of a special topic leading to an honors thesis.

The Staff (F, W, Sp)

Related Courses in Other Departments

Computer Science 101. Introduction to Computing for Engineering and Physical Sciences. (3-3) One hour of lecture per week.

Computer Science 169. Introduction to Combinatorics.

Economics 104. Introduction to Mathematical Analysis. (4-4-4) Three hours of lecture per week.

Statistics 168. Game Theory.

Computer Science 101. Introduction to Computing for Engineering and Physical Sciences. (3-3) One hour of lecture per week.

Computer Science 169. Introduction to Combinatorics.

Economics 104. Introduction to Mathematical Analysis. (4-4-4) Three hours of lecture per week. Prerequisite: course 206B. Study of functions, limits, continuity, differentiation, integration, and applications.

Statistics 168. Game Theory.

Computer Science 101. Introduction to Computing for Engineering and Physical Sciences. (3-3) One hour of lecture per week.

Computer Science 169. Introduction to Combinatorics.

Economics 104. Introduction to Mathematical Analysis. (4-4-4) Three hours of lecture per week.

Statistics 168. Game Theory.

Computer Science 101. Introduction to Computing for Engineering and Physical Sciences. (3-3) One hour of lecture per week.

Computer Science 169. Introduction to Combinatorics.

Economics 104. Introduction to Mathematical Analysis. (4-4-4) Three hours of lecture per week.

Statistics 168. Game Theory.

Computer Science 101. Introduction to Computing for Engineering and Physical Sciences. (3-3) One hour of lecture per week.

Computer Science 169. Introduction to Combinatorics.

Economics 104. Introduction to Mathematical Analysis. (4-4-4) Three hours of lecture per week.

Statistics 168. Game Theory.

Computer Science 101. Introduction to Computing for Engineering and Physical Sciences. (3-3) One hour of lecture per week.

Computer Science 169. Introduction to Combinatorics.

Economics 104. Introduction to Mathematical Analysis. (4-4-4) Three hours of lecture per week.

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Computer Science 101. Introduction to Computing for Engineering and Physical Sciences. (3-3) One hour of lecture per week.

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Computer Science 169. Introduction to Combinatorics.

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Statistics 168. Game Theory.

Computer Science 101. Introduction to Computing for Engineering and Physical Sciences. (3-3) One hour of lecture per week.

Computer Science 169. Introduction to Combinatorics.

Economics 104. Introduction to Mathematical Analysis. (4-4-4) Three hours of lecture per week.

Statistics 168. Game Theory.

Computer Science 101. Introduction to Computing for Engineering and Physical Sciences. (3-3) One hour of lecture per week.

Computer Science 169. Introduction to Combinatorics.

Economics 104. Introduction to Mathematical Analysis. (4-4-4) Three hours of lecture per week.

Statistics 168. Game Theory.
240A–240B. Riemannian Geometry. (4–4) Three hours of lecture per week. Prerequisite: course 214. Riemannian manifolds, parallelism, geodesics, structures, curvature, comprehensive study between curvature and topology. Further topics such as: general theory of connections, holonomy groups and de Rham decomposition, principal bundles, submanifolds. Riemannian geometry of Lie groups. Mr. Croke (F).

241A. Riemann Surfaces. (4) Three hours of lecture per week. Prerequisite: courses 205 and 214. Complex manifolds, meromorphic functions, Riemann-Roch theorem, Abel’s theorem, Jacobian variety and linear systems, integrals of 1st, 2nd, and 3rd kind, and periodic relations.

Mr. Ogg (Sp)

*241B. Complex Manifolds. (4) Three hours of lecture per week. Prerequisite: course 241A. Transcendental methods in algebraic geometry, Kahler manifolds, Hodge and Dolbeault theorems, fiber bundles and characteristic classes in algebraic geometry, abelian varieties and analytic surfaces.

*245A–*245B–*245C. General Theory of Algebraic Structures. (4–4–4) Three hours of lecture per week. Prerequisite: courses 113C and 135. General theories of classes of fields, groups, rings, fields, lattices, Boolean algebras, etc.

250A. Groups, Rings, and Modules. (4) Three hours of lecture per week. Prerequisite: courses 113A, 113B, and 245A. Groups and rings, homomorphisms, direct products, composition series, permutation groups, groups with operators. Ring theory: homomorphism, isomorphism, factorization, principal ideal domains. Modules over rings: maximum and minimum conditions, free modules, duality, tensor product and homomorphism modules.

Mr. Thomas (F)

250B. Field Theory. (4) Three hours of lecture per week. Prerequisite: course 250A. Extensions and composite fields, field automorphisms, Galois theory, finite fields. Mr. Seidenberg, Mr. Thomas (W)

250C. Multilinear Algebra and Commutative Algebra. (4) Three hours of lecture per week. Prerequisite: course 250B. Tensor algebra and exterior algebra of a module, with application to linear transformations. Elementary commutative ideal theory, rings of fractions, transcendental extensions. Mr. Seidenberg, Mr. Thomas (W)

254A–254B–254C. Introduction to Number Theory. (4–4–4) Three hours of lecture per week. Review of course 204A and basic knowledge of real, complex, and linear analysis. Basic properties of Fourier series, convergence and summability, conjugate series, Parseval’s identity, boundary behavior of analytic and harmonic functions, additional topics at the discretion of the instructor.

259A. Transformation Groups. (4) Three hours of lecture per week. Prerequisite: courses 254A and 254B. Topological groups, Haar measure, general theory of topological transformation groups, the existence of slices and transversals, the Smith theory of periodic transformations.

260A. Topological Groups. (4) Three hours of lecture per week. Prerequisite: courses 105, 204B, and 250A. General topological groups, Haar measure, compact groups.

Mr. Dubins (Sp)

*260B. Abstract Harmonic Analysis. (4) Three hours of lecture per week. Prerequisite: courses 254A and 254B. Algebraic topology, group representation.

261A–261B–261C. Lie Groups. (4–4–4) Three hours of lecture per week. Prerequisite: course 214. Lie groups and Lie algebras, structure theory, compact, solvable, complex, and semi-simple groups: classification of simple groups, representation theory; further topics such as homogeneous spaces.

Mr. Moore (Sequence beginning F)

*265. Differential Topology. (4) Three hours of lecture per week. Prerequisite: course 214. Vector bundles, tubular neighborhoods, approximation theorems, Morse theory, handlebodies, surgery and cobordism.

271. Topics in Foundations. (4) Three hours of lecture per week. Prerequisite: course 270. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars. Hence it may be repeated for credit.

272. Topics in Differential Topology. (4) Three hours of lecture per week. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars. Hence it may be repeated for credit.

Mr. Feldman (W)

280A. Mathematical Relativity. (4–4–4) Three hours of lecture per week. Prerequisite: course 140 or consent of instructor. Special theory of relativity, Lorentz group, reformulation of classical physical theories in relativistic form, principle of equivalence, general theory of gravity and cosmological problems.

290. Seminars, (2–8) 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.

Mr. Henkin, Mr. Lam, Mr. Singer (F), Mr. Henkin, Mr. Hartshorne (W), Mr. Harrington (Sp)


The Staff (F, W, Sp)

296. Reading Course for Graduate Students. (2–8) By appointment. Investigation of special problems under the direction of the department. Sections 1–20 must be taken on a letter grade basis. Sections 21–60 must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

300. Teaching Workshop, (2–8) Three hours of discussion per week. Designed for teaching assistants with little or no teaching experience. The course consists of practice teaching, alternatives to standard classroom methods, guided groups, and evaluation of videotaped classroom visits, and an individual project. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

Logic Colloquium. (No credit) Reports on current research and scholarly work by members of the staff, visitors, and graduate students.

Mathematics Colloquium. (No credit) Meetings for the presentation of original work by members of the staff, visiting mathematicians, and graduate students.

Related Courses in Other Departments

Computer Science 268A. Effective Computability.

Computer Science 272. Formal Models of Programs.

Computer Science 274. Algorithmic Complexity.

Industrial Engineering Operations Research 262A. Linear Programming.


Statistics 204A–204B–204C. Introduction to Probability and Statistics for the Physical Sciences.


Statistics 290. Individual research.

Statistics 296. Topics in Foundations.


Related Programs

Computer Science. See Department of Electrical Engineering and Computer Sciences, Computer Science Division.

Logic. See Group in Logic and the Methodology of Science and Department of Philosophy.

Mathematics Education. See Group in Science and Mathematics Education.

Operations Research. See Department of Industrial Engineering and Operations Research.

Statistics. See Department of Statistics.

NOTE: For key to symbols, see page 36.
The Graduate Program

The Department offers the M.A. and Ph.D. degrees in microbiology and immunology. There is no separate M.A. program; the M.A. degree is usually earned as part of the doctoral program. The completion of teaching assignments for a minimum of three quarters is required of all students working for the Ph.D. degree in microbiology. Information is available from the graduate adviser in 3573 Life Sciences Building.

Lower Division Course

100A–100B. General Microbiology. (4–4) Three 1 1/2-hour lectures per week (discussion included). Prerequisite: Biology 1A–1B–1C; Chemistry 5 and 8 or 12; Biochemistry 102 or 102L. A prerequisite sequence which presents our current understanding of and recent developments in the biology, physiology, genetics, biochemistry, and ultrastructure of the major microorganisms with primary emphasis on the bacteria and their viruses. 100A: Mr. Leighton, Mr. Thorner, Mr. Zusman (W); 100B: Mrs. Leighton, Mr. Thorner, Mr. Zusman (Sp)

101A–101B. General Microbiology Laboratory. (4–4) 101A: Three 3-hour labs per week. 101B: Two 1 1/2-hour laboratories per week. Prerequisite: course 100A–100B (may be taken concurrently). Laboratory experiments planned to accompany the lectures in courses 100A–100B. Sequences beginning (W). Ms. Cole, Mr. Leighton, Mr. Thorner, Mr. Zusman (Sp)

102. An Introduction to General Microbiology. (4) Two 1 1/2-hour and one 1-hour lectures per week. Prerequisite: Biology 1A–1B–1C; Chemistry 5 and 8 or 12; Biochemistry 102 or 102L. Not open to students who have credit in courses 100A–100B. Mr. Glazer, Mr. Nikaido (F)

102L. Microbiology Laboratory. (4) One 1-hour lecture and two 1 1/2-hour laboratories per week. Prerequisite: course 100A–100B (may be taken concurrently) or course 100A. Experimental work to acquaint the student with the techniques of general microbiology. Planned to accompany lectures in course 102. Ms. Cole (F)

103. An Introduction to Immunology. (4) Two 1 1/2-hour lectures and one 1-hour discussion per quarter. Prerequisite: Biology 1A–1B–1C; a course in biochemistry is recommended. Must be taken on a pass/not pass basis. Ms. Cole (F)

H190. Research Seminar, (0) Formerly H150. One hour seminar per week. Prerequisites: Microbiology 102 or Microbiology 100A–100B; Microbiology 103; or consent of the instructor. These informal discussions designed to introduce students to research being conducted in the Department of Microbiology and Immunology. Open to juniors eligible for the departmental honors program who intend to take course H190 in their senior year. The Staff (Sp)

H195. Individual Study. (3–5) Open to students in their senior year who are enrolled in the Department of Microbiology and Immunology honors program. The Staff (Mr. Thorner in charge) (W, Sp)

H196. Research. (3–5) Formerly numbered H180. Open to students in their senior year who are enrolled in the Department of Microbiology and Immunology honors program. Laboratory research. The Staff (Mr. Thorner in charge) (F, W, Sp)

198. Supervised Independent Study and Research. (1–5) Formerly numbered 195. Enrollment is restricted by regulations listed on page 36. Must be taken on a pass/not pass basis. The Staff (W, Sp)

1002A–202B. Immunology. (4–4) 202A. Two 1 1/2-hour lectures per week. Prerequisite: Biochemistry 102 or the equivalent. The immune response: antigen-antibody reactions, structure and function of the immune system; genetics basis of immunoglobulin diversity; lymphocyte differentiation, cellular interactions and mechanisms of immunity and tolerance. Mrs. Koshland (F) 202B. Two 1 1/2-hour lectures per week. Cell medi-
ated immunologic reactions, the allo-raft reaction; mechanisms of immunologic injury; immunologic disorders; and immunosuppression and the potentials of the immune response; allergic alterations in neoplasia and immunologic surveillance.

Mrs. Blair (W)

202L. Immunology-Immunochecmistry Laboratory. (4-8) Laboratory, seminar, and discussion periods to be arranged. Prerequisite: course 202A, or equivalent. Biochem 204A-205A or 202C or the equivalent; a course in molecular genetics. Lectures and discussion covering selected topics in the metabolism of various microorganisms, with special emphasis on intermediary metabolism. Mr. Thomer (F)

**203. Microbial Metabolism. (2) Seminar and discussion periods to be arranged. Prerequisite: Micro. 100C or 204A. Biochem 204A-205A or 202C or the equivalent; a course in molecular genetics. Open to advanced undergraduates and graduate students in microbiology and immunology. To be taken on a satisfactory/unsatisfactory basis.

Mrs. Blair (Sp)

205. The Nature of the Immune Response. (2) Three hours of lecture per week. Prerequisite: graduate student standing in biological science or permission of instructor. Antigens of normal and neoplastic cells; immune tolerance; lymphocyte function. To be taken on a satisfactory/unsatisfactory basis. Mrs. Blair (Sp)

207. Structure and Function of the Procaryotic Cell. (2) Two hours of lecture per week. Prerequisite: Biochemistry 102 or equivalent. A synthesis of structural and functional knowledge about the principal component of procaryotic cells, with emphasis on membranes. (Related course on the procaryotic cell membrane, Biochem 202, offered in the alternate year.) Mr. Glazer, Mr. Nikaido (Sp)

208L. Laboratory Methods in Cellular Immunology. (4-8) Laboratory, seminar, and discussion periods to be arranged. Prerequisite: course 202A, 205A, 202L, or consent of instructor. Students will work on a project involving a variety of techniques in cellular immunology. Under special circumstances, a student may arrange to take the course for more than one quarter and receive credit.

Mr. Leighton (Sp)

**209. Microbial Models of Development. (4) Two 1 1/2-hour lectures per week. Prerequisite: Biochemistry 102 or 100A-100B-100C; course 100A-100B; or consent of instructor. A critical analysis of the advantages and disadvantages of microbial systems for studying principles of growth, morphogenesis, differentiation, and multicellular organization. Genetic and biochemical approaches will be emphasized. Graduates who intend to continue graduate studies, including the dissertation, within four years. Mr. Henry (Sp)

210. Seminar in Microbiology. (1-3) Two hours of lecture and 4-8 hours of laboratory per week. An introduction to research topics or analysis of the literature. Required of all first-year graduate students in microbiology and immunology. To be taken on a satisfactory/unsatisfactory basis.

The Staff (Mr. Leighton, Mr. Mishell in charge). (F, W, Sp)

211. Seminar in Cellular Immunology Research. (2) Two hours of lecture per week. Prerequisites: Graduate standing in Immunology or consent of instructor. This course is an advanced seminar in cellular immunology. Students participate by reading, presenting and discussing papers from the current literature. To be taken on a satisfactory/unsatisfactory basis. Mr. R. I. Mishell (Sp)

280. Research. (1-12) To be arranged.

285. Special Topics. (1-3) Prerequisite: consent of instructor. From time to time, lecture series are offered on special topics of current interest. To be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

299. Special Study for Graduate Students. (2-4) Prerequisite: Graduate standing. To be arranged by instructor. Individual study in consultation with the major field adviser. Students interested in pursuing graduate work in molecular biology are advised to obtain a strong background in chemistry, physics and mathematics, and to be familiar with the basic concepts of biology. Biochemistry and genetics form the specific foundation for much of the instructional work in the Department. The common preparation required of all graduate students is essentially that outlined above for the undergraduate major program.

The Graduate Program. Students are expected to take Molecular Biology 204A and 208B and one additional graduate course offered by the Department. Other courses are chosen in consultation with the graduate major adviser. Each student serves as a teaching assistant for two quarters as a requirement for the Ph.D. degree. Demonstration of a reading knowledge of one foreign language chosen from French, German, Japanese, and Russian is required for those preparing for the comprehensive or language requirement. Students must demonstrate proficiency in research as well as a general knowledge of different areas of molecular biology. Incomin students with adequate undergraduate preparation should plan on finishing their Ph.D. requirements, including the dissertation, within four years. Those with deficiencies may require a longer time; such deficiencies, however, should not be made up during the first year of graduate work.

Lower Division Courses

**11. Molecules of Life. (4) Three lecture hours plus one hour of laboratory per week. Prerequisite: Chemistry 14 and 1B. Recommended: Biology 1A and 1B, and Chemistry 8 or 12. For students intending to major in the biological or physical sciences. Introduction to the molecular basis of metabolism and inheritance. Cell chemistry and division; biochemical pathways; enzyme function; gene structure, replication, mutation, recombination, and expression; protein synthesis. (Sp)

10. Introduction to Molecular Biology. (3) Three 1-hour lectures per week. Open without prerequisite for all students interested in advanced study in science. The molecular basis of life. Contemporary description of genetics, mutation, evolution, growth, and reproduction, with emphasis on viruses and simple organisms. Extension to higher organisms and medical and social implications. Mr. Fraenkel-Conrat (W)

NOTE: For key to symbols, see page 30.
119. Molecular Basis of Heredity. (3) Three 1-hour lectures and one discussion section per week. Prerequisite: 11A-B or equivalent, or Biology 100A; Biochemistry 100A or 102 (may be taken concurrently). Structure, reproduction, mutation, and host-cell interactions of animal viruses. Mr. Duesberg (F).

120. Introduction to Molecular Virology. (4) Four 1-hour lectures per week. Prerequisite: organic chemistry and an elementary course in biology. Consideration of viruses as infectious particles having chemical, physical, and hereditary characteristics. Ms. Blackburn (W).

H190. Research Seminar. (1) One hour of scheduled meeting per week to be arranged with research supervisor. Prerequisite: open to students enrolled in the Molecular Biology Honors Program and taken concurrently with H195. Seminar on presentation and evaluation of results in area of student's individual research interests. The Staff (Mr. Beckendorf in charge) (F, W, Sp).

H196. Research. (1-3) Meetings to be arranged. Prerequisite: open to students enrolled in the Molecular Biology Honors Program. Laboratory research followed by a written report for advanced students under the direction of a member of the staff. One unit of credit for 3 hours of laboratory research per week. May be repeated for credit. The Staff (Mr. Stent in charge) (F, W, Sp).

199. Current Topics in Molecular Biology. (2) One 2-hour meeting per week. Prerequisite: consent of instructor. Group studies of selected topics. Mr. Eckhos (Sp).

190. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed below. Students may register for this course: overall grade-point average of at least 3.0. Must be taken on a pass/no-pass basis. The Staff (Mr. Stent in charge) (F, W, Sp).

Graduate Courses

200A—200B—200C. Introduction to Molecular Biology. (5—5—5) Three 1 1/2-hour lectures and one discussion section per week. Prerequisite: Biology 1A—1B or equivalent, or Bacteriology 100A; Biochemistry 100A or 102, and a course in physical chemistry (these courses may be taken concurrently), or consent of instructor. Three-quarter sequence beginning in the fall. 200A. Genetic and functional characteristics of prokaryotic cells and viruses, biosynthesis of nucleic acids and proteins, metabolic regulation. Mr. Eckhos (F).

202B. Cell structure and gene expression in eukaryotic cells. Prerequisite: Molecular Genetics 200 or equivalent, or Bacteriology 100A; Biochemistry 100A or 102, and a course in physical chemistry (these courses may be taken concurrently), or consent of instructor. Three-quarter sequence beginning in the fall. 202A. Genetic and functional characteristics of prokaryotic cells and viruses, biosynthesis of nucleic acids and proteins, metabolic regulation. Mr. Eckhos (F).

Related Courses by Molecular Biology Faculty

Biochemistry 206. Physical Biochemistry. (5) See Biochemistry for complete description of this course.

Music

Department Office, 104 Morrison Hall

Professors: Philip Brett, Ph.D. Richard L. Creager, Ph.D. Alan Curran, Ph.D. Vincent H. Duggleby, Ph.D. Richard Feldman, Ph.D. Andrew W. Field, Ph.D. Joseph Kerman, Ph.D. Lawrence Mon, Ph.D. (University of Chicago) (Chairman)

Associate Professors: Michael Senturia, A.B.

Assistant Professors: James E. Cunningham, M.M. Anthony Newcomb, Ph.D. Edwin Dugger, M.F.A.

Lecturers: Susan Winslow, A.B. Jacqueline R. Clark, A.B. Elizabeth Davidson, M.A.

Assistant Professor: Robert Stine, M.M.

Professors: Frances Damott (Visiting Professor, Chair of Italian Culture) (Violin)

Lecturers: Doris Schwann, A.B. (Piano)

Departmental Major Advisers: Mr. Brett, Mr. Cunningham, Mr. Senturia, Mr. Winslow.

Graduate Advisers: Composition, Mr. Wilson (M.A. and Ph.D.); History and Literature, Mr. Hearst (M.A.), Mr. Kerman (Ph.D.); Ethnomusicology, Ms. Wade (M.A. and Ph.D.).

The Department of Music fosters the cultivation of music on campus through undergraduate and graduate programs of study, and also public concerts and lectures in Hertz Memorial Hall, Morrison Music Building, and other campus locations. For undergraduate students the Department offers a major in music, and for graduate students the department offers the M.A. and Ph.D. degrees in music composition, and in research. The Theory courses provide an introduction to the materials of musical composition through ear training, harmony, counterpoint, and analysis. The History and Literature courses present a comprehensive survey of the evolution of music and detailed study of the chief periods of its development. Courses in Ethnomusicology provide study of specific areas of world music, both in survey and in depth, and also provide an introduction to the principles and methods of research. Courses in Performance (including orchestras, chorus, concert band, and various ensembles) offer the opportunity to perform in band, orchestra, chorus, and choral ensembles, and also the opportunity to perform in the area of music of particular cultures. All students who wish either to audit or to enroll in any courses of the courses listed under Group II must take the Department's qualifying examination in music theory and basic keyboard skill. This examination is given at the beginning of every quarter, during the pre-enrollment period, as announced in the Circular for New Undergraduates. Results of this examination determine admission to the major and assignment to sections of the courses in music history. Students wishing to enroll for advanced placement in harmony can take the Department's special harmony examination; consult the Department Office.

All students who wish either to audit or to enroll in performance courses are required to take auditions for admission during the summer quarter before the fall quarter of their first year of study.

The Major

First Year. Courses A—B—C; 1A—1B—1C.


Third and Fourth Years. (a) Performance—Three courses from the group 140—149, preferably in sequence. (b) For students entering the major in Fall 1980 and after: courses 121A—121B—121C; a course in ethnomusicology (130 series) may be elected in place of any one quarter of the 121 sequence (c) Addi-
theological courses to complete the minimum of 36 units in the series for majors 100-150 (including courses in the 130 series and performances courses 140-149 but not 151, 152, 153, and 128 series). Interdepartmental courses 104, 115, and 117 are acceptable for the major.

Honors Program. Adviser: Mr. Moo. Qualitatively qualified students majoring in music are invited to consult the adviser concerning studies which they may propose to undertake. Appropriate general fields include music history, analysis, musical composition, and performance. The Honors Seminar (198B) is required of seniors who wish to obtain departmental honors at graduation.

Teacher Training. Consult major advisers.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Higher Degrees

The M.A. and Ph.D. degrees are offered in music composition or in research. Graduate students should consult the Graduate Division section of this catalog and send for the special announcements issued by this Department concerning these degrees.

Medieval Studies. Please see Index for further information on Medieval Studies.

Group I

Courses open to all students in the University.

Lower Division Courses

Theory

10A-10B. Basic Musicianship. (2-2) Three 1-hour meetings per week. Fundamentals of music, including notation, sight singing, ear training, and beginning linear analysis. For general students. The Staff (Mr. Swackhamer in charge) (F, W, Sp).

History and Literature

27. Introduction to Music. (4) Two 1-hour lectures, one 1-hour listening section, and one 1-hour discussion per week. Prerequisite: course 27 or consent of instructor. The evolution of Western music from the Middle Ages up to Beethoven.
Mr. Brett (W).

127B. History of Western Music. (4) Two 1-hour lectures, one 1-hour listening section, and one 1-hour discussion per week. Prerequisite: course 27 or consent of instructor. The evolution of Western music from the Middle Ages up to Beethoven.
Mr. Brett (W).

128B. The Symphonies of Beethoven. (4) Three hours of lecture per week. Prerequisite: course 27 or consent of instructor. Mr. Kerman (W).

128C. Survey of Contemporary Music. (4) Three hours of lecture per week. Prerequisite: course 27 or consent of instructor. Mr. Feliciano (F).

128D. J. S. Bach. (4) Three hours of lecture per week. Prerequisite: course 27 or consent of instructor. Mr. Moroney (Sp).

*1128F. Music of Johannes Brahms. (4) Three hours of lecture per week. Prerequisite: course 27 or consent of instructor. Mr. Hepert (Sp).

Etnomusicology

*129A-29B. Folk Music of Europe and the Americas. (4-4) Three hours of lecture and one of discussion per week. Emphasis will be on those particular musical cultures, their history, and their influence today. Special attention will be given to music throughout Europe and to the various indigenous musical traditions of the Americas. Mr. Crouch (F).

130. Afro-American Music. (4) Three hours of lecture per week. Black-American music from its African origins to the various cultures which exist in America today. The origins and development of contemporary American Black music in popular music as well as jazz and contributions to their white counterparts. Emphasis limited to 100 students. Mr. Wilson (F, W).

*131A. Music of the Southeast Asia Tradition. (4) Three hours of lecture per week, and participation in a performance ensemble. Survey of the major cultural elements of the musical traditions of Indonesia (Java and Bali), Thailand, Cambodia, Laos, Malaysia, and the Philippines—cultures which share instrument types but have developed distinctive musical styles.
Mr. Wade (F).

*131B. Music of India. (4) Three hours of lecture per week, and instruction in North Indian vocal style. Includes the classical music traditions of both North and South India (Hindustani and Karnatak music).
Emphasis on class teaching. Ms. Wade (Sp).

134A. Music of the East Asia Tradition. (4) Three hours of lecture per week and participation in a Chinese Music Ensemble. Survey of the major cultural elements of China, Korea, Vietnam and Japan—cultures which share instrument types but have developed distinctive musical styles.
Mr. Wade (Sp).

*134B. Music of Japan. (4) Three hours of lecture per week and participation in a performance ensemble. Traditional classical music of Japan: Shinjo ritual music, the imperial court music of the Edo period, and dance patterns, biwa and shakuhachi forms, chamber music for shamisen and koto, theatrical genres of kabuki and noh. Reading in music and pertinent Japanese literature in translation.
Mr. Wade (Sp).

134C. Music of Japan: The Noh Drama. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Analysis of the musical, theatrical, and dramatic elements of the theatrical form patronized by samurai: Consideration of historical antecedents, including Buddhist chant and aesthetics. To be offered 1979/80 only.
Mr. Malm (W).

134D. Music of Japan: Kabuki and Bunraku. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Analysis of the musical, theatrical, and dramatic elements of the Tokugawa period theatrical forms patronized by the merchant class in developing urban centers. Consideration of historical antecedents and interplay of elements from various theatrical forms (including Noh) within a single play. To be offered 1979/80 only.
Mr. Malm (Sp).

*1139. Musical Instruments. (4) Three hours of lecture per week. Survey of approaches to the study of musical instruments, including classification systems, folklore, symbolism, history, and studies of instrument makers. Coverage will be multi-cultural, considering, for example, the instruments they appear from the Middle East through Europe and from the Middle East through Africa and Asia.
Mr. Wade (Sp).

Performance

Admission to all performance courses is determined by audition during the period of advance enrollment. All courses in this group may be repeated for credit.

140. Javanese Gamelan. (2) Formerly 411. Two 2-hour rehearsals per week. This course should be taken in a three-quarter sequence.
Ms. Diamond (F, W, Sp).

141. University Symphony Orchestra. (2) Two 2-hour rehearsals per week. Prerequisite: course 140. This course should be taken in a three-quarter sequence.
Mr. Senturia (F, W, Sp).

143. University Concert Band. (2) Two 1 1/2-hour rehearsals and one section hour per week. This course should be taken in a two-quarter sequence.
Mr. Berdaoui (W, Sp).

144. University Chorus. (2) Two 1 1/2-hour rehearsals and one section hour per week. Primarily concerned with major works for chorus and orchestra. This course should be taken in a three-quarter sequence. Mr. Cunningham (F, W, Sp).

*145. Repertory Chorus. (2) Two 2-hour rehearsals. Small mixed chorus that aims at a high standard of ensemble singing of the well-known choral repertoire. This course should be taken in a three-quarter sequence. Mr. Hett (F).

146. Chamber Music Ensemble. (2) Four hours per week. Chamber Music for strings, winds, percussion, and voice.
The Staff (F, W).

147. Contemporary Chamber Music Ensemble. (2) Four hours per week. Performance of Renaissance and Baroque music for voices and instruments. This course should be taken in a three-quarter sequence.
Mr. Brett (F, W, Sp).

Group II

Courses primarily for students whose major subject is music.

Lower Division Courses

Notes: Musicianship (A-B-C-D-E-F), Harmony (1A-1B-1C),看清文（2B-C-D-E-F）are all prerequisite to the major and must be taken concurrently unless the requirement is satisfied by examination.

A-B-C. Musicianship. (2-2-2) Three 1-hour classes per week for ear training, sight singing, and dictation. Sequence beginning (F).
The Staff (Mrs. Clark in charge).

D-E-F. Musicianship. (2-2-2) A continuation of course A-B-C, which is prerequisite.
Sequence beginning (F).
The Staff (Mr. Dugger in charge).

1A-1B-1C. Harmony. (4-4-4) Three 1-hour classes per week. Diatonic harmony, chordal harmonization, and analytical studies. Emphasis will be on written work.
Sequence beginning (F).
The Staff (Mr. Dugger in charge).

2A-2B-2C. Harmony. (4-4-4) Three 1-hour classes per week. Prerequisite: 1A-1B-1C. Advanced diatonic and atonal harmony. Emphasis will be on written work. Sequence beginning (F).
The Staff (Mr. Imbrie in charge).

21A-21B-21C. History of Western Music I. (4-4-4) Three hours of lecture and end-of-semester section per week. Prerequisite: course 1G or consent of instructor. Introduction to music history and criticism, including the evolution of European musical thought from the Middle Ages to the Baroque period. Emphasis will be on written work.
Sequence beginning (F).
Mr. Kerman (W, F, Sp).

Upper Division Courses

Theory

*1100A. Advanced Musicianship. (2) Three class hours per week. Prerequisite: course 1100G or consent of instructor. Mr. Swackhamer (Sp).

*1100B. Keyboard Harmony. (2) Three class hours per week. Prerequisite: course 12G and consent of instructor. Ms. Davidson (Sp).

100C. Score Reading. (2) Three class hours per week. Prerequisite: course 2C and consent of instructor. Ms. Fuchter (Sp).

101A-101B-101C. Tonal Counterpoint. (4-4-4) Three 1-hour classes per week. Prerequisite: course 12G. Sequence beginning (W) Mr. Feliciano, Mr. Wilson (Sp).

105A-105B-105C. Composition. (4-4-4) Three class hours per week. Prerequisite: course 2C, 101A, and consent of instructor. Sequence beginning (F).
Mr. Stine (Sp).

NOTE: For key to symbols, see page 36.
106A–106B. Canon and Fugue. (4–4) Three class hours per week. Prerequisite: course 101B.

107A–107B. Studies in Musical Analysis. (4–4) Three class hours per week. Prerequisite: course 2C.

111A. Instrumental Conducting. (4) Formerly 112A. Two 2-hour classes per week. Prerequisite: course 1018. Recommended to open to students who have received credit for Music 112B or 112C prior to Fall 1977, with consent of instructor. Mr. Senturia (Sp)

111B. Advanced Instrumental Conducting. (4) Formerly 112B. Two 2-hour classes per week. Prerequisite: course 111A. Open to students who have received credit for Music 111A the preceding quarter, with consent of instructor. Continuation of 111A, which is prerequisite. Mr. Cunningham (W)

111C. Instrumental Ensemble. (4–4) One 2-hour meeting per week. Prerequisite: consent of instructor. Emphasis will be upon the dramatic music. Mr. Brett

112A. Choral Conducting. (4) Two 2-hour classes per week. Prerequisite: courses 2C, 1008 or 100C, or consent of instructor. Formerly 112C. Two 2-hour classes per week. Prerequisite: course 1018. Recommended to open to students who have received credit for Music 112B or 112C prior to Fall 1977, with consent of instructor. Continuation of 111A, which is prerequisite. Mr. Senturia (Sp)

112B. Advanced Choral Conducting. (4) Two 2-hour classes per week. Prerequisite: course 112A. Open to students who have received credit for Music 111A and 112A at any time. Mr. Cunningham (F, W, Sp)

112C. Piano Ensemble. (4–4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. Using four-hand piano editions. Mr. Senturia

111E. Music on the Grand Tour. (4) Three hours of lecture per week. Prerequisite: courses 2C and 21C, or consent of instructor. Topics of the 18th Century as seen through the eyes of the contemporary traveler and music historian. Mr. Crocker

112D. The History of the Organ. (4) Three hours of lecture per week. Prerequisite: courses 2C and 21C, or consent of instructor. The development of the organ with emphasis on the development of national styles. The unique instruments in the Music Department's collection will be studied in detail. Mr. Moe

112E. The Music of Baroque Music. (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. Emphasis in playing an instrument or in singing. Mr. Curtis (F)

116A. Beethoven. (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. The topic for 1979/80 will be the symphonies of Mozart. To be offered 1979/80 only. Mr. Curtis (Sp)

116C. Beethoven. (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. The topic for 1979/80 will be the symphonies of Beethoven. To be offered 1979/80 only. Mr. Curtis (Sp)

117A. Mozart. (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. The topic for 1979/80 will be the symphonies of Mozart. To be offered 1979/80 only. Mr. Heatr (Sp)

117C. Bach. (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. Emphasis in playing an instrument or in singing. Mr. Curtis

117E. Music on the Grand Tour. (4) Three hours of lecture per week. Prerequisite: courses 2C and 21C, or consent of instructor. The topic for 1979/80 will be the symphonies of Mozart. To be offered 1979/80 only. Mr. Heatr (Sp)

200C. Introduction to Musical Scholarship. (4) Three class hours per week. An introduction to music bibliography and historiography. Mr. Duckles (F)

200D. Elementary Piano. (1/2–1/2) One hour of laboratory per week. Open only to undergraduates with permission of instructor. Mr. Moe (W, Sp)

200F. The Sixteenth Century. Mr. Moe

201A. Seminar in Musical History. (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. A seminar of selected topics of the 17th–19th Centuries. Mr. Stine

201B. Seminar in Musical History. (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. A seminar of selected topics of the 17th–19th Centuries. Mr. Stine

202A–202B. Medieval Polyphony and its Notation. (4–4) Three class hours per week. Prerequisite: consent of instructor. Mr. Wilson

202C. The Sixteenth Century. Mr. Moe

203A. Seminar in Musical History. (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. The master's degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Heatr in charge) (F, W, Sp)

203B. Theory and Methodology of Ethnomusicology I. (4) Three class hours per week. Prerequisite: consent of instructor. An introduction to the ideas, methods, theories, themes, and work of historians, philosophers, musicologists, and other humanists. The Staff (Mr. Brett in charge) (F, W)

203C. Topics in Ethnomusicology. (4) Three class hours per week. Prerequisite: consent of instructor. Mr. Moe

2035A. Theory and Methodology of Ethnomusicology II. (4) Three class hours per week. Prerequisite: consent of instructor. An introduction to the ideas, methods, theories, themes, and work of anthropologists, sociologists, folklorists, linguists, and other social scientists in the field of ethnomusicology. Mr. Moe

204A. Studies in Musical Analysis. (4) Three class hours per week. Prerequisite: consent of instructor. Mr. Crocker

204B. Group Special Study for Undergraduates. (2 or 4) Restricted to senior honor students. Not to serve in lieu of regular courses of instruction. Mr. Moe (W)

205A. The Nineteenth Century. Mr. Kerman

205B. The Nineteenth Century. Mr. Kerman

205C. Field Methods in Ethnomusicology. (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. A seminar of selected topics of the 17th–19th Centuries. Mr. Stine

206A–206B. Seminar: Medieval Studies. (4–4) One 3-hour meeting per week. A final grade will be assigned upon completion of both quarters. Mr. Imbrie

207A–207B. Seminar: Studies in Classic Music. (4–4) Three class hours per week. A final grade will be assigned upon completion of both quarters. Mr. Curtis

208A–208B. Seminar: Studies in Romantic Music. (4–4) One 3-hour meeting per week. A final grade will be assigned upon completion of both quarters. The topic for 1979/80 will be the operas of Mozart and his contemporaries. To be offered 1979/80 only. Mr. Kerman (Sp)

209. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Additional limitation: overall grade-point average of 3.3 in the major. Mr. Felciano, Mr. Moe (W)

405A–405B–405C. Elementary Piano. (1–2–2) One hour of laboratory per week. Open only to majors in music. Required of music majors who do not pass the entrance examination in piano. Graded on a pass/fail basis. Mrs. Clark in charge. Sequence beginning (F)

405D–405E–405F. Elementary Piano. (1–2–2) One hour of laboratory per week. Open only to majors in music. Required of music majors who do not pass the entrance examination in piano. Graded on a pass/fail basis. Mrs. Clark in charge. Sequence beginning (F)
the nearby Graduate Theological Union enable stu-
dents in the Department to use the extensive library
holdings of the Union and to supplement their pro-
grams with selected courses in Palestinian archaeo-
logy, Biblical studies, Semitic epigraphy and philol-
ogy.

The Majors

A. The Major in Near Eastern Studies

1. In Arabic, Hebrew, Persian and Turkish: Prerequisite: the elemen-
tary knowledge of the language, or their equiv-

calents. It is recommended that these be taken begin-
ning in the freshman year.

The major requires 37 upper division language units plus 8 upper division lecture units, for a complete total of 45 units. Major guidelines for each discipline are available in the departmental office. With the consent of the Department, portions of the requirement may be ful-
filled by related courses in other departments.

Assyriology, Hittitology, and Islamic studies: A basic reading knowledge of German is recom-
mended. The major requires 36 upper division language units plus 8 upper division lecture units.

B. The Major in Ancient Near Eastern History and Archaeology

The major requires at least 68 quarter units. The re-
quired courses for the major shall include:

1. Lower division requirements. Emphasis 1, Meso-
potamian Archaeology: Near Eastern Studies 20A-
20B-20C, Anthropology 2, Near Eastern Studies 15
or 16. Emphasis 2, Art History: Near Eastern Studies 20A-
20B-20C, Near Eastern Studies 16 or Art History 40,
Near Eastern Studies 15. Emphasis 3, Egyptian Ar-
chaeology: Near Eastern Studies 20A-20B-20C, An-
thropology 2, Near Eastern Studies 25A or 25B.

2. At least 12 upper division units in one of the Near
Eastern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,

3. At least 12 upper division units in one Near East
ern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,

4. At least 12 upper division units in one of the Near
Eastern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,

5. At least 12 upper division units in one of the Near
Eastern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,

6. At least 12 upper division units in one of the Near
Eastern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,

7. At least 12 upper division units in one of the Near
Eastern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,

8. At least 12 upper division units in one of the Near
Eastern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,

9. At least 12 upper division units in one of the Near
Eastern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,

10. At least 12 upper division units in one of the Near
Eastern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,

11. At least 12 upper division units in one of the Near
Eastern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,

12. At least 12 upper division units in one of the Near
Eastern languages and at least 32 units to be selected
from the lecture courses and seminars offered by the
Department in the fields of history, archaeology, art
and culture. The following courses are required. Em-
phasis 1: Near Eastern Studies 143A-143B, an quar-
ter of Near Eastern Studies 175A-175B-175C-175D,
Near Eastern Studies 146 or other field method course,
Western Asia and Egypt. (5-5-5) Three hours of lecture and one hour of discussion per week. A survey of the civilizations of the Near East with special emphasis on ancient Egypt, Mesopotamia, Iran, Anatolia, from their origins until the 20th century.

Mr. Lesko in charge (F, W, Sp)

25. Introduction to Egyptian Art and Architecture. (4) Three hours of lecture per week. A survey of the art and architecture of the ancient Egyptians and their relationship to the social and political institutions of the time.

Mr. Weeks (W)


Prerequisite: Anthro 20A-20B-20C or NES 20A-20B-20C. A survey of archaeological evidence for the pre- and proto-historical periods of Egypt and neighboring regions.

Mr. Dales (F)

*141. Special Studies in the Medieval Art of Western and Central Asia. (4) Three hours of lecture per week. Topics will vary. May be repeated for credit.

*142. Introduction to Iranian Archaeology. (4) Three hours of lecture per week. Prerequisite: Anthropology 142A and 142B-142D. A survey of archaeological evidence for the pre- and proto-historical periods of Iran and neighboring regions.

Mr. Dales (F)

143A-143B. Mesopotamian Archaeology. (4-4) Three hours of lecture per week. Prerequisite: Anthropology 2 or NES 142A-142B. A survey of Mesopotamian art and architecture from the Early Dynastic period to the Neo-Assyrian period.

Ms. Azarpay (W, Sp)

**144A-144B. Islamic Painting. (4-4) Three hours of lecture per week. Topics will vary. May be repeated for credit.

Mr. Dales (F)

**144C. Islamic Miniatures. (4-4) Three hours of lecture per week. Topics will vary. May be repeated for credit.

Mr. Dales (F)

145A-145B-145C. The Archaeology of Palestine. (3-3-3) Formerly 195A-195B-195C. Two hours of lecture per week. The basic concerns of field archaeology (identification of excavations, excavation methods) together with historical and results of archaeological research in Palestine. Enrollment in all three quarters is required, but not required. A: Paleolithic Period to Middle Bronze Age. B: Late Bronze Age to Persian Period. C: Persian Period to end of Hellenistic period.

*146. Methods in Near Eastern Archaeology. (5) Four hours of lecture per week. Prerequisite: permission of instructors. A series of seminars and field sessions concerned with the methods of archaeological work in the near East and Egypt. Topics to be covered will include history of archaeology, techniques of excavation, dating, ceramic analysis, object registration, organization, publication.

Mr. Schwartz (F, W, Sp)

**150A-150B-150C. The History of Ancient Israel. (4-4-4) Three hours of lecture per week. 150A. The Patriarchal Age through the return of Solomon. 150B. The Divided Kingdom through the Persian period. 150C. The Hellenistic Period. Sequence beginning in the fall, but one quarter is not a prerequisite for another.

Mr. Milgrom (F, W, Sp)

151A-151B. Aspects of Biblical Religion. (4-4) Formerly courses 152A-152B. Three hours of lecture and one hour of discussion per week. 151A not prerequisite to 151B. The teachings of ancient Israel's intellectual leaders (prophets, sages) and sages. Individual and collective responsibility, sin versus self-redeemption, national versus individual, ancient Israel's spiritual and ethical aspirations, etc.

Mr. Milgrom (F, W)

152. The Bible in Translation. (4) Formerly course 154C. Three hours of lecture per week. Interested for students not majoring in Near Eastern studies as an introduction to the Bible, its historical development, and their place within the broader context of ancient Jewish thought. (F)

153. Judaism and Hellenism. (3) Formerly course 157. Two hours of lecture per week. Prerequisite: NES 35, 150A-150B, 151A-151B, 151C. The analysis of the impact of Hellenism on Judaism through the study of various apocryphal and pseudepigraphical texts. Special attention will be given to Wisdom tradition and the philosophical works of Philo Judaeus and their relationship to Greek philosophy and early Christianity.

Mr. Dales (F)

155. Problems in the History of Judaism. (4) Three hours of lecture per week. Prerequisite: one of the following: 151A, 151B, 153. The scope of Jewish thought will be discussed within a narrative historical framework. The Staff (W, Sp)

*156A-156B. Medieval Jewish Civilization. (4-4) Formerly 151A-151B. Three hours of lecture per week. The scope of Jewish thought will be discussed within a narrative historical framework. The Staff (W, Sp)

156A-156B. Medieval Jewish Civilization. (4-4) Formerly 151A-151B. Three hours of lecture per week. The scope of Jewish thought will be discussed within a narrative historical framework. The Staff (W, Sp)


Mr. Lopat (W)

158. Modern and Contemporary Jewish Thought. (3) Two hours of lecture per week. Prerequisite: NES 151A-151B. Topics in post-1700 Jewish thought, including Jewish thought in Europe and the Near East from the rise of islam to the eighteenth century.

Mr. Lopat (W)

160A-160B. Islam and the Near East. (4-4) Three hours of lecture per week. A general survey of the religious history of the Near East and North Africa from the rise of Islam to the 20th century. Any quarter of this course may be taken independently, & no quarter is prerequisite to any other. A: Predynastic & Early Dynastic. B: Old Kingdom. C: Middle Kingdom to Hyksos Period; D: New Kingdom & Late Period.

Mr. Weeks (W, Sp)

160A-160B. Islamic Institutions. (4-4) Three hours of lecture per week. The political, legal, and social institutions of Islam, and their development from the 6th to the 20th century. Any quarter of this course may be taken independently, & no quarter is prerequisite to any other. A: Predynastic & Early Dynastic. B: Old Kingdom. C: Middle Kingdom to Hyksos Period; D: New Kingdom & Late Period.

Mr. Weeks (W, Sp)

160C. Islamic History. (4-4) Three hours of lecture per week. The political, legal, and social institutions of Islam will be critically studied in an historical framework. The Staff (F, W)

161A-161B. The Reformation. (4-4) Three hours of lecture per week. Special emphasis will be given to current historical theses & recent research. The Staff (F, W)

161A-162B. The Religions of Ancient Iran. (4-4) Three hours of lecture per week. Prerequisite: NES 150A-150B. The study of ancient Iranian religion for the history of Hellenistic Gnosticism, Judaism, Zoroastrianism, and Islam.

Mr. Schwartz (F, W)

165A-165B. Sufism. (4-4) Three hours of lecture per week. The Staff (F, W)

166. Turkish Sufi Literature. (4) Three hours of lecture per week. An introduction to the study of Turkish Sufi literature and its place in world literature. No knowledge of Turkish is required.

Mr. Algar (W, Sp)

168A-168B. Turkish Literature in Translation. (4-4) Three hours of lecture per week. A study of Turkish literature in translation, from the 8th to the 20th century. Readings will be chosen to illustrate the development within specific genres: lyric poetry, folktales, etc.

Mr. Algar (W, Sp)

169A-169B. Ottoman Civilization. (4-4) Three hours of lecture per week. Religious, social, economic, and legal institutions of the Ottoman period (14th-20th centuries) will be discussed within a narrative historical framework.

Mr. Hickman (F)

170A-170B. Mesopotamian History. (4-4) Three hours of lecture per week. Prerequisite: NES 20A-20B-20C or consent of instructor. The history of Mesopotamian states and culture from 3000 B.C. to the Persian conquest.

Mr. Heimpe (F, W)

172A-172B. Ancient Mesopotamian Documents and Literature. (4-4) Three hours of lecture per week. A study of the Karluk cuneiform tablets and their place in the reconstruction of Egyptian culture and society. Special emphasis will be given to current historical theses & recent research. The Staff (F, W)


Mr. Lopat (W)

175A-175B-175C. Culture of Ancient Egypt. (4-4-4) Three hours of lecture per week. Prerequisite: NES 20A-20B-20C. A survey of the archaeological & textual materials available for the reconstruction of Egyptian culture and society. Special emphasis will be given to current historical theses & recent research.

Mr. Lopat (W)

198. Directed Group Study for Upper Division Students. (1-4) Variable meetings. Instruction in areas not covered by regularly scheduled courses.

The Staff (F, W, Sp)

H168. Senior Honors. (2) Limited to Senior Honors Candidates. Directed Study centered upon preparation of an honors thesis.

The Staff (F, W, Sp)

99. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations shown on page 36. Must be taken on a passed/not passed basis.

The Staff (Su, F, W)

209A-209B-209C-209D-209E-209F-209G-209H. Seminars in Mesopotamian and Persian Archaeology. (1-5) Three hours of lecture per week. Prerequisite: consent of instructor. 209A. Near Eastern Studies. 209B. Arabic. 209C. Cuneiform. 209D. Egyptian, 209E. Hebrew. 209F. Historical. 209G. Historical. 209H. Turkish. Students may enroll in more than one section of 209, but the total number of units of Special Study in any one quarter may not exceed 15.

The Staff (W, Sp)

292. Seminar in Mesopotamian Archaeology. (4) Three hours of lecture per week. Prerequisite: NES 142A-142B-142C or NES 142A-142B. A seminar on a major aspect or problem of Mesopotamian archaeological. May be repeated for credit when topic changes.

Mr. Dales (Sp)
Seminar. Credit and grades may be assigned upon completion of the sequence. May be repeated for credit with consent of Instructor. Ms. Azarpay (F, W)

294. Seminar in Islamic Art. (4) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Topics will vary according to student interest. May be repeated for credit. Students who take two or three quarters in succession will be assigned credit at the end of the sequence. Ms. Azarpay (Sp)

295. Supervised Field Research in Near Eastern/Egyptian Archaeology. (10–15) Full time participation in an archaeological excavation or exploratory survey. Students will participate in all aspects of the operation and will be responsible for preparing a written report on some specific part of the work. Geographical areas and sites to be determined each year. Mr. Weeks (Sp)

296. Special Problems in Egyptian Archaeology. (4) Three hours of lecture per week. Prerequisite: four quarters of 175 or the equivalent of permission of instructor. Topics will vary and may deal with a particular chronological period or with a particular class of archaeological material. Work with museum specimens or with field data may be involved. The course may be repeated when subject matter changes. Mr. Weeks (F)

298. Seminar. (3) Students may receive credit for more than one seminar in the same quarter. May be repeated for additional credit with consent of instructor. (F, W, Sp)

601. Individual Studies for Master Students. (1–8) Individual study for the comprehensive or language requirements in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for a master’s degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for a doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

Arabic

Lower Division Courses

1A–1B–1C. Elementary Arabic. (5–5–5) Five 1-hour recitation sessions and one 1-hour laboratory per week. Sequence beginning (F). The Staff (F, W, Sp)

20A–20B–20C. Intermediate Arabic. (4–4–4) Formerly 100A–100B–100C. Five 1-hour recitation sessions per week. Arabic 1A–1B–1C, or Arabic 10, or the equivalent. Sequence beginning Fall. The Staff (F, W, Sp)

Upper Division Courses

101A–101B–101C. Spoken Arabic. (4–4–4) Five hours of class per week. Prerequisite: Course 1A–1B–1C or equivalent. Practice (in class) of speaking an Arabic dialect. May be repeated for additional credit if a different dialect is offered. (F, W, Sp)

102A–102B–102C. Literary Arabic Usage. (4–4–4) Three hours of class per week. Prerequisite: Arabic 20A–20B–20C. Rapid reading of newspapers and literary texts, training in the usage of the literary language in writing and speaking and development of skill in Arabic penmanship. (F, W, Sp)

103A–103B–103C. Analysis of Grammar and Syntax. (4–4–4) Three hours of class per week. Prerequisite: Arabic 20A–20B–20C. Discussion of the grammar, syntax, semantics, and styles of Arabic, as reflected in literary texts. (F, W, Sp)

104A–104B–104C. Classical Arabic Poetry. (4–4–4) Three hours per week. Prerequisite: Arabic 103A–103B–103C or equivalent. Literary analysis of Arabic poetry from the pre-Islamic, Umayyid, Abbasid and Al-Andalusian periods. May be repeated for additional credit when topics vary. Credit and grade to be assigned at the end of the sequence. Mr. Brinner (F, W, Sp)

105A–105B–105C. Modern Arabic Poetry and Prose. (4–4–4) Three hours of lecture per week. Prerequisite: course 103A–103B–103C or equivalent. Selected readings from modern literary Arabic, including fiction, poetry, and expository essays. Treated to acquaint undergraduate majors not only with the structure of the literary language but also with the development of modern Arabic literary styles. May be repeated for credit when the readings vary. Mr. Khouri in charge (F, W, Sp)

110A–110B–110C. Survey of Arabic Literature. (4–4–4) Three 1-hour class meetings per week. Prerequisite: Arabic 103A–103B–103C or the equivalent. Designed primarily for majors and prospective majors in Arabic studies, the course is a literary-historical survey of Arabic literature from pre-Islamic times to the present with emphasis on the more important works and achievements of major Arab authors. Given in Arabic. Mr. Khouri (F, W, Sp)

198. Senior Honors. (2) Prerequisite: limited to senior honors candidates. Directed study centering upon topics of the student's major field of study. Open to qualified undergraduates. Selected readings in Arabic from the Qur'an, traditional Islamic exegesis and other secondary material. May be repeated for additional credit when texts vary. Mr. Algar (F, W, Sp)

200A–200B–200C. Readings in the Qur'an. (4–4–4) Three hours of lecture per week. Prerequisite: three years of Arabic or consent of instructor, open to qualified undergraduates. Selected readings in Arabic from the Qur'an, traditional Islamic exegesis and other secondary material. May be repeated for additional credit when texts vary. Mr. Monroe (F, W, Sp)

207A–207B–207C. Hispano-Arabic Literature. (4–4–4) Three hours of lecture per week. Prerequisite: Arabic 103A–103B–103C or equivalent. Significant writers of poetry and prose from the 10th and 11th centuries will be read and discussed. Credit and grades to be assigned at the end of the sequence. Mr. Monroe (F, W, Sp)

208A–208B–208C. Readings in the Qur'an. (4–4–4) Three hours of lecture per week. Prerequisite: three years of Arabic or consent of instructor, open to qualified undergraduates. Selected readings in Arabic from the Qur'an, traditional Islamic exegesis and other secondary material. May be repeated for additional credit when texts vary. Mr. Algar (F, W, Sp)

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NOTE: For key to symbols, see page 36.
Cuneiform

Upper Division Courses

100A—100B—100C. Elementary Akkadian. (4-4-4) Three hours per week. Introduction to Akkadian grammar; reading of selected Cuneiform texts. Sequence beginning (F).

101A—101B—101C. Intermediate Akkadian. (4-4-4) Three hours of lecture per week. Prerequisite: course 100A—100B—100C or equivalent. Reading of selected texts (law codes, legislation, mythological, epic) based on individual need. May be repeated for additional credit when readings vary.

Sequence beginning (F) The Staff (W, Sp)

102A—102B—102C. Elementary Sumerian. (4-4-4) Three hours per week. Introduction to Sumerian grammar. The Staff (F, W, Sp)

103A—103B—103C. Intermediate Sumerian. (4-4-4) Three hours per week. Prerequisite: course 102A—102B—102C or equivalent. Reading of texts selected for clarity of script, simplicity of vocabulary and historical and cultural significance. May be repeated for additional credit. The Staff (F, W, Sp)

*106A—106B—106C. Elementary Hittite (4-4-4) Three 1-hour meetings per week. Introduction to Cuneiform Hittite language and grammar with reading of selected historical and religious texts. Sequence beginning (F)

198. Directed Group Study for Upper Division Students. (1-4) The Staff (W, Sp)

H168. Senior Honors. (2) Prerequisite: limited to senior honors candidates. Directed study concerning preparation of an honors thesis. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

Graduate Courses

200A—200B—200C. Advanced Akkadian. (4-4-4) Three hours of lecture per week. Prerequisite: course 101A—101B—101C or consent of instructor. Major literary compositions (e.g., Abraham epic and related flood stories, Amarna letters, peripheral Akkadian texts [Ninurta, Ras Shamra, El Amarna], wisdom literature [Babylonian Job], etc.) May be repeated for additional credit. Major literary compositions. Mr. Kimler (W, Sp)

206A—206B—206C. Advanced Hittite. (4-4-4) Three 1-hour meetings per week. Prerequisite: course 106A—106B—106C. Preparatory study and critical reading of Hittite texts belonging to different literary genres (epics, mythology, histories, law codes, legal texts, etc.) Preparation of an honors thesis. Mr. Mclnlay (W, Sp)

298. Seminar. (2) Students may receive credit for more than one seminar in the same quarter. May be repeated for additional credit with consent of instructor. The Staff (F, W, Sp)

H168. Senior Honors. (2) Prerequisite: limited to senior honors candidates. Directed study concerning preparation of an honors thesis. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

Graduate Courses

Hebrew

Lower Division Courses

1A—1B—1C. Elementary Hebrew. (5-5-5) Five 1-hour recitation sessions and one 1-hour laboratory per week. Sequence beginning (F). Ms. Grossman, Mr. Stefanni (F, W)

15A—15B—1C. Hebrew Conversation. (1-1-1) Two 1-hour recitation sessions per week. Prerequisite: two quarters of Hebrew or equivalent. Practice of spoken Hebrew as a supplement to elementary and intermediate Hebrew. Sequence beginning (F, W, Sp)

20A—20B—20C. Intermediate Hebrew. (5-5-5) Five 1-hour recitation sessions per week. Prerequisite: course 1A—1B—1C or equivalents. The Staff (F, W, Sp)

Upper Division Courses

100A—100B—100C. Advanced Hebrew. (4-4-4) Three hours of class per week. Prerequisite: Hebrew 200A—200B—200C or equivalent. Advanced Hebrew, especially designed for those going on to the study of modern Hebrew literature. Vocabulary building, grammar review, and literary analysis of a sampling of modern texts. The Staff (F, W, Sp)

101A—101B—101C. Biblical Hebrew Texts. (4-4-4) Three 1-hour meetings per week. Prerequisite: course 20A—20B—20C or equivalent. The tools and procedures of biblical exegesis applied to simple narrative texts. May be repeated for additional credit. Mr. Milgrom (F, W, Sp)

*103B—103C. An advanced survey of formal structure, stylistic and idiomatic resources of Hebrew through exercises in writing and textual analysis.

104A—104B—104C. Modern Hebrew Texts. (4-4-4) Three hours of lecture per week. Prerequisite: Hebrew 200A—200B—200C or equivalent. An introductory study of selected topics in Hebrew literature from the European Enlightenment to contemporary Israeli poetry and fiction. May be repeated for credit with consent of instructor when reading material varies. The Staff (F, W, Sp)

105A—105B—105C. Grammar Review and Composition. (4-4-4) Three hours of lecture per week. Prerequisite: course 104A—104B—104C and either 101A—101B—101C, 102A—102B—102C or 103A—103B—103C. An advanced survey of modern Hebrew. Practice of the formal structures, stylistic and idiomatic resources of Hebrew through exercises in writing and textual analysis.

106A—106B—106C. Introduction to Bible. (2) Two hours of lecture per week. Prerequisite: introduction to the history, methods, and scope of bibliographical work in Jewish studies; descriptive bibliographies and reference tools for the study of Jewish and Hebrew literature. Sample problems in bibliographical research. Mr. Bokser (in charge) (F)

*107A—107B. The Structure of Modern Hebrew & Translation. Prerequisite: Hebrew to Speakers of English. (3-3) Three hours of lecture per week. Prerequisite: 6 quarters of Hebrew or the equivalent or permission of the instructor. Theoretical and applied analysis of the structure of modern Hebrew, its development and usage and its application to methods and techniques of teaching Hebrew to English speakers. The Staff (W, Sp)

198. Directed Group Study for Upper Division Students. (1-4) The Staff (W, Sp)

H168. Senior Honors. (2) Prerequisite: limited to senior honors candidates. Directed study concerning preparation of an honors thesis. The Staff (W, Sp)

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

Graduate Courses

201A—201B—201C. Advanced Biblical Hebrew Texts. (4-4-4) Three hours of lecture per week. Prerequisite: course 102A—102B—102C. Historical and literary study of Hebrew and Aramaic literature, e.g., Talmud and Midrash. May be repeated for credit when subject matter varies. Grades and units may be assigned at completion of sequence. Mr. Milgrom (F, W, Sp)

202A—202B—202C. Advanced Rabbinic Hebrew Texts. (4-4-4) Three hours of lecture per week. Prerequisite: course 102A—102B—102C and either 101A—101B—101C or equivalent. Study of selected topics in the development of Hebrew literature from the European Enlightenment to contemporary Israeli poetry and fiction. May be repeated for credit when subject matter varies. Grades and units may be assigned at completion of sequence. Mr. Bokser (W, Sp)

*203A—203B—203C. Advanced Medieval Hebrew Texts. (4-4-4) Three hours of lecture per week. Prerequisite: Hebrew 103A—103B—103C and 104A—104B—104C or equivalent. Literary analysis of belletristic Hebrew texts, either prose or poetry, chiefly from the Islamic period. Grades and units may be assigned at completion of sequence. Mr. Alter in charge (F, W, Sp)

204A—204B—204C. Advanced Modern Hebrew Texts. (4-4-4) Three hours of lecture per week. Prerequisite: Hebrew 105A—105B—105C and one of the following: 101A—101B—101C, 102A—102B—102C or 103A—103B—103C. Selected topics in the development of Hebrew literature from the European Enlightenment to contemporary Israeli poetry and fiction. May be repeated for credit when subject matter varies. Grades and units may be assigned at completion of sequence. Mr. Alter (Sp)

206. Ancient and Modern Hebrew Literary Texts. (4) Three hours of class per week. Prerequisite: Hebrew 100A—100B—100C or consent of instructor. Focus on biblical texts seen from a literary point of view, attempting to establish connections with later Jewish literature. Mr. Alter (Sp)

207. Topics In Jewish History, Literature, and Religion. (4) Three hours of lecture per week. Seminar in selected topics in Hebrew culture and Judaism to be given by the Visiting Taubman Professor or one of the regular faculty. As content varies, may be repeated for credit. Mr. Milgrom (W, Sp)

298. Seminar. (2) Students may receive credit for more than one seminar in the same quarter. May be repeated for additional credit with consent of instructor. The Staff (W, Sp)

Persian

Persian Lower Division Course

1A—1B—1C. Elementary Modern Persian. (5-5-5) Five 1-hour recitation sessions per week. Sequence
Semiotics
Upper Division Courses

100A–100B–100C. Aramaluc. (4–4–4) Three hours per week. Prerequisite: Hebrew 100A–100B–100C or consent of instructor. The study of the Semitic Aramaic, including study of the Aramaic script and Daniel and Ezra, and the inscriptions and papyri from Syria, Egypt, Mesopotamia, and the Inscriptions of Esarhaddon. Sequence beginning (F). Mr. Gold (F), Mr. Guinan (W, Sp)

101A–101B–101C. Syriac. (4–4–4) Three hours per week. Prerequisite: Biblical Aramaic or consent of instructor. The morphology and syntax of the Syriac languages, Reading of the Syriac translation of the Bible and in Syriac literature. Sequence beginning (F). Mr. Fulco (F, W, Sp)

198. Supervised Independent Study and Research. (1–5) Enrollment restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

Graduate Courses

*100A–200B–200C. Studies in Comparative Semitics. (4–4–4) Three hours of class per week. Prerequisite: 18 upper division units in Semitic languages or consent of instructor. This course covers the Semitic languages, morphology and lexicography within the wider context of Afroasiatic linguistics. Late in the course, concentration on the evolution of a particular Semitic language. Sequence beginning Fall. Mr. Fulco (F, W, Sp)

205A–205B–205C. Ugartic. (4–4–4) Three hours of class per week. Prerequisite: Upper division reading 101A–101B–101C, or Semitics 100A–100B–100C or equivalent. Ugartic language and literature with stress on comparative morphology and lexicography. Sequence beginning Fall. Mr. Fulco (F, W, Sp)

*120A–210B–210C. The Canaanite Dialects. (4–4–4) Three hours of class per week. Prerequisite: Advanced status in Hebrew. The Phoenician, Punic, Hebrew, Moabite and early Aramaic inscriptions, with reference to paleography, dialectology and literary style. Sequence beginning Fall. Mr. Fulco (F, W, Sp)

Neurobiology

Group Major Office, Division of Special Programs, 301 Campbell Hall

Major Advisers: Mr. C. H. F. Rowell (A–H), Mr. Richard C. Van Sluyters (I–R), Mr. Robert Zucker (S–Z)

Group Major in Neurobiology

The group major program is administered through the Division of Special Programs. Students are referred to this office for all administrative matters, and this is where major students will file their study lists.

The neurobiology group major is designed for students seriously committed to the study of the nervous system. In order to understand what is known about the function of the nervous system, and to prepare for future advances in this area, a sound background is required in basic sciences (physics, chemistry, mathematics) together with more selective knowledge in anatomy, biochemistry, physiology, psychology, molecular biology, and zoology. Since problems related to or analogous to those encountered in studying the nervous system are handled in electrical engineering, computer sciences, and linguistics, courses in these subjects may also be desirable.

The group major requires a basic background in physics, chemistry, and mathematics, and gives guidance on course work in the very large field of relevant subjects. It may lead to graduate study in neurobiology. It might also be suitable for students preparing the health sciences who are already strongly biased toward later specialization in neurology, neuropathology, psychiatry, pharmacology, or mental health. It must be noted that the major is not in physiology, psychology, zoology, electrical engineering, and psychology also provide a starting point for graduate work in neurobiology and lead to a greater range of career choices.

Lower Division Courses. Students are strongly advised to pursue physics, chemistry, and mathematics to the most advanced level they can achieve in their freshman and sophomore years.

The following, or equivalent courses at other institutions, are minimum requirements: Biology 1A–1B (5–6); Chemistry 1A–1B–1C (4–4–4); Mathematics 1A–1B–1C (4–4–4); Physics 5A–5B–5C (3–4–4); Physics 6A–6B–6C (4–4–4); Psychology 1 (5); Psychology 117 (5); Statistics 1A–1B–1C (3–3–3); Statistics 2 (5) or Statistics 20 (5); Zoology 1 (4).

Upper Division Courses. A minimum of 45 units, including two laboratory courses in different areas, is required. Students must complete at least one course in each of the following categories:

Behavior, Psychology 115 (5) or Zoology 135 (4) or Interdepartmental Studies 122 (6); Psychology 117 (5); Zoology 135 (4).

Biochemistry, Biochemistry 100A–100B–100C (4–4–4) or 102 (5) or 103A–103B (2.5–2.5–2.5), 102L (5).

FOR NOTE: key to symbols, see page 35.
Honors Program. At the end of the junior year or the beginning of the senior year, a student may submit a request to a major adviser to enroll in the honors program. Requirements for admission are a grade-point average of 3.3 or higher in all courses undertaken at the University, a grade-point average of 3.3 or higher in courses completed in the major, the recommendation of the major adviser, and agreement of a faculty member to serve as a sponsor.

The honors program consists of the preparation of a written thesis on a topic in neurobiology. Ordinarily the thesis consists of a report on the results of independent study and research conducted under the supervision of a faculty sponsor. The student must enroll in at least 4 units of a 199 course in a cognate department for the purpose of preparation of the thesis, but units for such courses will not count toward the 45 units of upper division courses required in the major. The thesis must be presented to the faculty sponsor before the ninth week of the quarter in which the student expects to graduate, and the sponsor will inform the major adviser whether the honors program has been satisfied or completed. Then, if the student has also satisfied the required grade-point stipulation, he or she will be recommended to the Dean for a degree with honors.

Graduate Program

The M.A. and Ph.D. degree programs in neurobiology are administered by the Graduate Group in Neurobiology. Information concerning admission and degree requirements may be obtained from the Chairperson of the Group, Prof. F. S. Werblin, Department of Electrical Engineering and Computer Science.

Graduate Courses

Anatomy 203. Functional Neuroanatomy. (6) See Physiology-Anatomy for a complete description of this course.

Psychology 201A, 201B, 201C. Seminar in Psychophysiological Optics. (3) See Physiology-Anatomy for a complete description of this course.

Biophysics and Medical Physics 201. Electrical and Transport Properties of Membrane. (3) See Biophysics and Medical Physics for the complete description of this course.

Biophysics and Medical Physics 222. Biocybernetic Systems, Nerve Noto, Artificial Intelligence. (4) See Medical Physics for a complete description of this course.

Biology 200C. Introduction to Molecular Biology (5) See Molecular Biology for a complete description of this course.

Physiological Optics 201A. Seminar in Physiological Optics. (5) See Physiology-Anatomy for the complete description of this course.

Physiological Optics 202. The Oculomotor System. (4) See Optometry for a complete description of this course.

Physiological Optics 207. Simulation of Visual Systems. (4) See Physiology-Anatomy for a complete description of this course.

Physiological Optics 208. Neurosensory Physiology of Vision. (4) See Physiology-Anatomy for a complete description of this course.

Physiology 215. Neuroendocrinology. (4) See Physiology-Anatomy for a complete description of this course.

Physiology 216. Seminar in Neuroendocrinology. (2) See Physiology-Anatomy for a complete description of this course.

Physiology 251. Seminar in History of Neurophysiology. (2) See Physiology-Anatomy for a complete description of this course.

Physiology 290. Seminar in Neurophysiology. (2) See Physiology-Anatomy for a complete description of this course.

Psychology 210A. Proseminar: Sensory Processes. (6) See Psychology for a complete description of this course.

Psychology 210B. Proseminar: Animal Behavior. (5) See Psychology for a complete description of this course.

Psychology 210C. Proseminar: Biology of Learning. (6) See Psychology for a complete description of this course.

Zoology 236. Seminar in Comparative Neurophysiology. (2) See Zoology for a complete description of this course.

Oriental Languages

Department Office, 104 Hall Durham

Professors:

Hanro Aoki, Ph.D.
Cyril Birch, Ph.D.
Kun Chang, Ph.D.
John C. Jamesson, Ph.D.
Lewis R. Lancaster, Ph.D.
Heleen C. McCulloch, Ph.D.
William H. McCulloch, Ph.D.

Associate Professors:

James E. Bosson, Ph.D.

Assistant Professor:

H. Samuel Cheung, Ph.D.

Michael C. Rogers, Ph.D.
Edward H. Schaar, Ph.D.
Ngates Professor

Denzil Carr, Ph.D. (Emeritus)

L. Philip McChesney

Helen C. McCulloch, Ph.D.

Associate Professor:

Edward H. Schafer, Ph.D.

Michel Strickmann

Senior Lecturers:

Tetsuo W. Nakamura, M.A. (Emeritus)

Departmental Major Advisers: Mr. Cheung (Chinese); Mr. Motofuji (Japanese); Mr. Bosson (Altaiac).

Graduate Advisers: Mr. Chang (Chinese); Mr. Schafer (Classical Chinese); Mr. Aoki (Japanese); Mr. Bosson (Altaiac).

The Department of Oriental Languages at Berkeley offers a thorough training in the classical and modern languages and literatures of Eastern Asia. The East Asiatic Library, which houses one of the largest American collections of materials related to China, Japan, Korea, and Tibet, is located on the Berkeley campus. A student selects one area of emphasis in the major: Chinese, Japanese, or Altaiac languages. In all cases students proceed from initial acquisition of a facility in the spoken language to a broader knowledge of both modern and classical forms. Individual upper division courses stress the philosophical, linguistic, or literary study of oriental cultures, and students are encouraged to select courses that will provide them an insight into each of these disciplines. The department also emphasizes the study of a particular oriental culture in its broader geographical context.

The Major

Emphasis on Chinese

Lower Division: Oriental Languages—Chinese 1A-1B-1C (5-5-5); Chinese 12A-12B-1C (4-4-4); Chinese 139A (4); Chinese 2A-2B-2C (5-5-5); Linguistics 20 (5). Linguistics 20 may be taken on a passed/not passed basis.

Upper Division: A total of 36 upper division units, with at least 4 units from each of the following areas: Modern Chinese (100A, 100B, 100C, 102A, 102B, 102C, 158A, 158B, 158C, 165A, 165B); Chinese Linguistics (108, 161, 162, 163, 166, 167); and Classical Chinese (140A, 140B, 140C, 145, 148, 150A, 150B, 153A, 153B, 153C, 155A, 155B). The remaining 24 units should be met primarily through upper division Oriental Languages language courses, but, with permission of the major adviser, some courses from other departments will be acceptable. Also, with permission of the major adviser, up to 8 upper division units may be drawn from the following Oriental Languages lecture courses: 110, 112, 121, 121A, 131A, 131B, 135, 136, 137.

Emphasis on Japanese

Lower Division: Oriental Languages—Japanese 1A–1B–1C (5-5-5); Japanese 10A–10B–1C (5-5-5); Japanese 12 (4); Linguistics 20 (5) (may be taken on a passed/not passed basis).

Upper Division: Oriental Languages—Japanese 100A–100B–100C (5-5-5); Japanese 129A (4) or Japanese 129B (4) or Japanese 129C (4); Japanese 160 (4); Japanese 139A (4); Oriental Languages 135 (4).

Lower and Upper Division: In consultation with the adviser, a program of courses in addition to those prescribed to make a total of 49 lower division units and 36 upper division units.

Emphasis on Altaiac Languages

Lower Division: Oriental Languages—Korean 1A–1B–1C (5-5-5) or Near Eastern Studies—Turkish 1A–1B–1C (4-4-4); Linguistics 20 (5).

Upper Division: Oriental Languages—Altaiic 144A–144B–144C (5-5-5); Altaiac 154A–154B–154C (4-4-4) and other relevant courses as designated by the adviser (e.g., Oriental Languages 114 (4), Alac 177A–177B (4-4); Near Eastern Studies—Turkish 100A–100B–100C (5-4-4) and 168A–168B (4-4) to make a total of 36 upper division units.

Honors Program. An undergraduate student who has completed 12 units of upper division language courses in the Department, and who has a grade-point average of 3.5 in those courses and an overall average of 3.0, may apply to the Departmental Chairman for admission to the honors program. The student will enroll in H195 for three consecutive quarters leading to the completion of an honors thesis, which must be submitted at least two weeks before the end of the quarter in which the student expects to graduate. While enrolled in H195, the student will undertake independent advanced study under the guidance of an
**Graduate Programs**

M.A. and Ph.D. programs are offered in Chinese Language and Literature, in Classical Chinese, and in Japanese Language and Literature. The M.A. degree is offered in Alanic Language and Literature, with emphasis on Mongolian. Information concerning graduate degree requirements may be obtained from the Department Office.

Prospective graduate students are urged to acquire an active command of their language of emphasis as early as possible. Toward this end, a period of study at the Inter-University Program for Chinese Language Studies in Taipei, Taiwan, or at the Inter-University Center for Japanese Language Studies in Tokyo, Japan, both institutions co-sponsored by the University of California at Berkeley, is strongly recommended.

**Oriental Languages — General**

(Courses in which knowledge of an Oriental language is not required.)

**Lower Division Course**

**121A-**121B. Development of Buddhism in East and Inner Asia. (4-4) Formerly 17A-17B. Three 1-hour lectures per week. The introduction of Buddhism from India into Central Asia and China, and its subsequent spread to Korea and Japan. The separate traditions of Tibetan Buddhism is included. A two quarter sequence beginning (F). May be repeated for credit with consent of instructor. Mr. Lancaster (F, W)

**124A.** Three 1-hour lectures per week. The organization, literature, and rituals of Chinese's indigenous religion from its second-century beginnings to the present day. Mr. Strickmann (W)

**126.** Three 1-hour lectures per week. The history and cultural influence of Indian meditators in China and Japan. Mr. Strickmann (W)

**127.** Religion and Society in Medieval China. (2-2-2) Three 1 1/2-hour lectures per week. The organization, literature, and rituals of China's indigenous religion from its second-century beginnings to the present day. Mr. Strickmann (F, W, Sp)

**130.** Three 1-hour lectures per week. The history and cultural influence of Indian meditators in China and Japan. Mr. Strickmann (W)

**131A-**131B. Chinese Literature in Translation. (4-4) Formerly 112A-112B. Three hours of lecture per week. Prerequisite: junior standing; soprones admitted with consent of instructor. Lectures on principal genres, authors, and individual works of Chinese literature from the present day, with section discussions (to follow each lecture) based on lectures and on students' reading of selected works in English translation. Mr. Birch (W)

**135.** History of Japanese Literature. (4) Formerly 132. Three 1-hour lectures per week. From the beginning to modern times, with emphasis on Chinese, Buddhist, and Western influences. Mr. Motofuji (W)

**136.** The Modern Japanese Novel in English Translation. (4) Formerly 133. Three 1-hour lectures per week. Intensive formal analysis of six modern Japanese novels in Chinese, including 136B. Three 1-hour lectures per week. Reading in Japanese translation of representative works from the present century to the present. Mr. Motofuji (F)

**137.** Modern Japanese Literature in Translation. (4) Formerly 152. Three 1-hour lectures per week. Reading in English translation of representative works from the present day to the present century. Mr. Motofuji (Sp)

**Chinese Lower Division Courses**

1A—18. Chinese Language In Translation. (6) Formerly 154. Three 1-hour lectures per week. Prerequisite: two 1/2-hour courses in classical Chinese or equivalent. Three days per week. (F)

1A—18C. Three 1-hour lectures per week. Reading in English translation of representative works from the present day to the present century. Mr. Motofuji (Sp)

**Upper Division Courses**

100A—100B. Intermediate Chinese. (5—5) Five 1-hour lectures per week. Prerequisite: completion of course 2C. Three 1-hour meetings per week. Mr. Jamieson (F, W, Sp)

10A—10B—10C. Intermediate Chinese. (5—5—5) Five 1-hour lectures and one additional hour in the language laboratory per week. Prerequisite: six credits from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

**101A.** Formerly 103; 101B formerly 104. Three 1-hour lectures per week. A different theme, or literary form, will be studied each quarter. Mr. Strickmann (F, W, Sp)

**102A—102B—102C.** Three 1-hour lectures per week. Prerequisite: course 100A, 100B or equivalent

102A: Pre-T'ang. 102B: T'ang through Sung. 102C: Ming to present. Mr. Strickmann (F, W)

103. Two 1 1/2-hour reading/lecture hours per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (F, W)

105. History of Taoism. (4) Two 1 1/2-hour lectures per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (W)

108A-108B-108C. Readings in Early Medieval Literature. (4—4—4) Formerly 113; 108B formerly 114A; 108C formerly 114B; 108 is not prerequisite to 109A; 108A and 108B are not prerequisite to 109C. Three 1-hour lectures per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (W)

110A—110B—110C. Classical Chinese Texts: Early Chinese Literature. (4—4—4) Three 1-hour lectures per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (W)

112A—**112B. Chinese Literature In Translation. (4—4) Formerly 112A-112B. Three hours of lecture per week. Prerequisite: junior standing; soprones admitted with consent of instructor. Lectures on principal genres, authors, and individual works of Chinese literature from the present day, with section discussions (to follow each lecture) based on lectures and on students' reading of selected works in English translation. Mr. Birch (W)

114. Classical Chinese Texts. (4) Formerly 155. Three 1-hour lectures per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (W)

120A—120B—120C. Readings in Later Medieval Prose and Poetry. (4—4—4) Formerly 156; 120A formerly 155; 120B formerly 156B; 120C formerly 156C. Three 1-hour lectures per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (W)

135. Two 1 1/2-hour lectures per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (W)

136. Modern Japanese Literature In Translation. (4) Formerly 152. Three 1-hour lectures per week. Reading in Japanese translation of representative works from the present day to the present century. Mr. Motofuji (Sp)

140A—140B—140C. Readings In Chinese Buddhist Texts. (4—4—4) Formerly 110A—110B—110C. Three 1-hour lectures per week. Prerequisite: one upper division course in Classical Chinese. 140A is not prerequisite to 140B; 140A and 140B are not prerequisite to 140C. Three 1-hour lectures per week. Mr. Birch (Sp)

146. Readings in Sino-Tibetan Languages. (4) Formerly 175. Three 1-hour lectures per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (Sp)

147. Readings in Sino-Tibetan Linguistics. (4—4—4) Formerly 176. Three 1-hour lectures per week. Prerequisite: course 102A or 102B or consent of instructor. Mr. Jamieson (W)

152A—**152B. Chinese Literature In Translation. (4—4) Three 1-hour lectures per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (F, W)

153A—153B—153C. Readings in Early Medieval Literature. (4—4—4) Three 1-hour lectures per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (F, W)

154A—154B—154C. Readings in Later Medieval Prose and Poetry. (4—4—4) Formerly 156; 154A formerly 155; 154B formerly 156B; 154C formerly 156C. Three 1-hour lectures per week. Prerequisite: course 102A or 102B. Three hours per week. Mr. Strickmann (F, W)

166. Sino-Tibetan Linguistics. (4) Formerly 175. Three 1-hour lectures per week. Prerequisite: course 102A or 102B or consent of instructor. Mr. Jamieson (W)


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NOTE: For key to symbols, see page 36.
Japanese

Lower Division Courses

1A—1B—1C. Elementary Japanese. (5—5—5) For- merly 103A—103B—103C. Five 1-hour meetings per week. Registration for two additional hours per week in the Language Laboratory is required. Prerequisite: students with previous knowledge of the language admitted by consent of instructor. Sequence beginning (F).

10A—10B—10C. Intermediate Japanese. (5—5—5) Formerly 123A—123B—123C. Five 1-hour meetings and one 1-hour laboratory per week. Prerequisite: course 10C. 10B—10C. Five 1-hour meetings per week. Prerequisite: 10A. 10B is prerequisite to 10C. Students who have attended a Japanese school admitted only by consent of the instructor.

12. Introduction to Literary Japanese. (4) Three 1-hour meetings per week. Prerequisite: course 10C or equivalent. Mrs. McCullough (F, W, Sp)

Upper Division Courses

100A—100B—100C. Advanced Japanese. (5—5—5) Five 1-hour meetings per week. Prerequisite for 100A—100B: Japanese 10C; for 100A: 100B or 100C. Readings taken from Japanese 100A—100B Expository writings. 100A is not prerequisite to 100B. 100C: Fiction. Students who have attended a Japanese school admitted only by consent of the instructor.

Mr. Motofuji (F, W, Sp)

*118A—129B—129C. Reading in Classical Japanese Literature. (4—4—4) Three 1-hour meetings per week. Prerequisite: course 12, 129A is not prerequisite to 129B; 129A and 129B are not prerequisite to 129C. Courses may be repeated for credit.

Mrs. McCullough (F, W, Sp), Mrs. McCullough (Sp)

139A—139B. Japanese Grammar. (4—4) Three hours of lecture per week. Prerequisite: course 12. 139A and 139B are not prerequisite to 139C. The second semester is for students who have completed the first semester. Courses may be repeated for credit.

Mr. Motofuji (F, W, Sp)

159. Contemporary Japanese Literature. (4) Three 1-hour meetings per week. Prerequisite: course 100C. Mr. Motofuji (F)

*160. Japanese Drama. (3) Three 1-hour meetings per week. Prerequisite: course 12. Mr. Motofuji (Sp)

*168. Japanese Documents. (4) Three 1-hour meetings per week. Prerequisite: course 129A or 129B or 129C. An introduction to some of the principal types of hental kanbun historical texts.

Korean

Lower Division Course

**1A—**1B—**1C. Elementary Korean. (5—5—5) Formerly 123A—123B—123C. Five 1-hour meetings and two 1-hour laboratories per week. 1B—1C. Five 1-hour meetings and one 1-hour laboratory per week. Sequence beginning (F).

Mr. Rogers (F, W, Sp)

Upper Division Courses

100A—100B—100C. Intermediate Korean. (4—4—4) Three hours of lecture per week. Prerequisite: course 12. Mr. Rogers (F, W, Sp)

Altai

**114A—114B—114C. Introduction to Mongolian. (6—5—4) Four 1-hour meetings per week. An introduction to the Mongolian language of the Mongolian People's Republic (Khalkha). Readings in literary and expository texts. Mr. Bosson (F, W, Sp)

*154A—154B—154C. Intermediate Mongolian. (4—3—3) Three 1 1/2 hour meetings per week. Continued reading and exercises in Khalkha, together with an introduction to the orthography and grammar of literary Mongolian in vertical script. Selected prose texts from the 17th century to the present in both Cyrillic script and vertical script. Mr. Bosson (F, W, Sp)

*177A—177B. Manchu. (4—4) Three 1 1/2-hour meetings per week. Prerequisite: junior standing; consent of instructor. An introduction to literary Manchu; reading of selected prose texts. Mr. Bosson (W, Sp)

Tibetan

**194A—194B—194C. Elementary Tibetan. (4—4—4) Three 1-hour meetings per week. Prerequisite: courses 144A, 144B, 144C. The standard modern Buriat literary language; reading of selected prose texts. Mr. Bosson (W, Sp)

*179. Burlat. (4) Three 1-hour meetings per week. Prerequisite: courses 178A, 178B. An introduction to the standard modern Tibetan literary language; reading of selected prose texts. Mr. Bosson (Sp)

Upper Division Courses

H195. Honors Course. (3—5) Hours to be arranged. Directed independent study and preparation of Senior Honors Thesis. Limited to senior honors candidates in Oriental Languages. (For description of Honors Program, see Index.) The Staff (F, W, Sp)

198. Preceptoral and Reading Course. (1—4) Hours to be arranged. Prerequisite: junior standing. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1—5) Enrollment is restricted to students who have missed the senior honors screening; admission by consent of instructor. May be repeated for credit.

Mrs. McCullough (F, W, Sp)

Graduate Courses

201. Japanese Bibliography. (3) Three 1-hour meetings per week. Prerequisite: Japanese 100A—100B—100C. Japanese reference works for literary background and history. Mr. McCullough (F)

**202. Korean Bibliography and Research Method. (4) Two 1 1/2-hour meetings per week. Prerequisite: Japanese 101C; Chinese 163, or consent of instructor. Survey and analysis of major sources works from the Three Kingdoms period through the Yi Dynasty. Mr. Jamieson (F)

**205. Seminar In Early Chinese Fiction. (4) One 2-hour seminar per week. Studies in the historical development of Chinese fiction and a critical analysis of some early oral writings. May be repeated for credit with consent of instructor. Mr. Cheung (Sp)

206. Chinese Vernacular Literature. (4) One 2-hour seminar per week. Detailed study of a text with its literary and historical background. May be repeated once for credit with consent of instructor. Mr. Birch (W)

210. Seminar In Buddhism and Buddhist Texts. (4) One 2-hour seminar per week. Prerequisite: consent of instructor. Mr. Rogers (F, W, Sp)

**212. Seminar In Chinese Literary History. (4) One 2-hour seminar per week. Textual and aesthetic criticism. Mr. Jamieson (Sp)

213A—213B. Seminar In Philological Analysis of Ancient Chinese Texts. (4—4) One 2-hour seminar per week. Prerequisite: course 144A or 129A or consent of instructor. Textual and historical approach to the texts of the late Chou period; the particular text chosen for study will vary from year to year. Credit and grade will be awarded upon completion of the sequence.

(4—3) 164A—164B—164C. Elementary Tibetan. (4—4—4) Three 1-hour meetings per week. Prerequisite: course 164A—164B. Mr. Bosson (F, W, Sp)

*174A—174B—174C. Intermediate Tibetan. (4—4—4) Three hours of lecture per week. Prerequisite: course 164C. Emphasis on doctrinal Buddhist texts. Mr. Lancaster (F, W, Sp)

164. Advanced Tibetan. (2) Two 1-hour meetings per week. Prerequisite: 164A—164B. Exten- sive reading in historical and literary texts. May be repeated for credit.

Mr. Bosson (Sp)

Special Upper Division Courses

H215. Tun-huang Studies. (4—4) One 2-hour meeting per week. Prerequisite: Japanese 159. O.L. 249A is prerequisite to 249B. May be repeated for credit with consent of instructor. A final grade is assigned upon completion of 249A or 249B. Mr. Bosson (W, Sp)

**249A—249B. Seminar In Modern Japanese Literature. (4—4) One 2-hour meeting per week. Prerequisite: Japanese 159. O.L. 249A is prerequisite to 249B. May be repeated for credit with consent of instructor. A final grade is assigned upon completion of 249A or 249B. Mr. Bosson (W, Sp)

**299. Japanese Literature Since 1700. (4) Three hours of seminar per week. Prerequisite: B.A. in Japanese Literature or 145. M.A. student will concentrate on one specific aspect of the problem. Mr. Bosson (F, W)

299A—299B. Seminar In Classical Japanese Drama. (4—4) One 2-hour seminar per week. Prerequisite: consent of instructor. A graduate seminar sequence intended to provide an oppor- tunity for advanced study in the area of the title. Content may be changed from year to year, and the course may be repeated for credit. A final grade is assigned upon completion of both quarters.

Mrs. McCullough (W, Sp)

275. Historical Documents. (4) Two 1-hour seminars per week. Prerequisite: advanced level of competence in literary Chinese or consent of instructor. Mr. Jamieson (F)

*275. Old Turkish: Uighur. (4) Two 1 1/2-hour meetings per week. Prerequisite: Near Eastern Studies 275. Mr. McCullough (F, W, Sp)

286. Directed Study for Graduate Students. (1—8) Special tutorial or seminar on selected topics not covered by available courses or seminars. The Staff (F, W, Sp)

290. Thesis Preparation and Related Research. (1—8) Hours to be arranged. Prerequisite: consent of thesis supervisor and graduate adviser. Grading is on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1—8) Prerequisite: consent of graduate adviser. Individual study for the comprehensive or language requirements. May be used in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for graduation.
Paleontology

Department Office, 3 Earth Sciences Building

Professors: William B. N. Berry, Ph.D. (Emeritus), J. Wyatt Durham, Ph.D.

William A. Clemens, Jr., Ph.D., Ph.D. (Emeritus)

Donald E. Savage, Ph.D. (Emeritus)

Zach M. Arnold, Ph.D. (Emeritus)

Robert M. Kleinpell, Ph.D. (Emeritus)

Associate Professor: Warren L. Fry, Ph.D.

Assistant Professor: Carole S. Hickman, Ph.D.

Departmental Major Adviser: Mr. Fry.

Graduate Adviser: Mr. Berry.

The Department offers instruction in invertebrate and vertebrate paleontology, micropaleontology, paleobotany, and stratigraphic paleontology. Professional opportunities are few in the field without an advanced degree; hence the undergraduate program is designed for those students who wish to prepare for graduate study. Either the biology of fossil organisms or the geological aspects of paleontology. Facilities are extensive and education in most paleontological fields is offered. Candidates are expected to acquire a broad familiarity with several fields in paleontology as well as with related subjects outside the Department, such as geology, anthropology, zoology, and botany. Ph.D. candidates are required to pass reading examinations in two foreign languages (usually French and German) before taking the oral qualifying examination.

For further details on the requirements for the M.A. and Ph.D. degrees, please contact the graduate adviser for the Department.

Lower Division Courses

*11. Fossils and the History of Life. (5) Three 1-hour lectures, two 2-hour laboratories per week. Origin and development of life; plants and animals, their changing relationships through time. Emphasis of significant groups of fossil organisms; fossiliferous strata, and an overview of earth history and evolution from the point of view of the fossil record.

2. Directed Studies in Paleontology. (2) Six hours of laboratory per week. Prerequisite: course 1 or 15 (may be taken concurrently). Field, laboratory, and museum investigations of diverse problems in paleontology under direct faculty guidance. Supervised field trips, readings, and discussions. The Staff (F, W, Sp)

15. Ecologies of the Past. (3) Three 1-hour lectures per week. Changes in plant and animal associations and interactions, and in the context of environmental and climatic changes that took place throughout geologic time. Emphasis is placed on using knowledge of modern ecological relationships to understand those of the past. Mr. Berry (W)

20. Fossils and the History of Life. (4) Two 1-hour lectures and two 3-hour laboratories per week supplemented with a field trip. Origin and development of life, plants and animals and their changing relationships through time, lineages of significant groups of organisms. Emphasis is placed on an overview of earth history and evolution from the point of view of the fossil record. Mr. Fry (F, Sp)

Upper Division Courses

101. Phylogeny and Evolution. (4) Two 1-hour lectures and one 2-hour laboratory (with preparation outside of laboratory) per week. Ons or more field trips. Prerequisite: course 15. A relativistic science. Paleoontology 101 is designed for science-oriented students not majoring in paleontology. Examination and discussion of selected examples from the fossil record of plants and animal groups. Mr. Clemens (Sp)

110. Marine Paleoecology, (3) Three 1-hour lectures and 1 hour of laboratory/demonstration per week. Prerequisite: Biology 150. Approaches to the study of fossil assemblages, associated with the context of environment and the fossiliferous strata. Emphasis will be placed on vertebrates. Ancient community structure and interactions, both among organisms and with the physical environment, will be considered with reference to modern ecological research. Ms. Hickman (Sp)

111. Invertebrate Paleontology. (4) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisite: course 1 or Biology 1A-1B, or 11A-11B, or Geology 5. Paleobiology, morphology, and systematics. Mr. Berry (F)

112. Stratigraphic Paleontology. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: course 111. Elements of biostatigraphy and taphonomy. Mr. Berry (W)

115. Paleobiology of Microorganisms. (4) Two 1-hour lectures and two 3-hour laboratories per week. Occasional field trips. Morphology, ecology, and general systematics of significant microorganisms, with emphasis on foraminifera and other marine protists. (W)

Established courses in the field of paleontology provide an opportunity for qualified students to prepare for various examinations required for the Ph.D. May not be used for unit or residence requirements for the Ph.D. degree. Must be taken on a satisfactory/unsatisfactory basis.

Preparation for Graduate Study

Graduate study, with programs leading to both the M.A. and Ph.D. degrees, is a principal activity of the Department. Students may emphasize either the biological or the geological aspects of paleontology. Facilities are extensive and education in most paleontological fields is offered. Candidates are expected to acquire a broad familiarity with several fields in paleontology as well as with related subjects outside the Department, such as geology, anthropology, zoology, and botany. Ph.D. candidates are required to pass reading examinations in two foreign languages (usually French and German) before taking the oral qualifying examination.

Mr. Fry (Sp)

120. Vertebrate Paleontology. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 1 or Anthropology 1, and Biology 1A-1B or 11A-11B equivalent. Geologic history and evolution of backbone animals. (Sp)

125. Morphology of the Vertebrate Skeleton. (2) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 1 or Anthropology 1, and Biology 1A-1B or 11A-11B. Development and morphology of skeleton and dentition. (W)

170. History of Paleontology. (4) Three 1-hour lectures per week, assigned reading and written report. Prerequisite: senior or graduate standing. To be offered alternate years with courses 224, 225. Discovery and development of ideas, principles and methods; modern trends and theories. H195. Honors Thesis, (8) Restricted to candidates for honors with the bachelor's degree. Preparation of a satisfactory report and final research. Requests for utilization of the report emphasis will be placed on composition and style as well as scientific content. The Staff (F, W, Sp)

195. Supervised Independent Study and Research. (1-6) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. (The Staff, F, W, Sp)

Graduate Courses

*120. Principles of Phylogeny and Systematics. (2) Two hours of lecture per week. Analysis and discussion of post-Paleozoic groups and systematics. Mr. Berry (Sp)

*1220. Advanced Paleobotany. (4) Two hours lecture and two 3-hour laboratories per week. Prerequisite: course 125 and 126 or Zoology 106 or equivalent. To be offered in alternate years. Mr. Fry (W)

*2225. Paleontology and Evolution of Insects. (4) Two hours of lecture and two 3-hour laboratory sessions per week. Prerequisite: courses 125 and 126 or comparable anatomy of vertebrates. Study of fossil record of Mammals and comparative research on modern animals. Mr. Clemens (F) and Mr. Savage (Sp)

*2275. History and Paleocoeology of Higher Vertebrates. (4) Two hours of lecture and two 3-hour laboratories per week. Prerequisite: course 2225. Mr. Savage (Sp)

229. Studies In Vertebrate Paleobiology. (1-4) Prerequisite: course 224, 225, or 227. Demonstrations of field and laboratory tools on problems in occurrence, taphonomy, stratigraphic relationships, and correlation of vertebrate-bearing deposits. Mr. Clemens (Sp)

240. Advanced Stratigraphic Paleontology. (2) Two hours of seminar per week. Prerequisite: consent of instructor, may be repeated for credit. Topics may include, for example, solution of current problems, or a series of current literature and discussions aimed at refinement of paleontologic discipline in stratigraphy and geologic history. Mr. Berry (W)

241. Ancient Climates. (2) Two hours of lecture per week. Prerequisite: consent of instructor. Review and discussion of major topics. Mr. Savage (F)

NOTE: For key to symbols, see page 36.
**Philosophy**

**Department Office, 314 Moses Hall**

**Professors:**
- Ernest W. Adams, Ph.D.
- Charles S. Chihara, Ph.D.
- William R. Myer, Ph.D.
- Samuel Scheffler, Ph.D.
- Barry G. Stroud, Ph.D.

**Associate Professors:**
- Benjamin Malott, Ph.D.
- Paul K. Feyenband, Ph.D.
- Wallace I. Matson, Ph.D.
- John Searle, Ph.D.
- Linda Fox, Ph.D.

**Visiting Mills Professor:**
- Gregory Vlastos, Ph.D.

**The Major**

**Lower Division.** 12A-12B or 14A-14B; 25A-25C-25D.

**Upper Division.** 100; 104; 134A.

A total of 60 units is required in the major program. Twenty-four units are required in the upper division in addition to the three required upper division courses: 102, 104, and 134A. The student must take two courses from the list above and four additional upper division restricted courses (one course numbered 191-199 may be counted among the four only if the major adviser gives written approval).

Philosophy 12A or 12B or 14A-14B should be passed before the end of the freshman year. Philosophy 100 should be taken as soon as possible after declaring a major. One of the four additional upper division per week. Prerequisite: consent of instructor. Systematics, ecology, functional morphology, and evolution of selected mollusc groups through lectures, discussions and individual projects. Ms. Hickman (Sp).

**Higher Degrees**

Attention is called to the requirement of a reading knowledge of French or German and one other foreign language for the Ph.D. in philosophy. Students who wish to complete an advanced major in philosophy should consult the graduate school for the requirements in the program for their particular major.

**Lower Division Courses**

2. Introduction to Philosophy: Ethical and Political Philosophy. (3-2) Two 1-hour lectures and one hour of discussion per week. Mr. Tussman (F).

4. Introduction to Philosophy: Theory of Knowledge. (3-2) Three lectures and one hour of discussion per week. Mr. Searle (Sp).

12A-12B. Introduction to Logic. (5-5) Three hours of lecture and two hours of discussion per week. Course 12A in itself should not be regarded as a terminal course in logic. Mr. Craig (W, Sp), Mr. Adams (W, Sp), Mr. Bates (F, W).


14A. Rudiments of Logic and the Philosophy of Logic. (3-3) Formerly 91A. Three hours of lecture and two hours of discussion per week. The first part of a sequence in which approximately equal time will be given to formal and philosophical contributions to predicate logic, and to an elementary examination of philosophical question directly raised thereby. Mr. Myro (W).

14B. Rudiments of Logic and the Philosophy of Logic. (6-6) Formerly 91B. Three hours of lecture and two hours of discussion per week. Study of topics in philosophy of science and the logical foundations of science. Mr. Myro (W).

25A. Ancient Philosophy. (3) Three 1-hour lectures per week and one weekly section meeting. Mr. Matson (F).

*125B. Medieval and Early Modern Philosophy. (3) Three 1-hour lectures per week and one weekly section meeting.

25C. Modern Philosophy to Kant. (5-5) Three hours of lecture and one section meeting per week. Mr. Matson (W). Ms. Grene (Sp).

**Upper Division Courses**

General prerequisites. — Students enrolling in any restricted upper division courses before having taken course 12A-12B or 25A, 25B, 25C, or 25D, or have completed, under conditions specified below, course 101. Additional prerequisites are indicated in certain courses.

**Unrestricted Course**

101. Philosophical Theories. (5) Two lecture per week and one section meeting per week. Fundamental problems in metaphysics and the theory of knowledge. Course 101 is open to juniors and seniors who are not majors in philosophy and who have not taken course 4 or its equivalent. It will be accepted as a prerequisite for other upper division courses in the department in lieu of course 4. Mr. Searle (F), Mr. Sluga (Sp).

104. Ethical Theories. (3) Three hours of lecture and one hour of discussion per week. The fundamental concepts and problems of morality examined through the major traditions of classical and contemporary philosophical theories. Mr. Scheffler (F).

106. Philosophy in Literature. (3) Three hours of lecture per week. Philosophical issues as expressed in poetry, drama, and the novel. Mr. Tussman (W).

107A. Existentialism in the Novel and Drama. (4) Formerly 107. Three hours of lecture and one hour of discussion per week. Prerequisite: at the discretion of the instructor. The major prerequisite may be waived for students in Literature, Novels and Drama who have studied existentialism in the works of Sartre, Dostoevsky, and other existentialist philosophers. Mr. Tussman (W).

107B. Existentialism in Drama and Film. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: at the discretion of the instructor, the general prerequisite may be waived for students in Literature, Novels and Drama who have studied existentialism in the works of Sartre, Dostoevsky, and other existentialist philosophers. Mr. Tussman (W).

112. Philosophy of Religion. (3) Three hours of lecture per week. The nature and the validity of religious ideas. Mr. Matson (Sp).

118. Philosophy of Law. (4-4) Three hours of lecture per week. Philosophical problems arising in the legal context. Mr. Tussman (F).

126A-126B. Aesthetics. (4) Three hours of lecture per week. Course 126A is not prerequisite to 126B. 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. Form and expression, representation, style, interpretation and evaluation.

126A. The Visual Arts. Mr. Vermazen (F).

126B. Literature and Music.
ture per week. Theories of history: Augustine, Vico, Hegel, and others.

128. Political Philosophy. (4) Three hours of lecture per week. Analysis of political obligation and related problems.

*129. Aesthetic Theories. (4) Three hours of lecture per week. A study of aesthetic theories based on historical and recent materials.

130. Philosophy of Action. (4) Three hours of lecture per week. A consideration, inter alia, of some of the following questions: What is an action? What is rational action? Are intentions causes of actions? What is the structure of practical arguments? What is the structure of explanations of actions? Mr. Vermaazan (W)

131. Metaphysics. (4) Three hours of lecture per week. Mr. Myro (W)

132. Philosophy of Mind. (4) Three hours of lecture per week. Mind and matter; other minds; the concept "person." Mr. Searle (Sp)

133A–133B. Philosophy of Language. (4–4) Three hours of lecture per week. 133B: Mr. Searte (F)

134A–134B. Theory of Knowledge. (4–4) Three hours of lecture per week. 134A: Mr. Clarke (Sp)

*135. Perception. (4) Three hours of lecture per week. The course will be devoted to studying major conflicting accounts of the nature of the simplest kinds of experience. Special attention will be given problems in the acquisition of knowledge with special emphasis on underlying divergent philosophical principles and orientations.

*136. Special Topics in the Philosophy of Science. (4) Three hours of lecture per week. A study of selected topics in the philosophy of science—recent research and systematically for the philosophy of science. Details of topics to be announced in the seminar guide for each quarter in which the course is given.

139. Philosophy of Science. (4) Three hours of lecture per week. A survey of major topics in the logic of science—the nature of laws, explanations, probability, reduction, etc.—and of other issues coming under the general heading of philosophy of science—overviews of science and its direction, etc.

140. Philosophy of the Natural Sciences. (4) Three hours of lecture per week. Philosophical topics arising from physics, biology, etc. Mr. Feyerabend (F)

*141. Philosophy of the Social Sciences. (4) Three hours of lecture per week. Philosophical topics arising from psychology, economics, sociology, etc.

142. Probability and Induction. (4) Three hours of lecture per week. Different approaches to the foundations of probability; inductive confirmation of scientific hypotheses. Mr. Adams (F)

143A–143B. Logic. (4–4) Three hours of lecture per week. Prerequisite: course 12A or 12B or equivalent. 143A: Mr. Craig (143B: Mr. Craig (Sp)

144. Philosophy of Mathematics. (4) Three hours of lecture per week. Foundations of mathematics: logic, intuitionism, formalism. Set theoretical paradoxes, definition of number, problems of continuity and infinity. Mr. Chihara (W)

*145. Modal Logic. (4) Three hours of lecture per week.

*146. Philosophical Logic. (4) Three hours of lecture per week. Main subject of study will be logical aspects of scientific theories. Among topics to be discussed: theories of scientific laws; the nature of laws; confirmation and the acquisition of knowledge; the functions of scientific theories.

*147. History of Logic. (4) Three hours of lecture per week. Mr. Chihara (W)

*148. History of Philosophy. (4) Three hours of lecture per week. Mr. Chihara (W)

150. Anglo-American Philosophy, 1900–1945. (4) Three hours of lecture per week.


152A–152B. Phenomenology and Existentialism. (5–5) Three hours of lecture and one hour of discussion section per week. Course 152A is prerequisite to 152B. Backgrounds of phenomenologists and existentialists: Kierkegaard, Nietzsche and Husserl. Contemporary existential phenomenology: Heidegger, Sartre, and Merleau-Ponty.

*153. The Later Heidegger. (6) Formerly course 191D. Three hours of lecture per week. Prerequisites: Philosophy 152B or equivalents. Division II of Being and Time, and related later works such as The Origin of the Work of Art and On Time and Being.

160A–160B. Plato. (4–4) Three hours of lecture per week.

161. Aristotle. (4) Three hours of lecture per week.

*168. Medieval Philosophy. (4) Three hours of lecture per week.

170. Descartes. (4) Three hours of lecture per week.


172. Spinoza. (4) Three hours of lecture per week. Mr. Matson (F)

173. Leibniz. (4) Three hours of lecture per week. Mr. Matson (W)

*174. Locke. (4) Three hours of lecture per week.

*175. Berkeley. (4) Three hours of lecture per week.

176. Hume. (4) Three hours of lecture per week. Mr. Stroud (F)

178A–178B. Kant. (4–4) Three hours of lecture per week. Ms. Broughton (W, Sp)

180. Philosophy of the 19th Century. (4) Three hours of lecture per week. Mr. Sluga (F)

181. Klirregoard. (4) Three hours of lecture and one hour of discussion section per week. Prerequisite: one Philosophy course. A study of Kierkegaard as theologian, philosopher, and psychologist with emphasis on those aspects of his thought which have provided the basis of existential phenomenology. Readings in The Present Age, Either/or, Fear and Trembling, Concept of Dread, and Sickness Unto Death. Mr. Dreyfus (F)

*184. Nietzsche. (4) Three hours of lecture per week.

190. The Later Wittgenstein. (4) Three hours of lecture per week.

H105. Philosophy Tutorial. (5) Meetings once a week. Prerequisite: restricted to students in the Honors Program. The Staff

H110. Senior Colloquium. (Formerly H117.) A seminar course for honors students in philosophy on an extended topic to be announced. Emphasis on the writing of papers and discussion of them in the seminar.

198. Group Study. (1–5) Directed study on special topics. Prerequisite: consent of instructor. The Staff

199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff

Graduate Courses

200. First Year Graduate Seminar. (5) Two hours of lecture and two hours of discussion per week. A combination seminar and tutorial, required of and limited to first year graduate students in philosophy. Mr. Sluga & Mr. Vermaazan (F), Mr. Matson (W), Mr. Grice, Mr. Myro (Sp)

204. Recent Work in Ethics. (5) Prerequisite: course 104 or equivalent. Open to advanced undergraduates.

234. Recent Work in Theory of Knowledge. (5) Two to four hours. Prerequisite: one Philosophy course. A study of various fields of philosophy. Topics will vary from year to year. The Staff

237. Philosophical Problems. (5) Two to four hours per week. Restricted to graduate students who have not yet passed the Qualifying Examination. Mr. Grice (F)

250. Special Studies. (1–9) Enrollment is ordinarily restricted to students who have been admitted to candidacy for the doctor's degree. The Staff

280. Seminar. (5) Advanced study in various fields of philosophy. Topics will vary from year to year. The Staff (F, W, Sp)

290. Seminar. (5) Advanced study in various fields of philosophy. Topics will vary from year to year. The Staff

The Staff

Physical Education

Department Office, 103 Harmon Gym

Professors:

Helen M. Eckert, Ph.D. (Emeritus)
Mary Lou Noris, Ph.D. (Emeritus)
Anna E. Lewis, Ph.D. (Emeritus)
Ann E. Spengel, Ph.D. (Emeritus)
Franklin M. Henry, Ph.D. (Emeritus)
Jesus Hodgson, Ph.D. (Emeritus)

G. Leonard Noris, Ph.D. (Emeritus)
G. Lawrence Warden, Ph.D. (Emeritus)
Joseph Royce, Ph.D. (Emeritus)

Superintendents:

Francis L. Bartlett, M.S. (Emeritus)
Peter J. Cymol, M.S. (Emeritus)
Lafayette, N., D.D. (Emeritus)
Chester J. Kente, M. (Emeritus)
Robert A. Miller, M.A. (Emeritus)
Julius Pathy-Anger, M.A. (Emeritus)

Associate Professors:

Geraldine K. Lotthof, Ph.D. (Emeritus)
M. Kathryn Scott, M.A. (Emeritus)

Departmental Major Advisers: Mr. Brooks, Mrs. Eckert, Mrs. Lotthof, Miss Park, and Mr. Royce.

Graduate Advisers: Miss Norrie, Miss Park.

Teacher Education Adviser: Mr. Flanagan, Miss Whistle.

The undergraduate major in physical education is designed to develop the scientific basis for understanding the physiological status of individuals and their ability to engage in motor activity. This includes the performance of daily life as well as that of a recreational, competitive, or esthetic nature. The role of athletics, dance, and other physical activities, both historical and contemporary, in the United States and certain other cultures is examined.

For junior transfer students who plan to apply for admission in the area of biological science with a major in physical education, the subject preparation is as follows:

Students who have completed 34 to 105 quarter units: Chemistry 1A and at least three of the following: Physics 108–109L, human physiology with laboratory, Physics 1, History 40 or 170, Anthropology 3 or Sociology 1A.

Students who have completed 106 to 122 quarter units: Chemistry 1A, Anatomy 108–109L or equivalent (a lower division course covering human anatomy with laboratory is acceptable), Elementary statistics, Physics 10, Physiological 1 or Physiology 109–109L, physiology with laboratory, Psychology 1, History 40 or 170, Anthropology 3 or Sociology 1A.

Courses accepted for the above requirements should be the equivalent of Berkeley campus courses.

The Major

Lower Division. Chemistry 1A; a course in elementary statistics; a college level course in human anatomy with laboratory; a college level course in human physiology with laboratory; Physics 10; Psychology 1; History 40 or 170; Sociology 1A or Anthropology 3.

Upper Division. Physical Education 101, 105A, 110A, 111, 121, 130; 12 units from Physical Education

NOTE: For key to symbols, see page 38.
Preparation for Graduate Study

Students must complete the equivalent of the under-graduate major.

The Graduate Major

For the M.A. degree, either Plan I requiring 30 units and
an additional 12 units in the major; (b) Plan II requiring 48 units in the major.

Lower Division Courses

1. Physical Education Activities at Harmon Gymnasium. (1/2) Sections meet two hours per week. Student selects section by activity, level, and time preference. A wide variety of sports, exercise, and conditioning activities are offered. Students should consult the Schedule of Classes each quarter to determine the particular activities and levels of instruction available.

2. Physical Education Activities at Hearst Gymnasium. (1/2) Sections meet two hours per week. Student selects section by activity, level, and time preference. A wide variety of sports, dance, and conditioning activities are offered. Students should consult the Schedule of Classes each quarter to determine the particular activities and levels of instruction available.

3. Physical Education Activities for Majors. (1) Four hours of laboratory per week. Sections in sport, exercise, and dance are offered. The Staff (Miss Norrie in charge) (F, W), Mr. Brooks (Sp)

**30. Theory and Practice of Staged Combat. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: elementary or theatrical fencing, or consent of instructor. The mechanics of movement in staged combat. Analysis and practice of related skills in dramatic scenes; choreography of physical conflict.

50. First Aid. (2) One 2-hour lecture and one 2-hour laboratory per week. Standard and advanced course. Upon successful completion of the course, an American Red Cross First Aid badge is awarded. Offered on a pass/not passed basis only. Miss Scott (W)

Upper Division Courses

101. Kinesiology and Body Mechanics. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: a college level course in human anatomy with laboratory, or course 110A. Analysis of muscular structure and muscular movements in various physical activities. Anatomical concepts and physical laws related to joint and muscle function. Mr. W. (Sp)

102. Kinesiology of the Handcapped. (3) Three 1-hour lectures per week. Prerequisite: P.E. 101. Causes, incidence, effects of those physical disabilities that affect participation in society. Current research and nature of programs designed to lead to optimum function of the handicapped. (W)

105A. Physiological Hygiene. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: a college level course in human physiology with laboratory and Chemistry 1A, or equivalent. Discussions of the effects of environmental stresses on the body; the effects of physical agents on the body; and the mechanics of movement in gymnastics, swimming, and aquatic activities. Mr. Brooks (F)

105B. Physiological Hygiene. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: Physical Education 105A. Discussions of the effect of exercise on skeletal muscle, exercise and cardio-vascular disease, exercise and cold, under water, and at altitude, nutrition and performance, the effects of drugs on performance, blood doping, sex differences and aging. Mr. Brooks (W)

106. Energy Sources for Human Movement. (3) Two hours of lecture and one 1-hour discussion section per week. Prerequisite: course 105B or permission of instructor. Lectures on potential and organic energy sources to work in the human. Emphasis will be placed on direct and indirect methods of calorigraphy, determinations of heat balance, metabolism, the concept of rate-limiting, reactions, and the substances used at rest, during various forms of physical exercise. Mr. Brooks (Sp)

108. Neuromuscular Fatigue. (3) Three hours of lecture per week. Prerequisite: elementary statistics, human physiology (or exercise physiology), or consent of instructor. Theories and experimental processes in gross human motor activity. Lectures on factors of fatigue ranging from a historical inquiry to contemporary considerations. Mrs. Loth (Sp)

110A—110B. Psychological Aspects of Physical Activity. (4—3) Three hours of lecture and two 1-hour laboratories per week. Prerequisite: Psychology 1 and an elementary course in statistics (recommended). Perception, learning, timing, and coordination as factors in physical activity. Mrs. Loth (W)

111. Motor Development. (4) Three hours of lecture and one 1-hour laboratory per week. Prerequisite: course 111 or equivalent. Motor development of the child from birth to maturity, age changes, sex and individual differences, physical education and motor learning in childhood and adolescence, relation of motor performance to other aspects of behavior. (Sp)

112. Motor Development of the Handicapped. (3) Three hours of lecture per week. Prerequisite: course 111 or equivalent. Motor development of the handicapped as a function of age, sex, and type of disability. Influence of medical and psychosomatic factors on motor development according to the type of handicapping condition. (F)

120. Sports in American Society. (3) Three hours of lecture per week. Prerequisite: Sociology 1A or equivalent. Interrelationships of sports and physical recreation with other social institutions in American culture. Emphasis on the twentieth century. (W)

121. Social-Cultural Bases of Human Movement. (4) Three hours of lecture and one 1-hour discussion per week. Prerequisite: Sociology 1A or Anthropology 3 or equivalent. The social and cultural importance and structure, variety, and extent of sport in modern socie- ties. Social factors such as institutions, processes, and systems are examined in relation to sport and sport groups as subcultures. (F)

130. History of Physical Education and Sport. (4) Three hours of lecture and one 1-hour discussion per week. Prerequisite: History 4D or consent of instructor. History of American and foreign physical education. Its cultural background: political, social, educational. Comparative analysis of physical education systems in other countries to develop critical judgment regarding the purposes and significance of physical education in modern life and education on the basis of pertinent cultural and social information. Miss Park (W)

131. Curriculum Development and Administration. (4) Four hours of lecture per week. Prerequisite: course 110A and 130. Curriculum development and administration in school programs of physical education including the instructional program, intramural sports and interscholastic athletics, administrative policies and procedures pertaining to staff, facilities, equipment, budget and program. Mr. Kyte (W)

135A—135B. Measurement and Evaluation in Phys- ical Education. (4—4) Three hours of lecture and 2 hours of laboratory per week. Prerequisite: a course in elementary statistics. Mrs. Loth (F)

135B. Three hours of lecture and three hours of labora- tory per week. Prerequisite: course 135A. Historical development of evaluation in physical education; measurement of physical abilities and specialized motor skills; analysis of selected statistical procedures; inferences from hypothesis testing, correlation and variance analysis and regression. The statistical nature of individual differences and error. Miss Eckert (F)

140. Recreational Activities in American Society. (3) Two 1-hour lectures and one lab meeting per week. Prerequisite: Sociology 1A or Anthropology 3. Nature, scope and significance of recreation in the social and economic life of the American people. Mr. Murphy, Miss Park (F)

145B. Theory of Sports Activities. (3) Two hours of lecture and four hours of laboratory per week. Prerequisites: course 165A; course 165B; course 165C; some knowledge in gymnastics, apparatus, individual exercises. The mechanics of movement in gymnastic activities. Analysis of coordination skills in a wide variety of gymnastic exercises and the analysis of exercise as it is related to such activities.

171. Conditioning of Athletes and Care of Injuries. (2) One hour of lecture and two hours of laboratory per week. Prerequisite: course 50; and a college level course in human physiology with laboratory or a college level course in human anatomy with laboratory, or equivalent. Conditioning and care of athletes: sleep, diet, health, and activity habits. Care of injuries, with special emphasis on taping, therapeutic and protective equipment. Mr. Royce (W)

195. Honors Course. (3—6) Individual conferences to be arranged. Special study and/or research in the field of the major. The Staff (Miss Norrie in charge) (F, W), Mr. Brooks (Sp)

196. Honors Thesis. (3) Individual conferences to be arranged. The Staff (Miss Norrie in charge) (F, W), Mr. Brooks (Sp)

197. Field Study in Physical Education. (1—5) Su- pervised experience relevant to specific aspects of Physical Education in off-campus organizations. Regular individual meetings with faculty. Full and periodic reports required. Must be taken on a passed/not passed basis. The Staff (Miss Norrie in charge) (F, W), Mr. Brooks (Sp)

198. Supervised Independent Study and Research for Undergraduates. (1—8) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (Miss Norrie in charge) (F, W, Sp)
Physical Science

Adviser: Mr. A. Carl Helmholtz, 374 LeConte Hall

Field Major in Physical Sciences

This program has been developed for students who wish to concentrate in the physical sciences on a broader basis than is possible in a departmental major. Two plans are offered within the major. Plan A is based on Physics 6, which is required for biology students, and Mathematics 16, which is required in part by biology departments. Through this plan a student preparing for a career in the physical sciences may major in physical science and at the same time acquire the necessary pre-professional preparation. For example, Plan A, together with organic chemistry and a year of biology, will meet the entrance requirements of most medical schools. Plan B is based on Physics 5 and Mathematics 1, which are required by physical science and engineering departments. Within this plan it is possible to complete much of the departmental major in, for example, physics or chemistry, while also studying astronomy and geology as well as computer science.

Plan A

(Broad introduction to physical science)

Lower Division Courses. Mathematics 16A, 16B, 41 or 55, Physics 6A, 6B, 6C, Chemistry 1A, 1B, 1C.

Additional Required Course. Computer Science 3 or 103.

Upper Division Courses. Physics 108B, 132, Chemistry 109A, 109B, Statistics 130A, 130B. Electives in computer science, mathematics, statistics, and physical science with the approval of the adviser to complete a total of 45 upper division units in the major.

Plan B

(Option of departmental concentration)

Lower Division Courses. Mathematics 1A, 1B, 1C, 5A, 51A, 51C; Physics 5A, 5B, 5C, 5D, 5E; Chemistry 1A, 1B, or 4A, 4B, 4C, 14. Strongly Recommended: Mathematics 51B.

Additional Required Course. Geology 5 or 101 or Astronomy 101 or 127A.

Upper Division Courses. Physics 105A, 105B; Physics 110A, 110B, HOC; Chemistry 104A. Electives in computer science, mathematics, statistics, and physical science with approval of the adviser to complete a total of 36 upper division units in the major.

Honors Program. Students with a grade-point average both overall and in the major of at least 3.50 may wish to participate in an honors program leading to graduation with honors. The honors program will include two quarters of work in a departmental honors program with a senior thesis.

Physical Science Undergraduate Courses

Department Office, 386 LeConte Hall


Graduate Courses

(3) One 3-hour meeting per week. Prerequisite: course 105A, intermediate 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.

Mr. Royce (W)

Wilton B. Luckett, Ph.D.

206. Seminar in Physiological Hygiene. (3) One 3-hour meeting per week. Prerequisite: course 105A, intermediate 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.

Mr. Royce (W)

207. Seminar in Movement and Body Mechanics. (3) One 3-hour meeting per week. Prerequisite: course 111. Neurophysiological concepts, physical laws, and kinesiology.

Mr. Royce (W)

208. Seminar in Educational Psychology. (3) One 3-hour meeting per week. Prerequisite: course 105A, intermediate 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.

Mr. Royce (W)

209. Seminar in Psychological Bases of Physical Activity. (3) One 3-hour meeting per week. Prerequisite: course 111. Critical review of current literature on the nature and process of learning and the role of factors in physical activities. Miss Norris (W), Miss Lofthouse (Sp)

210. Seminar in Motor Development. (3) One 3-hour meeting per week. Prerequisite: course 111. Contemporary theories of development. Changing motor abilities and behavior from childhood through youth and age.

Mr. Brooks (Sp)

211. Seminar in Motor Development of the Handicapped. (3) One 3-hour meeting per week. Prerequisite: course 112. Special problems in the motor development of the handicapped with reference to the age of disability, maturational level, sex, and environmental factors.

Mr. Brooks (Sp)

212. Seminar in Sociocultural Bases of Human Movement. (3) One 3-hour meeting per week. Prerequisite: course 121. Sociocultural analyses of sports, games, and dances in primitive and modern societies.

W (W)

213. Seminar in Historical Foundations of Physical Education. (3) One 3-hour meeting per week. Prerequisite: course 130. Historical analyses of sport, games, exercises, and dance in primitive and modern societies.

Miss Park (F)

*1231 Seminar in Contemporary Administrative and Curricular Theories and Problems in Physical Education. (3) One 3-hour meeting per week. Prerequisite: course 131 or instructor's consent. Theories, policies, and practices relative to the administrative process in planning and organizing physical education.

200. Research. (2-6) Hours to be arranged.

The Staff (F, W, Sp)

295. Department Seminar. (0) One hour of lecture per week. Presentations of research and lectures by faculty, visiting lecturers, and students. Masters degree students required to enroll for three quarters. Doctoral students in the Special Program in Physical Education required to enroll for one quarter. Must taken on a satisfactory/unsatisfactory basis.

Miss Park (F), Mr. Brooks (W), Mrs. Gipsman (Sp)

297. Special Study for Graduate Students. (2-4) Hours to be arranged. Advanced study of special problems under the direction of a faculty member.

The Staff (Miss Norris in charge F, W), Mr. Brooks (Sp)

601. Individual Study for Master's Students. (1-6) Hours to be arranged. Individual study to prepare for master's thesis or examination. Units may not be counted to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Miss Norris in charge F, W), Mr. Brooks (Sp)

602. Individual Study for Doctoral Students. (1-6) Hours to be arranged. Individual study to prepare for doctoral examination. Units may not be counted to meet either unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Miss Norris in charge F, W), Mr. Brooks (Sp)

NOTES: For key to symbols, see page 36.
usually required for admission to graduate work. Addi-
tional mathematics from among the courses Mathemat-
ic 10A—104A, 102A—120B—120C, 121A—121B, 185 is
recommended.

Honors Program. Students with an overall grade-
point average of 3.3 or higher and a grade-point aver-
age of 3.5 in all physics courses must consult the major
adviser concerning the honors program.

This program requires completion of the major, at least one
quarter of Physics H190 and a senior thesis, Physics H195A–H195B.

Biophysics. Students who wish to obtain a broad intro-
duction to modern physics and the application of
physics to biology are referred to the major in biophysics,
which appears under Biophysics and Medical Physics.

Engineering Physics. The College of Engineering,
with the cooperation of the Department of Physics,
ofers a curriculum in engineering physics leading to
the degree of Bachelor of Science. Major Adviser: Mr. Kerth.

Field Major in Physical Sciences. Students in-
terested in this major see Physical Science for descrip-
tion of the major program. Major Adviser: Mr. Helmholtz.

Letters and Science List of Courses: 162 units from
the List must be included in the 180 required for gradua-
tion. Students interested in this program should con-
tact the College of Letters and Science for courses on the List.

Graduate Programs

Graduate work leading to the M.A. and Ph.D. degrees is
offered in the Department of Physics with emphasis
placed on the Ph.D. In addition to applications and
transcripts of undergraduate work, applicants for ad-
mission must submit scores on the graduate record
examination in physics. Detailed information concern-
ing admission, teaching assistantships, fellowships, and
degree requirements is given in a departmental brochure
released in the spring by the graduate secretaries, Department of Physics.

Research is a major part of the Ph.D. program, and the
Department offers opportunities in a wide variety of
experimental and theoretical fields. Campus research
includes atomic physics and spectroscopy, laboratory
astrophysics, cosmic rays, mass spectroscopy, non-
linear optics, solid state physics, low-temperature
physics, electron and nuclear magnetic resonance,
gaseous electronics, and upper atmosphere physics.
At this time, opportunities exist for research in
elementary particle and nuclear physics, in plasma
physics, and in energy and environment problems. Space physics, interplanetary
studies, and magnetic fields of the Sun are also a
major area of research. Laboratory and observational
problems are pursued both in the Physics Department and in
the Space Sciences Laboratory, which also supports an inter-
departmental program of graduate study and research
in atmospheric and space sciences. Students with spe-
cial research interests should make inquiry in the de-
partment office.

Requirements for the Ph.D. include the contents of the
following courses: Physics 210A–210B–210C–210D–210E and
221A–221B–221C plus 21 units (7 quarter-courses) of
material elected from upper division or graduate
courses (not including any upper division material re-
quired for the graduate major), of which at least 12 units
must be in 200 courses. Some of these 12 units
would include courses in mathematics, biophysics
or astrophysics. Mathematics 224 is recommended.
Courses in philosophy are not counted toward the
120 units considered above. The M.A. degree is offered
under Plan II of the Graduate Division.

Lower Division Courses

Courses 5A—5B—5C—5D—5E, or HSA—H5B—H5C—H5D—
H5E, or 5A—I—5C—I—5D—I—5E are fundamental and
are designed to meet the needs of students majoring
in any of the physical sciences, or who are enrolled in the
colleges of Chemistry or Engineering. The Physics
5 series (but not 5H) may be taken in the regular (lec-
ture) format or in a self-paced version (5-I), as can
Physics 6. Those proceeding with the second year
mathematics sequence should take courses in the or-
der 51C–51A–51B concurrently with Physics 5C–5D–5E.
Physics 5A—6B—6C is designed for premedical students, students in architecture, and
students in the biological sciences. Physics 10 is rec-
ommended for the nonscience major student who desires
to gain some understanding of basic modern con-
cepts. These courses fulfill, in part, the natural science
requirements of the College of Letters and Science.
All students planning to take lower division courses, except Physics 10, should have completed trigo-
nometry.

The Physics 5 series (but not 5H), and also Physics 6,
may be taken in the regular lecture format or in an
independent-study version (5-I, 5-I). The units, content
and prerequisites of the I courses are the same as
the corresponding regular course, but the format is differ-
ent. The regular course's three lectures, plus one hour of
discussion, each week are replaced by approxi-
mately six hours of tutorials, held in the course center
where faculty, teaching assistants, or tutors give indi-
vidual instruction and assistance. The subject matter
is divided into modules, with mastery judged by a test
for each module (attempted more than once if necessary).
Course grades are based on a necessary minimum number of modules successfully completed, as well as a final examination. The laboratory work is taken in the laboratory sections of
the regular courses, except for 5A-I.

5A. Physics for Scientists and Engineers. (3) Three
hours of lecture and one hour of discussion per week.
Prerequisite: high school physics, Mathematics 1A
1AS; Mathematics 1B or 1BS must be taken concur-
rently if it has not been completed. Vectors, particle
motion. Galilean invariance, conservation of energy,
momentum, and angular momentum, center of mass,
motion of rigid bodies, central force fields.

The Staff (F, W, Sp)

SB. Physics for Scientists and Engineers. (4) Three
hours of lecture, one hour of discussion, and three
hours of laboratory per week. Prerequisite: course SA
or SB-I; Mathematics 1C or 1CS must be taken concurren-
tly or have been completed. Harmonic oscillator,
mechanical waves, fluids, kinetic theory of gases,
motion of rigid bodies, central force fields.

The Staff (F, W, Sp)

SC. Physics for Scientists and Engineers. (4) Three
hours of lecture, one hour of discussion, and three
hours of laboratory per week. Prerequisite: course SB
or SB-I, Mathematics 1A or 1AS; Mathematics 1B
or 1BS; Mathematics 1C or 1CS must be taken concurren-
tly or have been completed. Harmonic oscillator,
magnetic forces and fields, induction, dielectric and
magnetic materials.

The Staff (F, W, Sp)

SD. Physics for Scientists and Engineers. (4) Three
hours of lecture, one hour of discussion, and three
hours of laboratory per week. Prerequisite: course SC
or SC-I, Mathematics 1C or 1CS. Time-varying elec-
tric currents, Maxwell's equations, electromagnetic waves, refraction, polarization, optical instruments.

The Staff (F, W, Sp)

SE. Physics for Scientists and Engineers. (4) Three
hours of lecture, one hour of discussion, and three
hours of laboratory per week. Prerequisite: course SD
or SD-I. Microstructure of matter, quantization, Planck's
constant, wave-particle duality, wave mechanics, special relativity.

Mr. Karplus (F, W)

5D. Physics for Scientists and Engineers. (4) Three
hours of lecture, one hour of discussion, and five 3-hour
labouratories per week. Prerequisite: course SB or SB-I,
Mathematics 1C or 1CS; Physics 6B. Electricity and magnetism, optics and wave motion.

Mr. Ross, Mr. Judd, Mr. Crawford (F, W)

6A. Introductory Physics. (4) Three hours of lecture
and one hour of discussion per week, and five 3-hour
laboratories per quarter. Prerequisite: course 5A.
Students with credit for Physics 6A and 6B need not
receive credit for Physics 6B. Course equivalent to 5A but
designed for individual flexibly-paced study. Laboratory also in large part individually paced. Topics of greatest
demand included.

Mr. Helmholtz (F)

6B. Introductory Physics. (4) Three hours of lecture
and one hour of discussion per week, and five 3-hour
laboratories per quarter. Prerequisite: course 5B.
Students with credit for Physics 6A and 6B need not
receive credit for 6A. Course similar to 5A but designed for
individual flexibly-paced study. Laboratory also in large part individually paced. Topics of greatest
demand included.

Mr. Helmholtz (F)

6C. Introductory Physics. (4) Three hours of tutorial
and three hours of laboratory per week. Prere-
quises: Physics 5A or 5B. Students with credit for Physics 6A and 6B will not receive credit for Physics 6C. Equivalent to Physics 6C but
designed for individual flexibly-paced study. Laboratory also in large part individually paced. Topics of greatest
demand included.

Mr. Karplus (F)

6D. Introductory Physics. (4) Three to six hours of
tutorial and three hours of laboratory per week. Prere-
quises: proficiency in pre-college mathematics, Math 16A or 160A, or consent of the instructor. Stu-
dents with credit for Physics 5A or 5B will not receive credit for 6A. Course equivalent to 6A but designed for
individual flexibly-paced study. Laboratory also in large part individually paced. Topics of greatest
demand included.

Mr. Helmholtz (F)

10. Descriptive Introduction to Physics. (4) Four hours of
lecture and one hour of discussion per week. Prere-
quises: high school physics, Mathematics 1A or 1AS.
Mathematics 1B or 1BS; Mathematics 1C or 1CS may be
taken concurrently if it has not been completed. Vectors,
particle motion, Galilean invariance, Newton's laws, con-
servation of energy, momentum, and angular momentum, center of mass, motion of rigid bodies, central force fields.

Mr. Rosenfeld, Mr. Goldhaber, Mr. Shapiro (F, W, Sp)

21. Physics of Music. (4) Three hours of lecture and
one hour of discussion per week. Prerequisite: no pre-
vious courses in physics are assumed, although Graphs
and concepts from high school physics, fundamentals of
algebra and geometry will be used. Physical principles
countered in the study of music. The applicable laws of
mechanics, fundamentals of sound, wave phenomena,
principles of sound production in musical instru-
ments, musical scales. Numerous illustrative lecture
demonstrations will be given. Laboratory included.

Mr. Hahn (Sp)

49. Supplementary Work In Lower Division Phys-
ics. (1–3) Meetings to be arranged. Students with
partial credit in lower division physics courses may, with
consent of instructor, complete the credit under this heading. Courses may be repeated for credit.

Instructors in Lower Division Courses (F, W, Sp)

91. Problem Solving Skills Applied to Introductory Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Physics 5A and concurrent enrollment in introductory physics, or consent of instructor. Open to a limited number of qualified students interested in physics teaching at the college level. Students will be selected and engage in tutorial or laboratory teaching under the supervision of a faculty member. May be repeated twice for a maximum total of six units of credit on a passed/not passed basis only. Mr. Helmholz, Mr. Karplus (F, W, Sp)

Upper Division Courses

Courses 5A—5B—5C—5D—5E (regular, self-paced, or honors), and differential and integral calculus are prerequisites to all upper division courses except 106A—106B, and 132.

Four unit upper division courses may have scheduled one additional hour to the three hours of lecture. See Schedule of Classes.

105A—105B. Analytic Mechanics. (4—4) Three hours of lecture and one hour of discussion per week. Prerequisites: course 6A—6B—6C. Designed for optometry students. Geometrical methods applied to the optics of mirrors, lenses, and prisms; laboratory work to accompany lectures. Mr. Chamberlain (F)

105B—105C—105D. Analytic Mechanics. (4—4—4) Three hours of lecture and one hour of discussion per week. Prerequisites: course 5A—5B—5C. Not open to physics majors. Motion of charged particles in electric and magnetic fields, dynamics of fully ionized plasma from both microscopic and macroscopic points of view, magnetohydrodynamics, equilibria, waves and instabilities; examples from space sciences and controlled fusion research. Sequence beginning (W). Mr. Anderson, Mr. Davis, Mr. Halpern, Mr. Golchaber, Mr. Strovink

106A. Analytical Optics. (4) Three 1-hour lectures and two 1-hour discussions per week. Prerequisite: course 5A—5B—5C—5D—5E. Designed for optometry students. Geometrical methods applied to the optics of mirrors, lenses, and prisms; laboratory work to accompany lectures. Mr. Chamberlain (F)

106B. Physical Optics. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: course 5A—5B—5C—5D—5E. Not open to physics majors. Phenomena of diffraction, interference, and polarization of light, and applications; laboratory work to accompany the lectures. Mr. Chamberlain (W)

110A—110B—110C. Electromagnetism and Optics. (4—4—4) Three hours of lecture and one hour of discussion per week. Prerequisites: courses 105A—105B and 137A or equivalent. Geometric and physical optics, Maxwell’s equations, propagation of electromagnetic theory and problem-solving: electrostatics, magnetostatics, steady and time-varying currents, applications of Maxwell’s equations, wave equation, physical optics. Sequence beginning (F, Sp) Mr. Packard, Mr. Winkler, Mr. Mehaffy, Mr. McCree, Mr. Davis (F)

111. Modern Physics and Advanced Electrical Laboratory. (1—4) Four hours of laboratory per week. Prerequisite: course 137A or consent of instructor. Advanced laboratory for junior and senior students including some of the significant experiments of atomic, nuclear, and solid-state physics. Individual work is encouraged. Eight units required for physics coordinate. A general descriptive course in modern physics; electrons, neutrons, and atoms; periodic table, X rays, spectra, nuclear physics, nuclear energy, solids, fundamental particles. Mr. Reynolds (Sp)

137A—137B—137C. Quantum Mechanics and Its Applications. (4—4—4) Three hours of lecture and one hour of discussion per week. Introduction to the methods of quantum mechanics with applications to atomic physics, atoms, molecules, solid state, and nuclear. Sequence beginning (F, W, Sp) Mr. Jeffries, Mr. Kerth, Mr. Chiao, Mr. Muller, Mr. Morrison, Mr. Chinnovsky

139. Special Theory of Relativity. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 105A—105B, 112, or the equivalent. General principles of analytical mechanics and electromagnetic theory as applied to the physics of light and luminous phenomena. Emphasis on derivations and problems. Mr. Carter (Sp)

141A—141B—141C. Solid-State Physics. (4—4—4) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 137A and 137B, or taken concurrently. A thorough introductory course in modern solid-state physics. Crystal symmetry; electromagnetic, elastic, and plastic properties; quantum mechanics; magnetic order; resonant absorption; theory of metals and semiconductors, superconductivity. Sequence beginning (F) Mr. Clarke

142A—142B. Introduction to Plasma Physics. (4—4—4) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 105A—105B, 112, or the equivalent. Applications to Atomic Physics. (4—4—4) Three hours of lecture and one hour of discussion per week. Mr. Portis (W)

150. Introduction to Atmospheric and Space Sciences. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Senior standing in the physical sciences. Atmospheric and space sciences; observational data and physical theories of processes in the atmosphere and solar system resulting from the interactions of particles, fields, radiation, and matter. Mr. Anderson (Sp)

153. Physics in the American System. (1) One and one-half hours of lecture per week plus optional section meetings. Prerequisite: course 137A—137B or physical science or consent of instructor. A critical study of the political, economic and social forces that influence the work of physicists and scientists generally. To be offered on a pass/not pass basis only. Mr. Schwartz (Sp)

180A. Physics of Solar Radiation. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Physics 5A—5B—5C—5D—5E and Math 5C or equivalent. Basic concepts of thermodynamics with application to the conversion of solar radiation. Option for the collection, concentration and transmission of electromagnetic radiation. Electromagnetic theory with applications to the optical properties of materials. Mr. Portis (F)

180B. Physics of Solar Radiation. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 180A or equivalent or Math 5C or equivalent. Quantum physics of atoms and molecules. Introduction to the physics of solids, properties of semiconductors, photoelectric effect, electron spectroscopy and conversational image. Mr. Portis (W)

1910. Physics Honors Course. (2) A seminar which includes study of a standard book on theoretical physics and reports on current theoretical and experimental problems. Must be repeated for credit. Must be taken on a pass/ not pass basis. Mr. Richards, Mr. Strovink, Mr. Muller (F, W, Sp)

1922. Mathematical Methods of Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 1910 or equivalent. This course is designed to provide a rigorous mathematical foundation for advanced study and research in physics. Topics to be announced by the department. Participation will be given to recent developments in methods and to the unifying mathematical ideas. With consent of instructor may be repeated for credit.

Graduate Courses

205A—*205B. Advanced Dynamics. (2—3) 205A: two hours of lecture and one hour of discussion per week; 205B: three hours of lecture and one hour of discussion per week. Prerequisite: Physics 137A. Designed for advanced undergraduates in physics and astronomy. Mr. Perlmutter (W), Mr. Reif (Sp), Mr. Rubinstein, Mr. Scheinman (Sp)

*205C. Advanced Dynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 105A—105B—110C—137A. Not open for credit to those who have completed course 205A. Designed for advanced perturbation theory, and computational methods.

208. Interactions of Light with Matter. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 205A and 112 or the equivalent. Quantum theory: wave phenomena, quantum mechanics, applications to crystal theory and quantum theory through the correspondence principle. Mr. Shen (F)

209A—209B. Interactions of Solid State Theory with Matter. (3—3) Three hours of lecture and one hour of discussion per week. Prerequisite: 208 and 112 or consent of instructor. Introduction to the theory of the lattice and continuous systems. Assignment of quantum states for scattering. Nonlinear polarization: its physical origins and its reaction on the radiation field; the production of second and higher harmonic waves: applications to laser processes. Sequence beginning (W). Mr. Shen (Sp)

210A—210B—210C. Theory of Electricity and Magnetism. (3—3—3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 110A—110B—110C and a working knowledge of differential equations. Classical description of the electromagnetic field, including a special relativity aspects in class. Sequence Beginning (F). Mr. Schwartz (W)

211. Equilibrium Statistical Mechanics. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 137A—137B or equivalent. Foundations of statistical physics. Ensemble theory. Degenerate systems. Systems of interacting particles. Mr. Davis (W)


221A—221B—221C. Quantum Mechanics. (3—3—3) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 127A—127B or equivalent. 221A. Basic assumptions of quantum mechanics; quantum theory of measurement; matrix mechanics, Schrodinger’s equation; wave-functions; linear Hilbert spaces; theory of angular momentum; stationary state problems; variational principles; time independent perturbation theory; conversion of one state to another through a scattering process; electron exclusion principle; many particle formalism; creation and destruction operators. 221B. Boson and Fermion fields; radiative processes; the Dirac equation; perturbation theory. 221C. Boson and Fermion fields; radiative processes; the Dirac equation; perturbation theory. Mr. Kekets (F), Mr. Kekets (Sp)

222. Mathematical Methods of Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 1910 or equivalent. Application of a branch of mathematics to physical problems. Topics to be announced by the department. Participation will be given to recent developments in methods and to the unifying mathematical ideas. With consent of instructor may be repeated for credit.

223. Group Theory and Quantum Mechanics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: introduction to Group theory and linear representation theory of instructor. Introduction to groups and group

NOTE: For key to symbols, see page 36
representations; brief survey of quantum mechanics of atoms, molecules and solids, emphasizing applications of group theoretical methods. (W)

225A. Relativistic Particle Physics. (2) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 221A–221B–221C or the equivalent. Feynman diagram calculations in perturbation theory. Perturbation expansion and Feynman rules for Feynman diagrams with examples such as Compton scattering, Moller scattering, Breithe scattering, and meson-nucleon scattering. Emphasis is placed on getting answers.

Mr. Suzuki (F)

225B. Relativistic Particle Physics. (3) Three hours of lecture and 1 hour of discussion per week. Prerequisite: courses 221A–221B–221C or the equivalent. Invariance principles and symmetry principles. Conservation laws, selection rules, discrete symmetries such as space reflection, time reversal and charge conjugation and time reversal. Group theory of SU(3) and SU(3) properties of hadron spectra and interactions, static quark model, and properties of heavy quarks. Mr. Suzuki (W)

225C. Relativistic Particle Physics. (3) Three hours of lecture and 1 hour of discussion per week. Prerequisite: courses 221A–221B–221C or the equivalent. Dynamics of particle interactions. Description of particle dynamics in lepton-hadron collisions, electron-positron annihilation, and heavy-ion collisions. Scattering phenomena, scaling violations, and quark parton model in deep inelastic collisions. Mr. Suzuki (Sp)

226A. Properties and Interactions of Particles. (3) Three hours of lecture and 1 hour of discussion per week. Prerequisite: courses 225A–225B or the equivalent. Properties and interactions of hadrons: Thomas precession, spin dependence of strong interactions, etc. Mr. Chew (F)

226B. Properties and Interactions of Particles. (3) Three hours of lecture and 1 hour of discussion per week. Prerequisite: courses 225A–225B or the equivalent. Course material is selected from S matrix theory of strong interactions. Mr. Chew (W)

227. Dynamics of Strong Interactions. (3) Three hours of lecture and 1 hour of discussion per week. Prerequisite: courses 225A–225B or the equivalent. Weak interactions. Weak decays of leptons and hadrons, neutrino reactions, and gauge models of weak interactions. Mr. M. Gell-Mann (M)

230A–230B–230C. Quantum Theory of Fields and Particles. (3–3–3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 225A–225B or the equivalent; course 222A may be taken concurrently. Relativistic quantum mechanics of fields and particles. 230A–230B: Field quantization. 230C: Perturbation expansion, renormalization, and quantized electromagnetic fields. 230C: Topics selected from recent developments in field quantization and applications, e.g., nonabelian gauge fields, renormalization group, and axiomatic and constructive field theories.

Sequence beginning (F) Mr. Berdacki

*231A–231B. General Relativity. (3–3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 210C or equivalent. An introduction to Einstein’s theory of gravitation with applications to astrophysics and cosmology. Tensor analysis, general covariance, coordinate models for matter and the electromagnetic field, field equations. Applications to the solar system, dense stars, black hole theory and cosmology.

Sequence beginning (F) Mr. Berdacki

240A–240B–240C. Quantum Theory Of Solids. (3–3–3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 221A–221B and course 141A–141B or the equivalents; or consent of instructor. Phonon, magnon, plasmon, polaron, electron fields in solids and their interactions; superconductivity, pairing interactions; Green’s functions; Brillouin zones and symmetry; excitation; impurity states; transport processes; Fermi surfaces; neutron scattering; Fermi-sphere, theoretical methods, magnetic resonance.

Sequence beginning (F) Mr. Cohen


Sequence beginning (F). Not given every year. Mr. Kaufman

243A. Physics of I onized Gases. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 112, 137A, or equivalents or consent of instructor; some familiarity with plasma physics is recommended. Basic processes in ionized gases, macroscopic description of partially ionized plasmas including electronic reactions, radiation and transport phenomena, plasma production and decay. Applications to atmospheric and astrophysical sciences, high speed gas dynamics and electric discharges. Not given every year.

250. Special Topics In Physics. (2–4) Prerequisite: with consent of instructor, may be repeated for credit. Topics will vary from quarter to quarter. See Department of Physics announcements.

251A–251B. Introduction to Graduate Research In Physics. (2–2) One 1-hour lecture and one 1-hour discussion section per week. Prerequisite: Graduate standing in Physics Department, or consent of instructor. Must be taken on a satisfactory/unsatisfactory basis. A survey of experimental and theoretical research in the Physics Department, designed for first-year graduate students. One regular meeting each week with supplementary visits to experimental laboratories. Meetings include discussions by research staff.

The Staff (Sp)

252A–252B. Many-Body Theory of Nuclear Physics. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 221A, 221B and 221C, recommended. Many-body diagrammatic techniques in many-particle systems: linear response, collective modes. Specific applications to nuclear physics: Bethe-Goldstone equation; Breuer-Kammer theory; pairing; boson expansion; pairing equations. State of neutron stars and dense nuclear matter.

(W, Sp)

253A–253B. Nuclear Theory. (3–3) Three hours of lecture and one hour of discussion per week. Prerequisites: Graduate Quantum Mechanics (Physics 221A); Nuclear Physics, e.g., Chemistry 223A-223B or Nuclear Engineering 223C; consent of instructor. Foundation of single particle approximation, Hartree-Fock and collective model. Extended shell model, particle-hole excitations, linearization of equations of motion. Macro-nuclear physics, level densities, potential energy surfaces, fission. Rotational nuclei, radiations, giant resonances. Neutron absorption, origin of optical potential, direct reactions, heavy ions, isobaric analog states.

290. Seminar. (2) Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

295. Research. (1–9) Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

299. Special Study for Graduate Students. (1–4) Prerequisite: graduate standing. This course is arranged to allow students to investigate possible research fields or to pursue problems of interest through reading or nonlaboratory study under the direction of a member of the staff. The student is to give supervision to be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) Individual study in connection with the field advisor intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. Must be used for unit or residence requirements for the doctorate. Must be in physiology. Recommended: three additional quarters of course work in chemistry (e.g., Chemistry 5 or 109), physics or mathematics.

Honors Program. To be enrolled in the honors program a student must maintain a grade-point average of at least 3.3 and an overall grade-point average of at least 3.3 in the major courses required for the undergraduate major in physiology. To receive honors with the bachelor’s degree the student must (1) maintain a grade-point average of at least 3.3 in the major and in the honors program, (2) complete the requirements for the undergraduate major in physiology as stipulated above, (3) complete at least 8 units of course 199 or equivalent, and (4) submit a satisfactory thesis based upon the research work performed.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Major in Physiology

Students qualified for admission may elect a course of work leading either to the M.D. degree or directly to the Ph.D. degree in physiology. The M.A. degree is not prerequisite for the Ph.D. degree. On the other hand, candidates for either degree must have completed the equivalent of the requirements for the undergraduate major in physiology as stipulated above, in addition to the minimum requirements for the particular graduate degree, as follows:

1. The M.A. degree in physiology is to be earned according to Plan I of the Graduate Division, which includes the satisfactory completion of 30 units of course work and a thesis.

2. The Ph.D. degree in physiology. Required: Biochemistry 102 (5), Chemistry 109A–109B (3–3); a course in statistics; at least 8 units of upper division or graduate courses each in physiology and morphology; at least 8 units of upper division or graduate courses each in general biological sciences, such as organic chemistry, inorganic chemistry, microbiology, etc.
24 units of course 299. Recommended: Physics 132 (4).

Before advancement to candidacy for the Ph.D. degree the student must demonstrate that he/she can make an accurate written translation from the physiological scientific literature in two of the languages approved by the Department (e.g., French, German, Russian, or Chinese). Selection of a major professor should also have been made by that time. The student must also pass an oral qualifying examination to test general mastery of physiology and at least two other related subjects which are approved by the major professor and the graduate advisor. A dissertation based upon original research in physiology is to be prepared according to Plan B of the Graduate Division.

All candidates for the Ph.D. degree are required to acquire teaching experience equivalent to a minimum of three quarters of full-time teaching as a Teaching Assistant or Associate (e.g., 2 quarters of 1/2-time teaching; 4 quarters of 1/4-time teaching, etc.). For further details concerning the graduate degrees please consult the graduate advisors in physiology.

Major in Anatomy (Graduate Only)

In addition to meeting the general requirements of the Graduate Division, the student must have had the following courses, or their equivalents, before admission to candidacy. These courses are preferred but not required. They are:
- Biology 1A-1B-1C (4.5-5.5); Chemistry 1A-1B-1C (4-4-4), Chemistry 5 (4), Chemistry 8A-8B (4-4.5-4.5); Mathematics 1A-1B-1C (4-4-4) recommended or 16A-16B (4-4); Physics 8A-8B-8C (4-4-4).

1. The M.A. degree in anatomy is to be earned according to Plan I of the Graduate Division, which includes the satisfactory completion of 30 units of course work and a thesis. Required: course 151 (5); either course 209 (4), or courses 203 (5) and 205A-205B (5-5); at least 12 units of course 299.

2. The Ph.D. degree in anatomy. Required: course 151 (5); courses 209 (4-time teaching as Teaching Assistant or Associate (e.g., 2 quarters of 1/2-time teaching; 4 quarters of 1/4-time teaching, etc.).

For further details concerning the graduate degrees please consult the graduate advisors in anatomy.

Physiology

Lower Division Courses

1. Introductory Human Physiology. (6) Three hours of individual tutoring and examination, three hours of laboratory, and one hour of discussion per week. Prerequisite: either high school chemistry or a course in college physics or chemistry or biology. A comparative introduction to human physiology, taught in a flexible self-paced format. The course will concentrate on basic mechanisms underlying human life processes, including cells and membranes, nerves and muscle functions, cardiovascular, respiratory, renal and gastrointestinal physiology; metabolism, endocrinology and reproduction.

Mr. Machen and Mr. Zucker (Sp)

10. The Biology of Man. (4) Three hours of lecture and one hour of demonstration per week. Prerequisite: intended for students majoring in biological sciences. An introduction to the function and evolution of the human body and brain. Emphasis is placed on understanding human biological mechanisms and behavior in the context of the changed environment humans have created. Must be taken on a passed/not passed basis.

198. Directed Group Study. (1-5) The Staff (F, W, Sp)

Graduate Courses

213. Seminar in Cell Physiology. (1) One 2-hour meeting per week. Current research on cell and membrane structure and function must be taken on a passed/not passed basis.

Mr. Machen (F), Mr. Macey (W), Mr. Forte (Sp)

*215. Neuroendocrinology. (4) Four and one-half hours of lecture per week. Prerequisites: courses 101-102, 103 or equivalent, consent of instructor. Current research in the field will be considered. (Sp)

Mr. Nicoll (F)

216. Seminar in Neuroendoerinology. (2) One and one-half hours of lecture per week. Prerequisites: courses 101-103, 105, 107 or equivalent, consent of instructor. Current research in the field will be considered. (Sp)

Mr. Nicoll (F)

218. Neuropharmacology. (4) Four hours of laboratory per week. Prerequisite: courses 105 and 107 or equivalent, consent of instructor. Study of principles and mechanisms of drug actions on the nervous system and their use in the treatment of neurological disorders. (Sp)

Mr. Nicoll (F)

*223. Seminar in Comparative Physiology. (2) One and one-half hours of lecture per week. Prerequisite: courses 105 and 107 or equivalent, consent of instructor. Selected subjects in the field will be considered. (Sp)

Mr. Nicoll (F)

*231. Seminar in Environmental Physiology. (2) One 2-hour meeting per week. Prerequisites: courses 101, 102 and 103. Selected topics on the effects of environmental factors on man. (F)

Mr. Nicoll (F)

Note: For key to symbols, see page 38.
self-government, which intern the democratic goals of these societies and the means to pursue them, but may be curtailed by growth objectives. Socialist industrial countries also pursue development objectives. But these objectives, which in the West seem to curtail democratic practices, here seem to foster social and political diversity by hampering centralized rule. Irrespective of political format, political practitioners in every industrial country are faced with policy dilemmas when trying to accommodate development objectives with the preservation of their political institutions.

In order to achieve a better understanding of these dilemmas, students in the program design their plans of studies, in consultation with their advisers, so as to devote special attention to the institutions and values that have shaped and caused the emergence of contemporary issues. They also study the instrumentailities available for planning and problem solving, the way in which institutions and values link with policy choices, and the way in which contemporary issues feed back into institutions, values, and solving processes. Students study the emerging problems of industrial societies not only as problems of resource use and distribution, but also, and above all, as problems of institutional adaptation, value innovation, and changing political equilibria. They have an opportunity to combine problem solving with historical and analytical interests, and to ground them in the study of some of the most salient elements within which features and problems of industrialsm emerge.

(For a more detailed description of the program and course offerings, please obtain a brochure from the Group Major Office.)

Declaration of Major: U.C. Berkeley students must declare the major not later than the quarter in which they are completing their ninety-first unit. Unless declaring well before reaching the maximum number of units, they must have completed two of the required lower division courses and must be enrolled in a third. Students transferring in their junior year may wait till their second quarter at the University before declaring. They must have no more than 105 completed units, and must have completed two of the lower division prerequisites and be in the process of completing a third.

Advising: In the major great importance is assigned to the advising function. The purpose of advising is to give students' personal interests the appropriate academic orientation within the major's intellectual goals. When declaring, students must devise a plan of courses to complete the major to be discussed and approved by a major adviser. Changes in the plan must also be approved by an adviser.

Lower Division: 20 units.
Economics 1. Introduction to Economics (5); History 5 (5) and History 17D (5); Political Science 2 (5); optional: Mathematics 1A--1B (4-4) (Required only of students taking Economics 101A--101B to satisfy the methodology requirement. Must be taken in addition to the other lower division requirements, not in lieu of them.)

Upper Division: 48 to 54 units, including no more than three courses offered outside the College of Letters and Science.

Methodology: 10 units.
Economics 100A--100B (5--5) or Economics 101A--101B (5--5).

Introductory Sequence: 10 units.
Political Science 140D (5) or History 104 (5); Political Science 120A (5), or Political Science 126A (5), or Political Science 126B (5).

Fields of Concentration: 28 to 34 units as follows: five courses as specified from the first three fields below (no more than three from the same department), two additional courses from any of the four fields below to attain the unit total. All courses are to be chosen with an adviser when declaring the major.

I. Models of the Industrial State: three one-quarter courses.
Business Administration 111 (5), 117 (5); Economics 105 (4), 108 (4), 107 (5), 109 (4), 111B (4), 111C (4), 112 (5), 113 (5), 114 (5), 161 (4), 162 (4), 163 (4), 164 (5); History 104 (5), 123 (5), 124 (5), 125 (5), 126A--126B (5--5), 129A--129B (5--5), 168A--168B--180C (5--5--5), 174B (5); Interdepartmental Studies 196B--196J (5--5); Political Science 140A--140B (5--5), 140E (5); Interdepartmental Studies 196B--196J (5--5); Political Science 140A--140B (5--5), 140E (5); Interdepartmental Studies 196B--196J (5--5); Political Science 140A--140B (5--5), 140E (5); Political Science 140A--140B (5--5), 147C--147D (5--5), 183 (5), 189 (5); Sociology 132 (5), 141 (5), 183 (5), 184 (5).

Note: Courses on specific regions not listed above may also be chosen with the approval of a major adviser.

II. Systems of Interdependency: one one-quarter course.
Anthropology 148 (5); Biology 150 (4); Business Administration 188 (5); Conservation and Natural Resources 110 (4); Economics 111C (4); 111D (4); 163 (4); 181 (4); 182 (4); 183 (5); Geography 105 (4); History 126B (5), 127A--127B (5--5), 173A--173B (5--5); Interdepartmental Studies 180 (3), 196I--196J (5--5); Political Science 120A--120B--120C (5--5--5), 121 (5), 123 (5), 124 (5), 126A (5), 126B (5).

III. Planning and Policy Making: one one-quarter course.
Business Administration 190 (5), City and Regional Planning 203 (4), 235 (4); Economics 134 (4), 155 (4), 156 (5), 171 (4), 172 (4), 173 (5); Engineering 110 (3); Geography II (5); Interdepartmental Studies 175 (4); Political Science 140C (5), 182 (5), 184 (5), 185 (5), 187 (5), 188 (5); Public Policy 177 (5), 181 (5), 164 (5).

IV. Resource Management, Human and Environmental (Optional)
Human: Economics 157 (4), 158 (5), 175 (4), 176 (5); Social Welfare 110A--110B (5--5); Sociology 123 (5), 124 (5), 129.
Environmental: Anthropology 148 (5); Biology 150 (4); Business Administration 156 (5); PENR 100A--100B--100C (4--4--4); Conservation and Resource Studies 110 (4), 155 (4), 151 (4), 181 (5), 170A--170B (4--4); Economics 125 (4), 155 (5), 156 (5); Engineering 110 (3); Geography 101 (5), 111 (5), 121 (5), 130A (5), 135 (5), 137 (5); Sociology 160 (5).

Honors Program. Students accepted into the honors program will enroll in Political Economy of Industrial Societies H185, Senior Honors Seminar (5 units), the topic of which will be expressly designed for students in the group major. The topic may change from year to year. Honors students will write a thesis under the supervision of the seminar instructor. To be eligible for admission, a student must have a grade-point average of 3.3 or higher both in the major and in all courses completed in the University.

Course
H195. Senior Honors Seminar. (6) One-quarter seminar expressly designed for students in the group major. The topic may change from year to year. Honors students will write a thesis under the supervision of the seminar instructor. To be eligible for admission, a student must have a grade-point average of 3.3 or higher both in the major and in all courses completed in the University.

Mr. Vogel (Sp)

Political Science

Department Office, 210 Barrows Hall

Professors:
Reinhard Bendix,' Ph.D.
Giuseppe DiPalma, Ph.D.
A. James Gregor, Ph.D.
Emile B. Haas, Ph.D. (Robson Research Professor of Government)
Norman Jacobson, Ph.D.
Chalmers Johnson, Ph.D. (Chairman)
Merrin Landau,' Ph.D.
Todd R. LaPorte,' Ph.D.
Eugene C. Lee, Ph.D.
George Lensczowski, L.L.M., J.S.D.

Leslie Lipson, Ph.D.
Herbert McCloskey, Ph.D.
Kenneth T. Jowell, Ph.D.
William K. Muehlau, Ph.D.
Hanna Pitkin,* Ph.D.
Nelson W. Polsby, Ph.D.
Michael P. Rigney,* Ph.D.
Carl G. Robberg, Ph.D.
Robert A. Rosenzweig, Ph.D. (Robson Research Professor of Government)
Paul Seabury, Ph.D.

L&S: Political Science / 179

NOTE: For key to symbols, see page 36.
The Major

The major in political science at Berkeley consists of twelve courses. The courses required in the lower division are Political Science 1, 2, and 3. Equivalent courses approved by the Department may be accepted in lieu of these. The lower division courses (or the equivalents) are required as prerequisites to declaring the major.

A total of 45 units of upper division work is required. At the upper division level there are nine subfields of study. Within each subfield certain courses have been designated as "core" courses. The student will be required to take a total of three core courses, one from each of three different subfields. The nine subfields are divided into two main groups; the student must take one course from each group (for example, Group I, International Relations, 120A, and Group II, Political Behavior, 162). A third core course may be selected from any of the remaining seven subfields (for example, Group III, Political Parties). Directly below is the breakdown of the subfields into Groups I and II. The designated core courses are in parentheses.

Group I: International Relations (120A, 120B); Comparative Politics (any course from 140A–140K); Political Theory (119, 118B); International Theory and Quantitative Methods (131A, 131B).

Group II: American Government and Politics (102, 103, 104, 106, 161); Sub-national Government and Politics (170A, 170B); Public Organization, Administration, and Policy (101); Public Law and Jurisprudence (152, 157A, 157B); Political Behavior (162, 164, 165).

The student must take additional upper division courses in political science to achieve the total 45 units required. However, the student may petition to have up to 10 units of course work from other departments accepted to satisfy major requirements, provided that these are upper division courses on the Letters and Science List of Courses, and that the student obtains letter grades in the courses. The Undergraduate Advisor reviews these petitions for approval.

Not more than 10 units may be included in the major from the series of courses numbered 191, 197, 198, and 199. Within these 10 units, not more than 5 units of 197 and/or 199 may be counted toward the major, with the exception that 10 units may be accepted of 197A–197B.

Honor Courses. Seniors with an overall grade-point average of 3.3 or higher, and a 3.3 grade-point average or higher in the major may apply for admission to the honors program through the Undergraduate Office. Each student desiring to honor his major in political science must complete a seminar and a thesis under one of the following options: 1) two quarters of H190A–H190B, or 2) one to two quarters of H195A–H195B.

Further Information. For updated information on the major, honors program offerings, undergraduate course content, and faculty scheduling, contact the Undergraduate Office, 210 Barrows Hall. Booklets describing the undergraduate program for the year 1979-80 are available.

The American Institutions Requirement. This requirement may be satisfied by completing an approved course, or by passing an examination. Please check with the American Institutions and Institutions Office, 29 Dwinelle Hall for further information.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College and Letters and Science for courses on the List.

Higher Degrees

Inquiries should be addressed to the departmental Graduate Office, 210 B Barrows Hall.

Lower Division Courses

1. Introduction to Political Science: Political Policy. (Formerly 1A). Three hours of lecture and one hour of discussion per week. An introduction analysis of the structure and operations of the American political system, primarily at the national level.

2. Introduction to Political Science: Comparative Government and Politics. (Formerly 1B). Three hours of lecture and one hour of discussion per week. The variety of political forms, the theory of political differentiation and development, and politics in industrial democracies, communist systems, and developing nations.

3. Introduction to Political Science: Scope and Methods in Political Science. (Three hours of lecture and one hour of discussion per week. Analytical and methodological problems of political inquiry, including the social implications of scientific research.

*41. Experimental Course. (1–5) Prerequisite: consent of instructor. Topics, experimental in nature, will vary from year to year.

52. National Security Policy. (Four hours of lecture per week. Analysis of the evolution, development and formulation, and execution of current U.S. National Security Policy. Fundamental concepts of national interest; the translation of these concepts into specific policy objectives and supporting programs; the relationship to foreign policy, and current international securiy problems.

Mr. Boyd (Sp)

Upper Division Courses

100. American Institutions. (Formerly 5). Three hours of lecture and one hour of discussion per week. Prerequisite: not open to students who have received credit for 1A. A survey of American political system, primarily at the national level.

Mr. Davis (F, W); Ms. Gruber (Sp)

American Politics

102. The American Executive. (Formerly 107). Two 1/2-hour lectures and one 1-hour discussion per week. Analysis of political institutions, functions and problems of the Presidency and the federal executive branch. Special attention will be given to topics of presidential leadership, state of the union addresses, executive-legislative relations, and policy formation. Comparative reference to executive processes in other political systems.

Mr. Pollock (F, W) (Formerly 107)

103. Congress. (Formerly 108). Three hours of lecture and one hour of discussion per week. Prerequisite: 102AB. The institutional course in American political behavior. Nomination and election, constituent relations, the formal and informal structures of both houses, relations with the executive branch, ploying, and lobbying.

Mr. Mollinga (W)

104. Political Parties. (Formerly 163A–163B–163C). Three hours of lecture and one hour of discussion per week. The political parties in the American political institution. The relationship of the American parties takes place. Concept and history of parties in the American context; their nature and function, origin and development, party organization and structure. State, national, and local party systems and their variations. Nominations and elections. One directed research paper will be required.

Mr. Mollinga (W)

105. The Politician. (Formerly 3). Three hours of lecture and one hour of discussion per week. The nature of politics, the education of politicians, the structure of ambition, and the ethical values of social behavior in the political world. Sessions with elected officials and party workers on their vocation. Directed field research.

Mr. Mirt (W)

*106. Social Groups and Political Power. (5) Four hours of lecture and one hour of discussion per week. Private power and public policy; the nature and course of strategy and tactics of group influence; the conduct of the political process; setting, business, agriculture; labor; the military, black protest, and other significant loci of power. Ramifications for a democratic society.

Political Theory

113A–113B. American Political Theory. (5–5). Two 1 1/2-hour lectures and one 1-hour conference per week. Prerequisite: 113A: consent of instructor. 113B: 113A or consent of instructor. Basic problems of political theory as viewed as the intellectual history and institutions.

Mr. Rogin (W, Sp)

114. The Theorist and His Theory. (5) Three hours of lecture and one hour of discussion per week. Prerequisite: one quarter of 113 or 116, or consent of instructor. Intensive study of one great political theorist. Topic will vary with instructor.

Mr. Thomas (W)


118A. Classical political theories and the political thought of recent authors such as Christopher and including St. Augustine.

Mr. Lipson (F)

118B. Early modern theories up to the French Revolution, including Machiavelli, Hobbes, Locke, and Berkeley.

Mr. Lapidus (W)

118C. Modern theories of the nineteenth century including Hegel, Burke, the Utilitarians, and Marx.

Ms. Pitkin (W)

118D. Recent and contemporary political theories.

Mr. Gregor (Sp)

*119. Community and Intellectual Life. (5). Three hours of lecture and one hour of discussion per week. Intellectuals as a social group in the process of "moderization." Definitions of intellectuals in the modern world. Social and cultural antecedents, men of letters in the eighteenth century, the Romantic reaction. Intellectuals in the theories of Marx and his followers are the main themes.

International Relations

120A–120B–120C. International Relations. (5–5–5). 120A formerly 120B. Three hours of lecture and one hour of discussion per week. Prerequisite: 120A is prerequisite to 120B; 120B is prerequisite to 120C. Students with credit for 120B prior to Fall 1977 may not take 120A. 120A: Comparative foreign policy. 120B: Theory of international relations. 120C: Concepts and problems in international relations and foreign policy.

Mr. Hartman (F): Mr. Seabury (W)

121. International Organization. (5). Two 1 1/2 hours of lecture and one hour of discussion per week. Prerequisite: course 120A. An examination of the impact of international interdependencies (in security relations, economics, technology, ecology, etc.) upon the activities of international organizations (regional and global), and upon the structure of the international political order.

Mr. Hu (F, W)

122A–122B. Public International Law. (5–5). Three hours of lecture and one hour of discussion per week. Prerequisite: Course 122A is prerequisite to 122B. Nature and function of international law; principal law-making and adjudicatory processes; treaties and executive agreements; jurisdiction; immunities; sea law; war; intervention; human rights; foreign policy.

Mr. Hauck (W, Sp)

124. Politics and Military Strategy. (5) Two 1 1/2-hours lectures and one 1-hour conference per week. The international relationships among military strategy, technology, science, relationships between strategic doctrine, national security concepts, and domestic politics.

Mr. Seabury (F)
social change theory, and comparative politics in the
light of contemporary experience in selected countries
pursuing different goals and processes of develop-
m, including the study of national, regional, and
rational development and the distributive outcomes
associated with general results of development.
Mr. Das Gupta (W)

140D.* 1140E. The Industrial State. (5-5) Two
1 1/2-hour lectures and one 1-hour discussion per week.
The evolution of the modern industrial state from its
feudal antecedents and analysis that produce the
manufacturing, urban, and political institutions of
the state in economic life. 140D: Mr. Zymsyn (W)

140F. Revolutionary Movements. (5) Formerly 139.
Two 1 1/2-hour lectures and one 1-hour discussion per
week. An analysis of the social, political, and
ideological revolutions from the middle ages to the
present day, emphasizing reactions to the
rise of modern individualism, industrial society,
and post-industrial age. Mr. Gregor (W)

140G. Authoritarian Government. (5) Two 1 1/2-
hour lectures and one 1-hour discussion per week.
Authoritarianism in traditional and contem-
nary states. Trends in authoritarian institutional
power, legitimacy, efficiency, and political ends
and bureaucratic means. Mr. Janos (W)

140H. Comparative Communism. (5) Formerly
128A-128B. Two 1 1/2-hour discussions per
week. The formation and evolution of com-
munist elites; organizational patterns; methods of
economic and political power; social, economic,
and political obstacles to the success of com-
munist revolutions; political and economic
problems; strategies of the Communist
movement; political power relations; and
characteristics of political behavior. The effect on
Southeast Asian politics of the influence, religious
values, economic changes, and political changes
on political problems and the role of
psychological roots of colonialism. Mr. Jackson (F)

143E. Problem of Vietnam. (5) Formerly 143C-143D.
Two 1 1/2-hours of lecture and one 1-hour
discussion per week. VIETNAM: social, political,
and military factors shaping the course of the
war; the resistance; the effects on the
American society; and the future of Southeast
Asia. Mr. Lipson (F, W)

145A-145B. Government and Politics in South
Asia. (5-5) Three hours of lecture and one
1-hour discussion per week. A comparative analysis of
development and change in the political systems of
contemporary South Asia. 145B: Mr. Das Gupta (Sp)

*145C. Political Theory in Non-Western Societies.
(5) Formerly 145D-145E. Two 1 1/2 hours and
two 1-hour discussions per week. Political thought
in non-European societies. Mr. Lenczowski (Sp)

Comparative Politics

140A.* 140B. Process and Character of Modernization.
(5-5) Two 1 1/2 hours and one 1-hour discussion per
week. Processes of modernization in societies in
the modernization theory, conflict over the
development of political and economic social
development within the
140A: Mr. Jewell (W, Sp)

140C. Introduction to Theory and Practice of De-
velopment. (5-5) Two 1 1/2-hour lectures and one
1-hour discussion per week. Major theories of development in growth economics,
organizational behavior. The differences between bureaucratic and collegial decision-making will also be explored.

*186. Public Policy and Decision Theory. (5) Three hours of lecture and one hour of discussion per week. An inquiry into synoptic and incremental decision-making, the concept of rationality—substantive and procedural, and their relationship to democracy, pluralism, elitism and mass politics. The differences between bureaucratic and collegial decision-making will also be explored.

*187. Policy and Administration of Public Finances. (5) Three hours of lecture and one 1-hour conference per week. Financial administration in the modern state—American, comparative, historical; fiscal implications of governmental activity; the budget process in public administration; management decisions to secure administrative accountability and political responsibility.

*188. Public Opinion and Voting Behavior. (5) Three hours of lecture and one hour of discussion per week. Prerequisite: not open to students who have received credit or course 161A prior to Fall 1975. How individuals see the political world, think about it, and vote. The role of public opinion, attitudes, and political allegiance in each of these actions. 

The Staff (F, W, Sp)

Graduate Courses
A statement on admission to graduate study may be obtained from the graduate office in the department. Properly qualified undergraduates may be admitted to graduate courses or seminars with special permission of the instructor. For updated information on graduate course descriptions and faculty scheduling, consult the departmental graduate office.

Comparative Analysis Courses

200. Major Works in Comparative Analysis. (4) Two hours of lecture per week. A product of the last 10 years, comparative politics by examining major theoretical works in the field. Emphasis on the structure of authoritative diversity and its effects to the development of political change. 

*201A-201B. Comparative Analysis of Western Political Systems. (4-4) Two hours of lecture and one hour of discussion per week. An introduction to the study of politics in Western societies; development of subject matter and methodology; political culture and political behavior. The role of the political parties; the relationship of parties to governmental structures and functions. 201A. The comparative study of political parties in Western societies; development of the political parties; the relationship of parties to governmental structures and functions. 201B. The comparative study of political parties in Western societies; development of the political parties; the relationship of parties to governmental structures and functions. 

*202A-202B. Comparative Analysis of Developing Political Systems. (4-4) One 2-hour session and one
1-hour conference per week. The comparative analysis of the processes of political modernization and change in developing countries. Major emphasis will be given to comparative analytical theory and methodology. Completion of the course will be awarded upon completion of the sequence.

Mr. Price (W, Sp)

203A-203B. Comparative Analysis of Communist Political Systems. (4-4) One 2-hour session and one 1-hour conference per week. An analysis of the interrelations between Communist systems with particular reference to institutional and ideological differences. Prerequisite: completion of 218A-218B; 218C will be optional and graded separately.

Mr. Thomas (W, Sp)

Seminars

204.* Comparative Analysis. (4) Four hours of lecture per week.

Mr. Jawitt (Sp)

205. Theories for Comparative Analysis. (4) One 2-hour seminar per week.

206. The Nation-Building Process. (4) Three hours of lecture and one hour of consultation per week.

207A-207B. Revolutionary Changes. (4-4) One 2-hour session and one 1-hour conference per week. An intensive examination of the nature and aims of various forms of political theory. Attention will also be given to selected theories in the social sciences and to relevant aspects of philosophy. Credit and grade to be awarded upon completion of 218A-218B; 218C will be optional and graded separately.

Mr. Jacobson (F)

International Relations

Courses

220. Theories of International Relations. (4) One 2-hour session per week. Prerequisite: previous work in international relations. Origin, application and utility of major theories of international relations. Relation of various strands of political and social theory to international relations. Mr. Waltz (F)

222. Nationalism and Imperialism. (4) One 2-hour session per week. Themes in the theory of nationalism, illustrated with Western and non-Western case studies.

Mr. Jackson (F)

226A. International Organization. (4) One 2-hour seminar per week. The practice of collective security and collective self-defense by the United Nations and regional organizations and alliances. Mr. Bendix (W)

228A-228B. American National Security Policy. (4-4) Two hours of lecture and one hour of discussion per week. Special, but not exclusive, emphasis on United States foreign policy. The analysis of major policy problems is supplemented by discussions of the role of the United Nations and the Western Alliance in conflict-theory to policy planning and national action.

Mr. Lenz (W)

Seminars

224. Soviet Policy and International Communism. (4-4) One 2-hour seminar per week. Prerequisite: course 221A or consent of instructor. Themes to be specified each year. In-Progress grade to be assigned to students who take 224A-224B.

Mr. Price (W, Sp)

225. Marxist Theory. (4) One 2-hour session and one 1-hour conference per week.

226A-226B. Contemporary Theory and Politics. (4-4) One 2-hour session per week. The properties of theory—both classical and contemporary—as empirical and intellectual constructs with each offering. Credit and grade to be awarded upon completion of the sequence.

Mr. Jacobson (Sp)

227. International Relations and Foreign Policy. (4) Two hours of lecture per week. Themes to be specified each year. In-Progress grade to be assigned to students who take 227A-227B.

228A-228B. American National Security Policy. (4-4) One 2-hour seminar per week. 228A: Historical evolution of national security policy, processes involved in policy-making, the role of Congress and the Executive, defense and strategic stability, arms racing and arms control, the uses of military force in a future environment, and future challenges to American national security. 228B: Strategic concepts, theories of national security, and the relationship of conflict-theory to policy planning and national action. Special, but not exclusive, emphasis on United States data and policy problems.

229B. International Economic Institutions and Behavior. (4) Two data. 231C: MINI PERM. Prerequisite: course 229A. Readings and discussions dealing with changing international patterns of collaboration and conflict to meet special cases of Interest to students of international political economy.

Mr. Rose (Sp)

Area Studies

Seminars

241A-241B. Soviet Government and Politics. (4-4) Two hours per week. 241A: The historical roots of Soviet Communist Party and Soviet government. Origin, development and evolution of the political system. Mr. Seabury (W)

241A-241B. Chinese Political Development. (4-4) One 2-hour seminar per week. 241A: Historical evolution of Chinese political development. The study of the formation and evolution of the Chinese Communist Party. Mr. Breslauer (Sp)

242A-242B. Politics and Diplomacy In the Middle East. (4-4) One 2-hour seminar and one 1-hour conference per week. 242A: The nature of international relations. 242B: Strategic concepts. 242A: Geopolitics of the Middle East. 242B: Strategic concepts.

Mr. Lenz (W)

243A-243B. Contemporary Problems of the Far East. (4-4) One 2-hour seminar and one 1-hour conference per week. Mr. Seabury (W)

244A-244B. Research Seminar on Southeast Asian Politics. (4-4) One 2-hour seminar and one 1-hour conference per week. Mr. Lenz (Sp)

244A-244B. Japan. (4-4) One 2-hour seminar per week.

Mr. Dittmer (F, W)

245A-245B. South Asian Politics. (4-4) One 2-hour session and one 1-hour conference per week. Prerequisite: 245A or consent of instructor.

Mr. Rose (Sp)
American Government and Politics

262A-262B-262C. Voting Behavior and Public Opinion. (4-4-4) Two hours of lecture per week. Analysis of conflicts of various types: Intrapersonal, interpersonal, intragroup, intergroup, intragroup, intergroup. Examination of theories (psychological, sociological, political) specifying causes, structures, and consequences of conflictive and harmonious relations. Investigation of conflict perspectives in political systems and ideologies. Credit and grade awarded upon completion of sequence.

263A-263B. Seminar in Political Behavior. (4-4) One 2-hour session per week. Research and special topics in political behavior. Topics may vary from year to year.

266A-266B. Conflict and Politics. (4-4) Two hours of lecture per week. Analysis of conflicts of various types: Intrapersonal, interpersonal, intragroup, intergroup, intragroup, intergroup. Examination of theories (psychological, sociological, political) specifying causes, structures, and consequences of conflictive and harmonious relations. Investigation of conflict perspectives in political systems and ideologies. Credit and grade awarded upon completion of sequence.

267A-267B. American Urban Politics. (4-4) One 2-hour session per week. Politics and policy-making in American cities, historical, economic and social context of cities. Major urban political institutions, other levels of government in urban affairs.

268C. Public Policy and Decision Theory. (4-4) One 2-hour session per week. The process of public policy formulation, governmental planning and programming, and administrative decision-making.

Seminars

265D. The Politics of Taxation. (4-4) One 3-hour session per week. Taxation as policy and a unit of political analysis. Public organization tactics for getting taxes and revenue. Public tax preferences.

286. Governmental Planning and Societal Purpose. (4-4) Two hours per week. The principle and processes of public planning for socio-economic and ecologic-environmental objectives. Mr. Davis (W)

287A-287B. Development Administration and Political Economy. (4-4) Two hours of lecture and one hour of conference per week. The structure and function of public administration in the development process of "low-income" countries; the relationship of administration to a nation's political regime, social structure, and economic organization and objectives; an assessment of the comparative success enjoyed by various regimes in achieving their public purposes. Credit and grade will be awarded upon completion of the sequence.

Mr. Leonard (Sp)

298B. Science and Politics. (4-4) One 2-hour session and one 1-hour conference per week. The structure of science and politics, public policies and political science; scientific and social change; the governance of science and technology and the administration of science and technology.

298A-298B-298C. Research in Public Organization and Policy. (4-4-4) One 2-hour session per week. Research on local political processes, decision-making, and community power structure.

Special Studies

291. Experimental Course. (1-5) Prerequisite: consent of instructor. Topics, experimental in nature, will vary from year to year.

292. Directed Advanced Study. (4 or 8) Prerequisite: consent of instructor and graduate advisor. Open to qualified graduate students wishing to pursue special study and research under direction of a member of the staff. The Staff (F, W, Sp)

296. Directed Dissertation Research. (8) Open to qualified students advanced to candidacy for the Ph.D. degree. Must be taken on a satisfactory/unsatisfactory basis. May be repeated for credit. The Staff (F, W, Sp)

297. Independent Study in Preparation for the M.A. Examination. (4 or 8) Open only to qualified graduate students working toward the M.A. degree. Credit and grade will be awarded upon completion of the course. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

298. Professional Preparation for Teaching Assistants. (4) Special study under the direction of a staff member, with emphasis on the teaching of undergraduate courses in political science. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

299. Individual Study for Doctoral Students. (4 or 8) Individual study in consultation with the major field advisor. Intended to provide opportunity for qualified students and graders themselves for the comprehensive examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

IDS 33A-33B. American Studies. (6-5) See Interdepartmental Studies for the complete description of this course.

IDS 159. Introduction to Marxism. (6) See Interdepartmental Studies for the complete description of this course.

IDS 33A. A Nontechnical Introduction to Operations Research. (4) See Interdepartmental Studies for the complete description of this course.


IDS 280A-280B. Methods of Survey Research. (4-4) See Interdepartmental Studies for the complete description of this course.

IDS 281. Multivariate Causal Analysis of Quantitative Social Data. (4) See Interdepartmental Studies for the complete description of this course.
Psychology

Department Office, 3210 Tolman Hall


Associate Professors: Ernest H. Heth, Ph.D.; Christine Mashc, Ph.D.

Assistant Professors: James C. Coyne, Ph.D.; Enrico Jones, Ph.D.; Mary B. Matin, Ph.D.; Stephen Palmer, Ph.D.

Lecturer: William H. Saulcy, Ph.D.

Psychology represents an extremely broad discipline, ranging from the study of behavior of the simplest of organisms to the behavior of humans and groups of humans in complicated situations.

The major serves three purposes: (1) For the liberal arts student, the study of psychology provides an avenue for increased self-understanding and insight into the behavior of others. The objective study of behavior is essential to the understanding of the intellectual history of the last hundred years. (2) For students preparing for a career in psychology, the major prepares them for further training in a variety of areas. The undergraduate major in psychology does not prepare the student for a position as a professional psychologist.

The primary goal of the major is to ensure that the student becomes aware of the diversity within the discipline and of the interrelationships among the different subareas of psychology. More specifically, the major consists of: (1) a set of prerequisites, (2) a year-long course in advanced general psychology, (3) a two- or three-quarter sequence in statistics and methodology, and (4) advanced courses, laboratories, and seminars in psychology. Most students will begin requirements (2) and (3) in the junior year, although satisfaction of either or both requirements during the sophomore year is encouraged in order to allow for flexibility of course scheduling in subsequent years. It is felt that students will find the 100A-100B-100C course requirement (2) more meaningful and comprehensible if they have completed or at least initiated completion of the statistics-methodology requirement (3) prior to enrolling in 100A. If this is not possible, students should consider electing in either 101A or 102A in the fall quarter concurrently with 100A, or in 101A in the winter quarter concurrently with 100B. It is recommended that students delay the completion of either requirement until the senior year.

Students will be admitted to the major at the beginning of the fall quarter only. Applications for the major will be taken at the time of pre-admission to Psychology 100A, Tuesday, September 18. (Pre-admission for all other courses is scheduled for Thursday, September 20. See the Schedule of Classes for additional details.) Students who are unable to pre-enroll for 100A on September 18 may submit an application to the Student Services Office beginning September 1. Students will not be considered for the major after the September 18 deadline. Thus, students planning to transfer to Berkeley with a major in psychology should apply for fall quarter admission. It is not recommended that students delay the completion of either requirement until the senior year.

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pass/not pass basis. Mr. Tetlock in charge (F).

General

100A—100B—100C. Advanced General Psychology. (5-5-5) Three 1 1/2-hours of lecture and one hour of discussion per week. Prerequisites: course 1 and completion of the other upper division prerequisites for the major or consent of the instructor. Intended primarily for majors. Enrollment restricted to 300 students. See description of major for further information. A systematic introduction to the core of psychology. Will include guest lectures given by a number of members of the staff. A detailed and integrative overview of major areas of interest within psychology. Course must be taken in the A, B, C order. Statistics or concurrent enrollment in psychology recommended.

Mr. Glickman, Ms. Main, Mr. Sherman (F); Mr. Glickman, Mr. Palmer, Mr. Saullley (W); Mr. Kilman, Mr. Sargeant (Sp).

108. Environmental Psychology. (Formerly 191X) Two 1/2-hours of lecture per week. Prerequisite: course 10A 1A useful but not necessary. Survey of environmental psychology, including environmental perception and assessment; cognitive representations of the large-scale environment; environmental attitudes and dispositions; human-environmental behavior; effects of variables of indoor and outdoor environmental factors on behavior; environmental psychology and social psychology— as well as general trends.

Quantitative

101A. The Analysis of Psychological Data. (5) Two 1 1/2-hours of lecture and one 2-hour laboratory per week. Prerequisite: course 10A. Continuation of 101A with heavy emphasis on application. Students will be expected to collect and analyze their own data. Reliability, validity and level of measurement; factor analysis; principal components; Multiple regression; multiple analysis. Topics to be covered include experimental design, comparison of means, comparison of frequency distributions, tests of hypotheses, regression and correlation. Mr. Meredith (F); Mr. Keppel (W).

101B. The Analysis of Psychological Data. (5) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 10A. Continuation of 101A with heavy emphasis on application. Students will be expected to collect and analyze their own data. Reliability, validity and level of measurement; factor analysis; principal components; Multiple regression; multiple analysis. Topics to be covered include experimental design, comparison of means, comparison of frequency distributions, tests of hypotheses, regression and correlation. Mr. Meredith (W), Mr. Koppol (Sp).

102A—102B—102C. Research Design in Psychology. (4—4—4) Three 1-hour lectures and one 4-hour laboratory per week. Prerequisites: course 1 and completion of the other upper division prerequisites for the major or consent of the instructor. A broad survey of experimental design and statistical and data analytic techniques generally useful by psychological researchers. Emphasis on the formulation of scientifically testable research problems as well as the theory of measurement will be emphasized.

Mr. Jarrett (F, W, Sp).

104. Theory of Psychological Measurement. (5) Three 1-hour lectures and one 2-hour discussion/laboratory per week. Prerequisites: courses 10A—100B—100C and either 10A—101B or 102A—102B—102C, or consent of instructor. To be offered in alternate years. An introduction to the methodology of psychological measurement. Topics include the nature of reliability and validity and homogeneity. Correlation methods including multivariate regression, and introduction to path analysis and special correlational techniques will be emphasized.

105. Introduction to Multivariate Psychological Experimentation. (6) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisites: courses 100A—100B—100C and either 10A—101B or 102A—102B—102C, or consent of instructor. To be offered in alternate years. An introduction to advanced experimental methods yielding multiple measures of observations. Emphasis on multivariate prediction, regression analysis, discriminant and classification, multivariate analysis of variance, and latent class and structural analysis. Topics will vary somewhat from year to year.

Mr. Meredith (F).

106. Topical Seminars in Quantitative Psychology. (5, 6) Two 1-hour lectures per week. Prerequisites: as indicated below. For a precise schedule of courses, check with the Student Services Office each quarter. May be repeated for credit with a different topic and permission of instructor.

- 119A. Topics to be announced
- 119B—119C. Two-quarter seminar on effects of experience on brain and behavior. Credit and grade to be awarded upon completion of sequence.

Cognitive Psychology

121. Animal Learning. (5) Formerly 120. Two 1 1/2-hours and one hour of discussion per week. Prerequisite: course 100A—100B—100C or consent of instructor. Course 101A is useful but not necessary. Theoretical and experimental analysis of human learning and memory. Students who have taken 121A and wish to take 121B must have the permission of the instructor. For a precise schedule of courses, check with the Student Services Office each quarter. May be repeated for credit with a different topic and permission of instructor.

Mr. Riley (W).

122A—122B. Human Learning and Memory. (4—4) Formerly 122A—122B. Two 1-hour and one 2-hour discussion per week. Prerequisites: course 10A 1A or equivalent is useful but not necessary. 122A is recommended but not required. Survey of psychological research in the role of coding processes and organization in retention; recall and recognition; acquisition processes in verbal learning; development of learning skills and transfer of training; mechanisms of interference; long-term retention; current theories of human learning and memory. Students who have taken 122A and wish to take 122B must have the permission of the instructor.

Mr. Fink (W), Mr. Palmar (Sp).

123. Two 2-hour lectures per week. Lectures cover a broad range of topics related to the psychology of learning and memory of the auditory and the visual system.

Mr. DeVolos (Sp).

124. Psycholinguistics. (Formerly 185) Two 1 1/2-hours and one 2-hour discussion section per week. Prerequisites: course 1 and an introductory course in linguistics or consent of instructor in cognitive psychology. Examination of the relations between language and psychological processes; special attention to psycholinguistic and social psychological aspects of language behavior.

Mr. Riley (W).

125. Second Language Learning and Bilingualism. (Formerly 132) Two 1 1/2-hours and one 2-hour discussion section per week. Prerequisites: course 100A—100B—100C or consent of instructor. The role of the cognitive processes and the role of the social context in second language acquisition, including development of "interlanguages." Processing of information by bilinguals (perception, recall, sentence recognition and classification; perception and comprehension of language; attention; theoretical models and experimental techniques in the study of imagery and other cognitive processes.

Mr. Rosch (W).

126. Topical Seminars in Cognitive Psychology. (5, 6) Two 1-hour lectures per week. Prerequisites: as indicated below. For a precise schedule of courses, check with the Student Services Office each quarter. May be repeated for credit with a different topic and permission of instructor.

Mr. Tetlock (F).

128. Animal Learning

129. Information Processing. (Formerly 129) Two 1 1/2-hours and one 2-hour discussion/laboratory per week. Prerequisites: courses 100A—100B—100C or consent of instructor and, depending upon the course with which the seminar forms a sequence, course 121, 122, or 123. For a precise schedule of courses, check with the Student Services Office each quarter. May be repeated for credit with a different topic and permission of instructor.

129A. Animal Learning

129B. Human Learning and Memory

129C. Thinking and Problem Solving

129D. Psycholinguistics

129E. Information Processing

Mr. Rosch (W).

129F. Psychological Statistics

129G. Psychological Measurement

130. Topical Seminars in Cognitive Psychology. (5) Two 1-hour lectures per week. Prerequisites: consent of instructor and, depending upon the course with which the laboratory forms a sequence, course 121, 122, 124, or 126. For a precise schedule of offerings, check with the Student Services Office.

Mr. Zucker (W).
the Student Services Office each quarter. May be repeated for credit with a different topic and permission of instructor.

129A. Animal Learning Mr. Roberts (Sp)
129B. Human Learning and Memory
129C. Thinking and Problem Solving
129D. Psycholinguistics Mr. Stobin (Sp)
129E. Information Processing

Clinical Psychology

130. Principles of Psychopathology. (5) Formerly 155. Two 1/2-hour lectures and one 1/2-hour discussion per week. Prerequisite: course 100A-100B-100C or consent of instructor. The first quarter focuses on understanding the experience of "mental illness" or "emotional disturbance" from individual, family, and community points of view. The second quarter describes and evaluates traditional and new approaches to psychological treatment. Five weeks of fieldwork in community mental health centers or similar agencies. Five weeks of supervised student psychotherapy. Ms. Weinstein (Sp)

131A–131B. Clinical Psychology. (5–5) Formerly 156A–156B. Two 1/2-hour lectures and two hours of discussion per week. Prerequisite: course 100A-100B-100C or consent of instructor. Taught in two sequences. Course 131A focuses on the study of psychological problems and the implications of these modalities for psychotherapy and other forms of psychological intervention. Course 131B focuses on understanding the experience of "mental illness" or "emotional disturbance" from individual, family, and community perspectives. The course is required for students who have received credit for Psychology 131A–131B beginning Fall 1976. Critical evaluation of current theories on diagnosis and explanation of psychological difficulties. Implications of these modalities for psychotherapy and other forms of psychological intervention.

Personality Psychology

150. Psychology of Personality. (5) Two 1/2-hour lectures and one hour of discussion per week. Prerequisite: course 100A-100B-100C or consent of instructor. Course 1 contains an assessment of personality; observational procedures; the interview; problems of test interpretation and psychodiagnosis. Mr. Block (W)

151. Assessment of Personality. (5) Two 1/2-hour lectures and two hours of laboratory per week. Prerequisite: course 130 and consent of instructor. Theoretical and methodological issues in the assessment of personality; observational procedures; the interview; problems of test interpretation and psychodiagnosis. Mr. Block (W)

153. Stress and Adjustment. (5) Two 1/2-hour lectures and one 1/2-hour discussion/laboratory per week. Prerequisite: course 150 and consent of instructor. Examines stress theory and research from the clinical and laboratory settings dealing with the psychological issues involved in adjustment to life stresses.

Social Psychology

160. Social Psychology. (5) Three 1-hour lectures and two 1-hour discussions per week. Prerequisite: course 100A-100B-100C or consent of instructor. Theory and research on individual differences, family, sex, class, and race difference. Mr. Tetlock (Sp)

165. Language in Social Interaction. (5) Formerly Rheticus. Two 1-hour lectures per week. Variation in linguistic features, register, style, dialect and language in interaction, in relation to social features of participants, with emphasis on sociolinguistic rules, and strategic use to convey social meaning. Background in linguistics and psychology recommended. Mr. Tannen (Sp)

168. Attitudes, Beliefs, and Influence Processes. (5) Two 1/2-hour lectures and one 1/2-hour laboratory per week. Prerequisite: course 100A-100B-100C or consent of instructor. Theory and research in the social psychological theories and research methods in the area of small groups. Ms. Nemeth (W)

169A. Interpersonal Processes Ms. Maslach (Sp)
168B. Attitudes, Beliefs, and Influence Processes
168C. Small Group Structure and Processes
168D. Special Topic to be Announced

Differential Psychology

170. Differential Psychology. (5) Two 1/2-hour lectures and one 1/2-hour laboratory per week. Prerequisite: course 101B or 102B or equivalent course. May be taken concurrently with 170A. Personality theory and evaluation of the principal tests of abilities and aptitudes. Mr. Tuddenham (F)

171. Psychology of Abilities and Aptitudes. (5) Two 1-hour lectures per week. Prerequisite: course 101B or 102B or equivalent course. May be repeated for credit with consent of instructor. Mr. Tetlock (Sp)

Industrial-Organizational Psychology

180. Industrial-Organizational Psychology. (5) Three 1/2-hour lectures per week. Prerequisite: course 101A or 102A or consent of instructor. Primarily for majors. Introduction to the field of industrial psychology, covering fundamental theory and concepts in personnel and social aspects in the field. Concerned with the process involved in developing and maintaining organizations. Mr. Zedeck (F)

182. Personnel Psychology. (5) Two 1/2-hour lectures and two hours of discussion per week. Prerequisite: courses 180 and 101B or 102B or equivalent course. Examination of why people choose their occupations. Emphasis on the role of motivation in the development of techniques and practices in personnel selection and development. Mr. Zedeck (Sp)

183. Social Psychology of Organizations. (5) Three 2-hour lectures and one 1/2-hour discussion per week. Prerequisite: course 180 or consent of instructor. Social psychological theories and current research with emphasis on the social, motivational, and attitudinal aspects of the work environment.

NOTE: For key to symbols, see page 35.
Special Course Offerings

190. Cluster Seminars, (1-2) Two hours of lecture per week. Prerequisites: Psychology major and admission to cluster program. Weekly discussion on the nature, methods, and problems of contemporary research in psychology. Course to be taught on a pass/not pass basis. Mr. Tellock (F)

191D. Applications of Biological Psychology to Problems in the Field. (4) Three 2-hour lectures per week. Prerequisite: Psychology 110 or the equivalent. A survey of contemporary psychological approaches to the problems of mental disorders. Behavior changes following human brain injury and disease, and mental subnormality. Emphasis on nervous system models of these problems and areas of potential application of basic research developments. To be offered 1979/80 and 1980/81 only.

Mr. Leiman (F, W, Sp)

197. Field Study in Psychology, (1-6) Individual conferences to be arranged. Prerequisite: course 1; appropriate upper division work in psychology (to be determined by instructor); consent of instructor. Supervised experience relevant to specific aspects of psychology in off-campus settings. Individual and/or group meetings with faculty sponsor and written report required. Offered on a passed/not passed basis only. (May be repeated for up to 10 units total)

The Staff (F, W, Sp)

Graduate Courses

Graduate standing and consent of the instructor are prerequisites for all graduate offerings. (Undergraduates may enroll only upon approval of a faculty adviser and consent of the instructor.) Courses beginning each decade are designated as seminars and are designed to have the background essential to entering students planning to concentrate in that area of specializa-
tion. These seminars are sufficiently general, however, for students from other areas of Psychology to obtain breadth of training in complementary areas of study. Most seminar courses are self-contained and may be taken separately. For most the sequence is not critical. See instructor before enrolling.) Students from other areas of Psychology who plan to enroll in these seminars are strongly advised to take the introductory courses in the area of specialization that are the prerequisites for these seminars.

Quantitative

200A. Proseminar: Survey of Hypothesis Testing, (5) Three 2-hour lectures per week. Complex analysis of variance, nonparametric and large sample hypothesis testing. Model fitting will be stressed as will post hoc comparison procedures. Mr. Ort (F, Sp)

200B. Proseminar: Regression and Test Theory, (5) Three 1 1/2-hour lectures per week. Correlation analysis, regression analysis, chi coefficients, reliability, validity, latent trait models, test theory. (W) Mr. Roberts (W)

200C. Proseminar: Factor Analysis and Other Multivariate Analyses, (5) Three 1 1/2-hour lectures per week. Factor analysis, discriminant analysis, and introduction to component analysis and factor analysis. Mr. Meredith (Sp)

**201A–201B. Design and Analysis of Psychological Experiments, (5-6) Hours of lecture per week. Prerequisites: 201A none; 201B, course 201A or consent of instructor. Design and statistical analysis of psychological experiments are examined from an intuitive and practical point of view. Stress is given to the inter-
relationship between research design and the analytical analysis of an experiment. 201A, which may be taken by itself, will consider the most common designs found in psychological experiments. 201B is a continuation of 201A and will cover the design and analysis of more complicated experimental designs, and additional
topics of interest.

202A–202B. Computers in Psychology, (2-3) Two 1 1/2-hour lectures per week. Survey course on the use of computers in psychology (A) hardware design and interface; on-line control of experiments; levels of computer design; experimental computer techniques; (B) complex statistical programs; computer models of psychological processes. Must be taken on a satisfac-
tory/unsatisfactory basis. Either A or B may be taken separately. 202B: Mr. Palmer (F)

206. Quantitative Seminar, (1) One 1 1/2-hour lecture per week. Prerequisite: graduate standing or consent of instructor. Group study of selected topics in the quantitative research in the area of quantitative psychology. Not all participants need report in any given quarter, but all are expected to attend and to enter into the discussions. Required course for all students in the quantitative graduate program. Satisfactory/Unsatisfactory basis only.

Mr. Meredith in charge (F, W, Sp)

Biological

**210A. Proseminar: Sensory Processes, (5) Three 2-hour lectures per week. A discussion of selected topics in sensory physiology and psychophysics.

**210B. Proseminar: Animal Behavior, (5) Three 2-hour lectures per week. A consideration of the biological processes that underlie the capture, storage, and retrieval of information. Discussion and concepts not only from behavioral and clinical investigations but also from neighboring fields including neurochemistry, neuroanatomy, and neuro-
physiology.

210D. Proseminar: Perception, (5) Three 2-hour lectures per week. This course will cover both the classical literature on visual and other recent information-processing material. An attempt will be made to relate these studies to our knowledge of the physiological bases of vision.

Mr. DelVatois (Sp)

**211. Hormones and Behavior, (5) Three hours of lecture per week. Prerequisite: course 210A, 210B, 210C. An introduction to the role of hormones in the mediation of male and female reproductive behaviors, including emphasis on hormones in the process of sexual differentiation and sex roles in behavior. Discussion of parental behavior, seasonal reproduction, and of hormonal involvement with various non-repro-
ductive processes, including eating, social behavior, and mood changes. Emphasis on mammalian species. To be offered alternative years.

**212. Biological Clocks and Animal Behavior, (5) Three 2-hour lectures per week. Prerequisite: course 210A, 210B, 210C. A description of former models of entrainment and generation of circadian rhythms. Consideration of the role of circadian processes in photo-
tics and other periodic time mechanisms and emphasis on seasonal reproductive cycles. Discussion of chemical and neural basis of circadian rhythms and visual mechanisms by which entrainment to the light-dark cycle occurs. Will be offered every other year.

219. Biological Seminar, (1) One 1 1/2-hour lecture per week. Prerequisite: graduate standing or consent of instructor. Reports and discussions of original research in the area of biological psychology. Not all participants need report in any given quarter, but all are expected to attend and to enter into the discussions. Required course for all students in the biological graduate program. Satisfactory/Unsatisfactory basis only.

Mr. Rosenzweig in charge (F, W, Sp)

Cognitive

Note: course 240D and 240E form part of this se-
quence.

**220A. Proseminar: Information Processing, (5) Three 1 1/2-hour lectures per week. Prerequisites: 220A none. Information processing of visual, auditory, and symbolic information, including topics such as: iconic storage, pattern recog-
nition, classification and concepts in imagery, att-
tention, semantic memory, computer simulation.

220B. Proseminar: Conditioning and Discrimi-
 nation Learning, (5) Three 1 1/2-hour lectures per week. Prerequisites: 220A. Proseminar: Conditioning and Discrimina-
tion Learning, with material taken both from hu-
nan and animal literature, but with emphasis on the animal.

Mr. Roberts (Sp)

**220C. Proseminar: Human Learning and Memo-
ry, (5) Three 1 1/2-hour lectures per week. Theoretical and experimental analysis of human learning, transfer, and memory. Stress will be given to the learning and retention of verbal materials.

**220D. Proseminar: Problem Solving, (5) Three 1 1/2-hour lectures per week. Theories, methods, and applications of mental processes in convergent and divergent thinking, especially creative problem solving and productive thinking. Topics include cognitive and dispositional factors in convergent and divergent thinking, computer simulation, and the measurement and training of prob-
lem-solving effectiveness.

229. Cognitive Seminar, (1) One 1 1/2-hour lec-
ture per week. Prerequisite: graduate standing or con-
sent of instructor. Reports and discussions of original research in the area of cognitive psychology. Not all participants need report in any given quarter, but all are expected to attend and to enter into the discussions. Required course for all students in the cognitive gradu-
ate program. Satisfactory/Unsatisfactory basis only.

Clinical

230A. Proseminar: Theory and History of Clinical Psychology, (5) Two hours of lecture and one hour of clinical work per week. Prerequisite: consent of instructor. Examination of major theoretical and historical themes in the development of clinical psychology. Special attention to concepts of mental health and psycho-
pathology, models of intervention and clinical re-
search, and emerging professional roles and functions.

Mr. Korchin (F)

230B. Proseminar: Community Psychology, (5) Two hours of lecture and one hour of clinical work per week. Practical application of psychological principles to psychological problems through group work for community psychology; history, scope, and direction of field; examples of social and community interventions; methodology for testing inter-
ventions and assessing their effectiveness.

Ms. Weinstein (W)

**230C. Proseminar: Child Clinical Psychology, (5) Two hours of lecture and one hour of clinical work per week. Prerequisite: consent of instructor. An examination of three major theoretical views of child development: neo-Freudian (Anna Freud), cognitive-developmental (Piaget, Kohlberg), and one theory of family psychopathology (Satir, et al.). Implica-

231A–231B–231C. Theory and Method of Clinical Assessment, (3–3–3) One 2-hour lecture per week. Prerequisites: first-year status as graduate student in Clinical Psychology or consent of instructor. Must be taken in conjunction with psychology 237A– 237B– 237C. Principles and techniques of intelli-
gent, objective, and creative personality testing. In the context of personality theory and psychology of human behavior, the development of all first-year clinical students. Credit and grade award-
ning upon completion of the three-quarter sequence.

232A. Psychotherapy: Theory, (3) Two hours of lecture per week. Prerequisite: consent of the instructor. In-depth exploration of the major theories of psycho-
therapy with an emphasis on the role of theorizing and classroom discussion. Orientations toward personal change that will be covered include psycho-
analytic approaches, behavior modification, Gestalt and other humanistic schools, as well as systems theory.

Mr. Jones (F)

**232B. Psychotherapy: Research, (3) Two hours of lecture per week. Prerequisites: consent of the instruc-
tor. Examination of research in psychotherapy, includ-
ing its historical development, problems in method, innovative approaches to psychotherapy, and the role of the therapist in the psychotherapy process. Special attention will be brought to bear on the implications of research findings for clinical practice.

sulator. Reading and discussion of literature in the field of group psychotherapy. Classes focus on theory, research, and methods of intervention.

234A. Child Therapy, (3) One-two hour lecture per week. Prerequisites: 233A–233B–233C, 231A–231B–231C and/or consent of instructor. Reading and dis-
cussion in the study of therapy with children. Discuss-
ion of innovative approaches to investigation, and current

Mr. Block (F)

234B. Family Therapy, (3) One-two hour lecture per week. Prerequisites: 233A–233B–233C, 231A–231B–231C and/or consent of instructor. Reading and dis-
cussion in the study of therapy with families. Discuss-
vions focus on theory, research, and methods of inter-
vention. Ms. Burton (W)

**235. Community Psychology. (3) One 2-hour lec-
ture per week. Prerequisite: 230A-230B-239C, 23A-
23B-23-1C and/or consent of instructor. Reading and dis-
cussion of readings in social psychology. Discussion focuses on theory, research and method of inter-
vention.**

[237A–237B–237C. Laboratory in Clinical Assess-
ment and Evaluation. Three 1 1/2-hour laboratory per week. Prerequisite: consent of instructor. Supervised pracicum in clinical interviewing, and in the administra-
tion and interpretation of psychological tests. In two-
hour sections per week, students are expected to attend and to enter into discussions. Required course for all students in the Graduate Personality Program. Satisfactory/Unsatisfactory basis only. Ms. Weinstein in charge (F, W, Sp)

**Developmental**

**240A. Proseminar: Early Cognitive Develop-
ment. (5) Three 1 1/2-hour lectures per week. Broad coverage of theory, methods, and research findings pertaining to cognitive development in the first two years of life. Specific content areas to be emphasized will include learning processes, memory, and socialization.**

**240B. Proseminar: Human Ethology and Early Social Development. (5) Three 1 1/2-hour lectures per week. The work of current British and American experts on human development will be critically reviewed. Influences on early social develop-
ment and development of attachment relations will be emphasized.**

**240C. Proseminar: Socialization and Personality Development. (5) Three 1 1/2-hour lectures per week. The focus of the course is on the antecedents and correlates of personality development and early social behavior and competencies of children. Related issues will be surveyed (particularly parent-child relationships and peer influences) and relevant research findings reviewed. Research methods and methodological problems will be emphasized.**

**240D. Proseminar: Cognitive Development. (5) Three 1 1/2-hour lectures per week. Stages and struc-
tures of cognitive development as exemplified in infancy through formal operations in adolescence and adulthood, with focus upon the progressive con-
struction of logical and physical concepts. As relevant, developmental aspects of symbolization, perception, and learning will be considered. Mr. Langer (F)

**240E. Proseminar: Language Development. (5) Three 1 1/2-hour lectures per week. Child language development within the theoretical and methodological framework of psycholinguistics. Review of phonologi-
cal, grammatical, semantic, and sociolinguistic develop-
ment, considered in relation to developmental models, with special attention to interactions between lin-
guistic and cognitive development and to the develop-
ment of language within communicative context. Mr. Stobin (W)

**240F. Proseminar: Development of Behavior Problems. (3) Three 1 1/2-hour lectures per week. Extensive coverage of theoretical and research litera-
ture pertaining to the development of a broad range of behavior problems, their origins, diagnoses, and treat-
ment. Discussion will focus upon normality and dis-
crepancy in emotional and social development. Discuss-
ton will stress the need for intervention. The staff (F, W, Sp)

**249. Developmental Seminar. (1) One 1 1/2-hour lec-
ture per week. Prerequisite: graduate standing or consent of instructor. Reports and discussions of original research in the area of social psychology. Not all participants need report in any given quarter, but all are expected to attend and to enter into discussions. Required for all students in the Graduate Personality Program. Satisfactory/Unsatisfactory basis only. Mr. Mussen in charge (F, W, Sp)

**Personality**

**250A–250B. Proseminar Courses in Personality Psych-
ology. (5–5) One 3-hour lecture per week. Basic-
fundamental issues in personality psychology. Discussion of topics varies from year to year. Emphasis on analysis of significant research paradigms.**

**251A–251B–251C. Personality Assessment. (5–5–5) Three 1 1/2-hour laboratory per week. Prerequisite: Ph.D. candidate in personality psychology or consent of instructor. Lectures and laboratory work on personality assessment, in-
cluding (A) the history and background of assessment and the design of an assessment program, (B) con-
ducting an assessment interview, (C) preparation of research reports, and methods of data analysis.**

**253A–253B–253C. Appraisal of the School-Age Child. (5–5–5) Two 1-hour laboratories or equivalent. Field work, one hour individual recitation, and one hour lecture/discussion per week. Prerequisite: graduate standing or consent of instructor.**

**259. Personality Seminar. (1) One 1 1/2-hour lec-
ture/discussion per week. Prerequisite: graduate standing or consent of instructor. Reports and discus-
sions of original research in the area of personality psychology. Not all participants need report in any given quarter, but all are expected to attend and to enter into the discussions. Satisfactory/Unsatisfactory basis only.**

**Social**

**260A. Proseminar: Attitudes, Motivation, and Organizational Behavior. (5) One 3-hour meeting per week.**

**260B. Proseminar: Social Interaction Processes: Small Groups. (5) One 3-hour meeting per week.**

**260C. Proseminar: History and Systems: Inter-
personal Behavior. (5) One 3-hour meeting per week.**

**289. Social Seminar. (1) One 1 1/2-hour lecture per week. Prerequisite: graduate standing or consent of instructor. Reports and discus-
sions of original research in the area of social psychology. Not all participants need report in any given quarter, but all are expected to attend and to enter into the discussions. Required course for all students in the social graduate program. Satisfactory/Unsatisfactory basis only. Mr. Zeckos in charge (F, W, Sp)

**Special Course Offerings**

**290. Seminars. (3) (a) Measurement, (b) Biological, (c) Cognitive, (d) Developmental, (e) Thinking, (f) Language and Communication, (g) Develop-
mental, (h) Personality, (i) Social, (k) Clinical, (l) Di-
ferential (m) Industrial, (n) Mathematical Models in Learning and in Psychophysics, (o) Analysis of Vari-
techniques, (p) Additional seminars on special topics to be announced. (G) Cognit.**

**298. Directed Study. (1–5) Special study under the direction of a member of the staff.**

**299. Research. (1–5) Individual research.**

**300. Seminar in the Presentation and Teaching of Psychological Material. (3) One 3-hour lecture per week. Principles and methods of the presentation of psychological materials, including the development of course outlines, demonstrations, class discussions, laboratory exercises, problem sets, and written assignments with emphasis on the teaching of undergraduate courses in psychology. May be re-
peated for credit.**

**401A–401B–401C. Clinical Internship (Psychology Clin-
ics). (1–12; 1–12; 1–12) Prerequisite: consent of the Head of the Clinic. Individual programs of case study in the practice of clinical supervision provided by the Psychology Clinic maintained by the Department of Psychology for study, treatment and research on prob-
lems of mental health.**

**402A–402B–402C. Clinical Internship (Off-
campus). (1–12; 1–12; 1–12) Prerequisite: consent of the Clinical Internship Committee. Individual programs of practice and supervision in approved off-campus agencies. Credit and grade of supervisor awarded on comple-
tion of the internship appointment.**

**602. Individual Study for Doctoral Students. (1–3) Individual study in consultation with the major field ad-
viser, intended to provide opportunity for qualified stu-
dents to prepare themselves for the various examina-
tions required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis only.**

The Staff (F, W, Sp)

IDS 122. Animal Behavior. (6) See Interdepartmental Studies for a complete description of this course.

**IDS 190A–190B–190C. Principles and Applica-
tions of Psychoanalysis. (3–3–3) See Inter-
departmental Studies for a complete description of this course.**

**IDS 203A–203B–203C. Concepts of Mental Dys-
function. (3–3–3) See Interdepartmental Studies for a complete description of this course.**

**IDS 204. Animal Behavior Research Reviews. (1) See Interdepartmental Studies for a complete descrip-
tion of this course.**

**IDS 217A–217B–217C. Theoretical Concepts in Men-
tal Health. (3–3–3) See Interdepartmental Studies for a complete description of this course.**

**IDS 242. Environmental Psychology. (4) See Inter-
departmental Studies for a complete description of this course.**

**IDS 272. Neuropsychology of Language. (4) See Interdepartmental Studies for a complete description of this course.**

**Religious Studies**

**Group Major Office, Division of Special Pro-
grams, 301 Campbell Hall**

Advisors: Mr. Gerard Caspary (Christianity), Mr. Bar-
uch M. Boker (Judaism), Mr. William Brinner (Islam), Mr. Michel Strickman (Buddhism), Mr. P. S. Jaini (Hindu-
ism), Mr. Juergensmeyer (General Studies); other ad-
visors: Mr. Wei-ning Tu.

**Group Major in Religious Studies**

The group major program is administered through the Division of Special Programs. Students are referred to this office for all administrative matters, and this is where major students will file their study lists.

The group major in religious studies offers specialization in one of five major religious traditions or in more general religious studies, with a certain amount of credit considered either toward the major pri-
marily for its intrinsic value or as preparation for gradu-
ate work in religion or related areas rather than as preparation for theological studies or a ministerial ca-
rier, though it could serve the latter purposes for some re-
ligious studies courses. Most religious studies courses are open to non-majors. Because of the wide variety of approaches possible in the academic study of religion and the need for detailed work in one or more of these approaches, students are encouraged to begin as early as possible in their careers. This is especially true for students contemplating specialization in a particular cultural area or attempting the degree with honors, as these require a reading knowledge of, and if possible upper division work in, a scriptural language. Note that the introductory course, Religious Studies 90A–90B–90C, should be taken consecutively and before the selection of the individual program by undergraduate students. Students already majoring in religious studies under the old pro-
gram may see their adviser about desired changes in their program.

In addition to the courses listed below, the Advisory Committee on Religious Studies maintains a revised list of special programs and courses of general interest for students of religious studies (some of which can be included in the major offerings with consent of the adviser). Berkeley students may also take for credit (outside the major) courses at the neighboring Graduate Theological Uni-

cation. Consult the Group Major Office concerning the approval required. With adviser approval, religious studies students may use up to two of these courses for credit toward completion of the major.

NOTE: For key to symbols, see page 36.
Major Program

One course, to be taken by all major students and before selection of the field of specialization by area studies students: Religious Studies 90A–90B–90C, Introduction to the Study of Religion (4–4–4).

Courses in Area Studies or General Studies, as indicated below (substitutions can sometimes be made with the consent of the adviser):

I. Area Studies. Students desiring to major in a religious tradition plus one of those which appear below, e.g., Confucianism and/or Taoism, pre-Christian European religions, etc., may sometimes do so with the guidance of an adviser and, if necessary, a faculty member from outside the program. With the guidance of the adviser, advanced language courses that emphasize readings from religious texts can be substituted for the elective courses in each area.

A. Christianity. Recommended: Students intending to go on to graduate school in Christianity are encouraged to begin studying Latin or Greek. Required (five courses): History 108A (5) or 117A (5); 108B (5) or 117B (5); 108C (5); Religious Studies 120A–120B (5–5). Two of the five core courses in General Studies; two courses in other traditions, one of which must be an Eastern religion. Additional courses, if required, from the following list to make a total of at least 45 upper division units: Classics (Greek) 125 (4); Comparative Literature (Asian) 127 (4); English 116 (5), 120A–120B (5–5), 154 (5); History 108A–108B (5–5), 114A (5), 117A–117B (5–5), 121 (5); Italian 108A–108B–109C (4–4–4), 130 (4); Near Eastern Studies 15A–15B (4–4), 152 (4); Philosophy 168 (4), 194 (4), 195 (5); Scandinavian 175A–175B (5–5); Slavic 146 (5).


D. Hinduism. Recommended: Students intending to go on to graduate school in Hinduism are encouraged to begin studying Sanskrit. Required (six courses): Intertropical Studies 155 (4); South and Southeast Asian Studies (South Asian) 10A–10B (5–5), 127 (4), 131 (4), 140 (4). Two of the five core courses in General Studies; two courses in other religious traditions, one of which must be a Western religion (Christianity, Judaism, or Islam). Additional courses, if required, from the following list to make a total of at least 45 upper division units: History of Art 136A–136B (5–5); History 141 (4), 160 (4). Additional courses in other religious traditions, one of which must be a Western religion (Christianity, Judaism, or Islam). Additional courses, if required, from the following list to make a total of at least 45 upper division units: Classics 141 (4), 142 (4), 143 (4); South and Southeast Asian Studies (South Asian) 140 (4), 141 (4).

II. General Studies. Classics 178 (4) or Comparative Literature 165 (5); Philosophy 112 (4); Religious Studies 115 (4); Sociology 146 (5). Three courses in a particular area of religious tradition (see Area Studies lists).

Additional courses, if required, from the following list, or any non-language courses listed under the separate area studies, to make a total of at least 45 upper division units: Anthropology 158 (5); Classics 175A–175B (4–4); Near Eastern Studies 161A–161B (4–4); Philosophy 191S (5); Scandinavian 160 (4); Sociology 165 (4).

Honors Program. Students majoring in either Area Studies or General Studies may elect to attempt graduation with honors if they have done well in both general university work and the major courses at the beginning of their senior year. Required are upper division work in a language relevant to the student's academic program (with consent of adviser) and the submission of a bachelor's thesis as a culmination of Religious Studies H155A–H155B, the thesis to be approved by both the adviser and the student's thesis director, if these are different.

Letters and Science List of Courses: 162 units from the list must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the list.

Lower Division Course

90A–90B–90C. Introduction to Religious Studies. (4–4–4) Three hours of lecture per week. A three-quarter series designed as a survey of major religious traditions and themes, and introduction to various approaches to religious studies. 90A surveys basic teachings of various cultural areas, 90B examines major themes which appear cross-culturally, and 90C considers the ways in which religion has been studied and interpreted. Mr. Juergensmeyer (F, W, Sp).

Upper Division Courses

115. Mysticism. (4) Three hours of lecture per week. Studies in the literature and piety of various mystical traditions, including readings of scripture, lyrical poetry, spiritual discourse, autobiography, etc. The relationship of several forms of mysticism to their religious traditions will be treated.

120A–120B. The Origins of Christianity. (4–4) Three one-hour meetings and one hour of discussion per week. The development of Christianity, its relationship to the historical development of the New Testament; the relationship of the movement of the Gospel with special attention to Mark, Early Christianity and the Theology of Paul. May be repeated for credit, with consent of the instructor. (F, W).

190. Topics in the Study of Religion. (4) Three hours of lecture per week. Selected problems in religion and theology. Topics will vary. (F, W, Sp).

H195A–H195B. Honors Course. (4–4) Hours to be arranged. Format and nature of program to be announced by professor at beginning of term. Credit assignment: student may enroll for a total of 4 units one quarter, or 8 units for two quarters, with credit to be earned upon completion of a successful thesis. The work may take one or two quarters at the option of the instructor and the student. Failure to complete credit requirements formally, but not necessarily, mean the awarding of honors. (F, W, Sp).

198. Directed Group Study for Upper Division Students. (1–6) Two to five hours per week. Tutorial instruction in areas not covered by regularly scheduled courses. The Staff (F, W, Sp).

199. Supervised Independent Study and Research. (1–15) May be repeated for a total of 15 units. (In addition, Enrollments in 199 are restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.)

Related Courses in Other Departments

Afro-American Studies 186A. The Black Church: A Historical Perspective. (5)

Afro-American Studies 186B. Sociology of Black Religion. (5)

Classics 26. The Classic Myths. (4)

History 103. Proseminar: Problems in Interpretation and Research in the Several Fields of History. (5)

History 104. Special Topics in the Various Fields of History. (5)

History 120. The Renaissance. (5)

History 135B. European Jewish History Since 1917. (5)

History 176. Religion in American Society. (5)

Near Eastern Studies 35. Introduction to Judaism. (4)


Philosophy 102. Practical Ethics. (4)

Philosophy 104. Ethical Theories. (4)

Political Science 115A. History of Political Theory. (5)

Rhetoric 131. Rhetoric of Religious Discourse. (5)

Rhetoric

Department Office, 2125 Dwinelle Hall

Professors:

Robert L. Belote, Ph.D.

William J. Brandt, Ph.D.

Donald B. Chapman, Ph.D.

Leonard Nathan, Ph.D.

Earl H. Richardson, Ph.D.

Barbara Shapiro, Ph.D.

Thomas O. Sloane, Ph.D.

(Chairman, Fell)

Associate Professors:

Arthur J. Quinn, Ph.D.

Seymour B. Chatman, Ph.D.

Daniel F. Melia, Ph.D.

(Chairman)

Assistant Professors:

Bridget Connolly, Ph.D.

John Leopold, B. Litt.

Lecturers:

Fred S. Stripp, Th.D.

Ward E. Tatber, A.B., L.H.D.

(Non.) (Emeritus)

Departmental Major Advisers: Ms. Connolly, Mr. Leopold, Mr. Melia.

Graduate Adviser: Mr. Sloane.

Rhetoric defines the communicative relationship between author and audience. This approach to written and spoken communication, of whatever type, necessitates the consideration of the author's intention to persuade, entertain or inform the audience through some form of discourse. Modern rhetoric adapts classical theories of persuasion to all forms of discourse, and is also concerned with the extension and development of rhetorical theory itself.

The aim of the department's undergraduate program is to graduate majors who are sophisticated readers in a wide range of discourse, who can present and defend their interpretations persuasively, whether orally or in writing, and who are prepared to develop effective arguments in the areas studied, once the relevant knowledge has been acquired. Students in the major program progress from the mastery of basic skills to the study of theory and history and complete their work with an understanding of both in courses applying theory to the analysis of texts. Graduate courses deal with rhetorical theory, its history, and its application to special topics.

Major Program

To complete their major, students must take Rhetoric 1A–1B (or 10), 30, 31, 32 A (formerly 1C) and 32 B (formerly 32), plus forty units of upper division work. It is highly recommended that the lower division courses be taken in numerical order. Note that Rhetoric 2 (formerly 1D) is not a required course and may be taken at any time after the 1A–1B (or 10) requirement has been completed. The upper division work must include Rhetoric 100 and at least one 5 unit course from each of the following categories:

I. Theory and History of Rhetorical Practice.
Theory Courses explore the major efforts to establish a philosophical basis for rhetorical practice. History Courses familiarize the student with rhetoric as a continuous part of Western intellectual tradition from the Classical period to our own time: Rhetoric 101-104, 115, 123, 126, 129, 162.

II. Rhetoric Discourse. These courses examine the ways in which modes such as lyric poetry, the novel, and the film achieve their special impact on audiences: Rhetoric 111, 122, 124, 127, 128, 135, 142, 143, 145, 159.

III. Argumentative and Declarative Discourse. These courses provide methods for analyzing the persuasive strategies employed in various kinds of argument including legal, political, scientific, philosophic, historical, and religious: Rhetoric 110, 130, 131, 152, 153, 154, 155, 156, 161, 164, 169, 171, 172, 173, 174, 175.

For students in the major program, Rhetoric 1A-1B (or 30 and 30) are prerequisite to all upper division courses unless otherwise specified. These prerequisites apply to non-majors only where specified in the course descriptions. Grade C- or higher in courses Rhetoric 30, 31, and 32A-32B is required to receive credit toward completion of the major program. A maximum of five units of each Field Studies in Rhetoric (197) and Discussion courses (189) may be allowed toward completion of the major on prior approval of the major adviser.

Passed or Not Passed. No course taken passed or not passed may be used to satisfy a requirement for the major.

Honors Program. A thesis is required of all majors seeking the degree. A dean's approval is all. Further, a grade of credit for Rhetoric H180 may be applied toward graduation for this project. To receive departmental honors the student must complete the honors course with a B+ or higher and have an overall grade-point average of 3.5 or better, and a grade-point average of at least 3.3 in all Rhetoric courses.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Program

The Department of Rhetoric offers programs leading to both the M.A. and Ph.D. degrees. Students are admitted to either degree only upon recommendation of the major department or institution and the Graduate Adviser.

1A-1B. The Craft of Writing, (5-5) Four to 4 1/2 hours of meeting per week. Prerequisite: Subject A or exam is prerequisite for 1A. Course 1A or equivalent is prerequisite for 1B. Rhetorical approach to reading and writing argumentative discourse. 1A: Close reading of assigned works: written themes developed from class discussion and analysis of rhetorical strategies. 1B: Intensive argumentative writing drawn from course readings and through selected readings and class discussion. The Staff (F, W, Sp).

2. Fundamentals of Oral Argument. (5) Formerly 10D. Four to 1 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. An introduction to the strategies of oral persuasion, with emphasis on the application of the craft and practice of public speaking. Mr. Slone (F, W, Sp).

10. Principles of Argumentation. (5) Four to 1 1/2 hours of lecture per week. Emphasis on the selection of evidence, inference, induction, deduction, semantic arguments, arguments from authority, and rhetorical strategies for analysis of works. Students are allowed as well as required to create argumentative prose. Required of those students who wish to complete a major in Rhetoric and who did not take Rhetoric 1A-1B.

The Staff (F, W, Sp).

30. Rhetorical Theory and Practice. (5) Formerly 117. Four to 4 1/2 hours of lecture per week. An introduction to rhetorical analysis, designed to familiarize the student with the basic concepts and terms of the discipline. Emphasis will be upon argumentation, but much of the material covered will be informative. Rhetoric 30 is prerequisite to all upper division courses unless otherwise specified. Mr. Brandt.

31. Aristotle and Classical Rhetoric. (5) Formerly 111. Four to 4 1/2 hours of lecture per week. An historical survey of the development of rhetorical theory in the Classical Age. Emphasis will be on the important documents, especially Aristotle's Rhetoric, and on the changing conception of rhetorical issues and practice. The Staff.

32A. Fundamentals of Oral Interpretation (5) Formerly 10C. Four to 4 1/2 hours of lecture per week. The use of oral performance as a critical instrument in the rhetorical analysis of literature. The literature is primarily, though not exclusively, that of the classical age. Rhetoric 32A, which is the prerequisite for this course. Rhetoric 32B will expand the principles acquired in Rhetoric 32A into rhetorical analysis of narrative and dramatic genres.

Mr. Slone (F, W, Sp).

Upper Division Courses

100. Modern Rhetorical Theory. (5) Formerly 112. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. A close reading of the works of those modern students of language whose point of view can be described as rhetorical—Ricard, Burke, Cassirer, and others. Mr. Quinn.

101. Rhetorical Theory and Practice: Middle Ages. (5) Formerly 154. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. A consideration of the rhetoric of the Middle Ages. Examination of the way in which various rhetorical principles and patterns inform such medieval modes of expression as allegory, romance, fabliau, sermon, saint's legend, etc. Ms. Richmond.

102. Rhetorical Theory and Practice: Renaissance. (5) Formerly 15A. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. Consideration of the special problems of an author's or speaker's presentation of self in relation to the character of the intended audience. Mr. Slone, Ms. Shapiro.

103. Rhetorical Theory and Practice: Seventeenth Century. (5) Four to 4 1/2 hours of lecture per week. Consideration of the special systems of an author's or speaker's presentation of self in relation to the character of the intended audience. Ms. Shapiro.

104. Rhetorical Theory and Practice: Nineteenth Century. (5) Four to 4 1/2 hours of lecture per week. Consideration of the special systems of an author's or speaker's presentation of self in relation to the character of the intended audience. Ms. Slone.

110. Advanced Argumentative Writing. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Any of 1A-1B or permission of instructor. Intensive practice in argumentative writing, mainly on topics of current concern. Special sections for Rhetoric majors. The Staff.

111. The Practice of Poetry, (3) Three hours of lecture per week. Prerequisites: Rhetoric 32A, 30, or consent of instructor. A rhetorical approach to composing poetry. Students will be expected to read their work aloud and criticism will be in large measure directed to questions of effective tonality in terms of the writer's understanding of the rhetorical problems involved and with a different instructor. Mr. Nathan.

115. Rhetoric and Aesthetics. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. History of the theory of poetic speech. Special attention to conceptions of speaker, situation, intention, language, meaning, form, and style. Emphasis on the definition and knowledge. Special sections for Rhetoric majors. Mr. Chatman.

121. The Rhetoric of the Novel. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. An examination of the novel, working from an identification of basic concepts and units to gross structure, directed toward an understanding of the relationship of structure to meaning. Mr. Willy.

122. Rhetoric of Drama. (5) Formerly 122A, 122B. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. A consideration of the way characters are created in drama by repetitive rhetorical patterns and the way themes are defined by the manipulation of such patterns. Topic to be announced. May be repeated once for credit as subject changes.

123. Narrative Structure in Fiction and Cinema. (5) Former to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. A survey of narrative types from the simple tale to the most complex modern fiction, including advanced topics like the stream of consciousness. Emphasis will be on the definition and analysis of narrative, rather than on content and thematic analysis. Mr. Chatman.

124. Rhetoric of Poetry, (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Consideration of the relation between the poetic discourse largely defined by figures of speech and overall poetic structures. Mr. Brandt.

126. Rhetoric of Symbolism. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. The functions of language in literature, especially poetry; the literary symbol; the nature and function of figures of speech in ritual. Mr. de Melo.

127. Film Auteurs. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. The concept of style and stylistics in general, and the stylistic study of films in particular. The auteur theory. Concentration generally is on one or two directors (e.g. Antonioni, Bergman, Resnais). Course may be repeated for credit as course content changes.

128. Novel into Film. (5) Five to six hours of lecture per week. Prerequisite: Rhetoric 123 or equivalent and permission of instructor. A close examination of the practice of writing theatrical novels, which typically five novels will be read and their filmed versions examined closely; the focus will be on problems arising in the adaptation. Mr. Chatman.

208. Theories of Film. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: one UC film class. Classical theories of film by Eisenstein, Arnheim, Kracauer, and others. Consideration of the nature of a realistic film in terms of narrative. Only one or two films will be analyzed in great depth to test the power of the various theories.

130. Political Oratory. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 123 or equivalent and permission of instructor. A close examination of the practice of writing theatrical novels, which typically five novels will be read and their filmed versions examined closely; the focus will be on problems arising in the adaptation. Mr. Chatman.

131. Rhetoric of Religious Discourse. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Consideration of the rhetoric of hermeneutics or religious persuasion with special emphasis on the poetics of the Bible. Mr. Maffia.

132. Rhetoric of Narrative Genre in Non-Literary Context. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. An investigation of the rhetorical and cultural principles governing a variety of oral and written genres—non-literary societies. Mythic, epic and folk narratives will be considered, as well as written works from cultures in transition. Mr. Maffia.

142. The Lyric Mode. (5) Formerly 171. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. An investigation of the rhetoric of hermeneutics or religious persuasion with special emphasis on the poetics of the Bible. Mr. Maffia.
hours of lecture per week. Prerequisite: Rhetoric 30, Rhetoric 1C and 32 or 1C and 144, or consent of instructor. Qualities of the various lyric modes developed through oral reading; advanced study of the traditional lyric in the major American literary periods.

Mr. Beloff

143. The Narrative and Dialogic Mode. (5) Four to 4 1/2 hours of lecture per week. Prerequisites: Rhetoric 30-32 and consent of instructor. Qualities of narrative and dialogic mode as developed through oral reading of both poetry and prose.

Mr. Composition 144. Readers Theatre. (5) Four to 4 1/2 hours of lecture per week. Prerequisites: Rhetoric 30, 1C and 32 or consent of instructor: Understanding literary genres through group performances. Mr. Sloane

152. Rhetoric of Constitutional Discourse. (Formerly 142.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Rhetorical analysis of constitutional documents from the Constitution to the present. Criticism of the rhetoric in works of Madison and Marshall, Jefferson and Hamilton and of Supreme Court documents concerning interpretation of the Constitution and its Amendments. The Staff

153. American Political Rhetoric. (Formerly 143C-143D.) Four to 4 1/2 hours of lecture per week. Prerequisites: Rhetoric 30, and 32 and 1C or 144. Study of modern spokesmen for major political movements; problems of ideology and ideology conflict, with a special focus on the compositional intentions of ideologues with reference to the United States and other nations. Mr. Myhre

154. English Political Rhetoric. (Formerly 143A-143B.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. An assessment of rhetorical styles in the Parliament and press. Mr. Willy

155. Rhetoric of Nineteenth Century Imperialism. (Formerly 145.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Analysis of the rhetorical patterns in official and public documents relating to English Imperial expansion. The Staff

156. Rhetoric of the Political Novel. (Formerly 146 and 147.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Investigation of major 19th and 20th century European and American fiction. Theoretical orientations and political stances are explicated as dominant themes. Close reading of authorial viewpoints and rhetorical strategies. Mr. Myhre

157. Rhetoric and Continental European Ideologies. (Formerly 148.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Rhetorical delineation of fundamental distinctions between the apparent modern novels, speeches and political tracts. Emphasis upon readings in Fascism, Communism, Liberalism, and Nationalism as the latter emerged between 1830 and 1945. The Staff

161. Rhetoric of Legal Documents. (Formerly 149.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Examination of legal argu-ment through analysis of structure and style in judicial opinions, study of problems and methods of interpretation in such documents as contracts, statutes, or constitu-tions, and reference to major authors in legal and rhetorical theory. The Staff

162. Stasis in Legal Argumentation. (Formerly 146C-146D.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or 31 or consent of instructor. Introduction to the concept of stasis (controlling the appropriate theory developed by the major rhetorical authors. Analysis of how stasis operates in modern legal argumentation. Discussion of the value of stasis theory to the legal profession. Mr. Quinn

164. Ethos and Audience in Legal Proceedings. (Formerly 147.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Examination of the characteristics of speakers and audiences in the trial and other legal forums. Advocacy, deliberation and decision making will be studied as they are influenced by these factors and ends of deliberations and dispute settlement procedures. The Staff

166. Legal Conceptions of Proof and Authority. (Formerly 158.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Examination of fundamental concepts and assumptions in Anglo-American procedures, rules of evidence and sources of authority for judicial decision. Major topics will include methods of proof and issues of judicial reliance on precedent, natural law and expediency. Ms. Shapiro

168. Rhetoric of Legal Philosophy. (Formerly 159.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Consideration of basic philosophical issues in legal theory and in the intellectual history of the law. The course includes study of legal philosophical disputes, as well as conventional legal documents. The Staff

171. Rhetoric of Scientific Discourse. (Formerly 141C-141D.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Rhetorical analysis of scientific and legal arguments. Mr. Quinn

172. Rhetoric of Social Theory. (Formerly 141D-141E.) Four to 4 1/2 hours of lecture per week. Prerequisites: Rhetoric 30, Rhetoric 1A-1B or 10. An examination of the rhetorical practice of selected narrative historians such as Gibbon or Carlyle; historical discourse considered as a sausory act.

174. Rhetoric of Psychological Discourse. (Formerly 141A-141B.) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Systematic rhetorical analysis of selected theorists in modern psychology focusing on the significant theoretical innovations of the Freudian school and extending to the rhetoric of contemporary psychoanalytic thought.

175. Rhetoric of Philosophical Discourse. (Formerly 141C-141D.) Four to 4 1/2 hours of lecture per week. Prerequisites: Rhetoric 30, Rhetoric 1A-1B or 10. An introduction to the theoretical issues involved in the application of rhetorical analysis to philosophical discourse; intensive rhetorical analysis of selected philosophical works.

Mr. Quinn

Independent Studies

180. Senior Thesis. (5) Prerequisites: Sophomore status in residence, consent of advisor and approval of a faculty director. Independent study under guidance of a faculty director culminating in a written thesis. May be used as an upper division elective in the major.

Mr. Nathan

190. Honors Theses. (5) Prerequisite: Graduate standing and approval of the graduate adviser. An original research project culminating in the written thesis. May be accepted for honors if approved by the Staff.

The Staff

191. Field Study in Rhetoric. (1-5) Prerequisite: Sophomore standing. Student-supervised experience relevant to specific aspects of rhetoric in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required.

Chairperson in charge

196. Supervised Group Study. (1-5) Prerequisites: Junior and good academic standing. Instructor supervises small group of students in work on a topic initiated by those students. May be used toward the major with prior approval of the student's adviser.

Chairperson in charge

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations of the Graduate Department. The Staff

200. Introduction to Graduate Study in Rhetoric. (4) Hours of seminar per week. Prerequisite: graduate standing. Introduction to research methodology, bibliography, and scholarly writing in the field of Rhetoric.

Mr. Nathan

202A-202B-202C. Principals of Rhetorical Invention. (3-3) Three hours of meeting per week. Prerequisite: graduate status. Problems in the scope, applications, and divergencies of western theory and practice of rhetorical theory and aesthetic principles of invention. This course is normally required of all graduate students.

A. to 400 A.D. Mr. Leopold

B. 400-1750. Ms. Richardson

C. 1750 through the 20th century. Mr. Willy

205. Contemporary Rhetorical Criticism. (5) Four to 4 1/2 hours of seminar per week. Prerequisite: Rhetoric 30 or consent of instructor. Intensive examination of rhetoric in contemporary written and oral media. This course is normally required of all first-year graduate students. Mr. Brandt

210. History of Oral Literature and Oral Interpretation. (5) Four to four and one-half hours of lecture per week. An exploration of the oral traditions of many peoples from the prehistoric to the present. The role of oral literature in the development of written languages, the purport of oral traditions and the oral performance of literature as an art form. Mr. Myhre

213A—213B. Methodology of Oral Interpretation. (5) Formerly 148. Four to 4 1/2 hours of seminar per week. An intensive investigation of the oral implications in the works of specific authors by means of an extensive examination of their canon. Students must complete both parts of the sequence. Credit and grade will be awarded upon completion of the full sequence. Mr. Sloane

215A—215B, Explication and Oral Interpretation. (5) Formerly 149. Four to 4 1/2 hours of seminar per week. In-depth exploration of the oral composition of poetry, with special emphasis on similarities and differences in different traditions. Mr. Melia

220. Prosody and Oral Communication. (5) Four to 4 1/2 hours of seminar per week. Problems in the aesthetic usage of metrics and rhythm, the history of metrics, and the relationship of metrics to oral transmission of poetry.

225. Oral Tradition in Poetry. (5) Four to 4 1/2 hours per week. Advanced study in the modes of oral composition of poetry, with special emphasis on similarities and differences in different traditions.

The Staff

230. Rhetoric and Rhetorical Criticism: Ancient Greece. (5) Four to 4 1/2 hours of seminar per week. Prerequisite: competence in Greek. Rhetoric in Ancient Greece, both as it was expounded by theorists and as it permeated subsequent discourse. Topic to be announced. Mr. Sloane

231. Rhetoric and Rhetorical Criticism: Ancient Rome. (5) Four to 4 1/2 hours of seminar per week. Prerequisite: graduate status and approval of the graduate adviser. Rhetorical practice and competence in Ancient Rome, both as it was expounded by theorists and as it permeated various forms of Latin discourse. Ms. Rich, Mr. Carlson

232. Rhetoric and Rhetorical Criticism: The Middle Ages. (5) Four to 4 1/2 hours per week. Prerequisite: graduate status and approval of the graduate adviser. Rhetorical practice and knowledge of rhetoric in the Middle Ages, both as expounded by medieval rhetoricians and as practiced by medieval writers.

Ms. Rich, Mr. Carlson

234A—234B. Rhetoric and Poetics in the Middle Ages and Renaissance. (3-3) One 2-hour seminar per week per quarter. Examination of the development of the concepts of rhetoric between the Middle Ages and the Renaissance, with a focus on the role of rhetoric in the Middle Ages, both as expounded by medi-

235. Rhetoric and Ideology. (5) Four to 4 1/2 hours of lecture per week. Rhetorical delineation of formal ideological structures as they appear in modern political and oratory.

Mr. Melia

242A—242B. Rhetoric and Perception in the Seventeenth Century. (5-1) Investigation of modes of thought in the seventeenth century through close analysis of the English and Continental rhetoric. The major forms of discourse characteristic of the period will be considered. Credit and grade will be awarded upon completion of the full sequence.

Mr. Sloane

243A—243B. The Rhetoric of Donne and Milton. (3-3) Three hours meeting per week. Investigation of relationships between developments in rhetorical theory and the poetic practice of Donne and Milton. Credit and grade will be awarded upon completion of the full sequence.

Mr. Sloane
### Graduate Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Details</th>
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<tbody>
<tr>
<td>299</td>
<td>Special Advanced Study</td>
<td>1-4 hours of lecture per week. Prerequisite: graduate status and approval of graduate adviser. Open to qualified graduate students who wish to pursue special studies and research under the direction of a member of the staff. May be repeated for credit. Credit and grade will be awarded upon completion of the full sequence. The Staff</td>
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### Related Courses in Other Departments

- Studies in Medieval Literature (Comparative Literature 210A–210B)
- The Age of Chaucer (English 155A–155B)
- Readings in Medieval Latin (English 210A–210B)
- Introduction to French Linguistics (French 133)
- Historical Grammar (French 210A–210B–210C)
- French Syntax (French 230A–230B)
- Studies in Medieval Literature (French 210A–210B–210C)
- Reading and Interpretation of Old French Text (French 211A–211B)
- Old Provencal Literature (French 212A–212B)
- Gothic (German 273)
- Danish Divine Commedia (Italian 109A–109B–109C)
- Italian Literature of the Fourteenth and Fifteenth Centuries (Italian 110A–110B)
- Historical Grammar (Italian 201A–201B)
- Minor Medieval Authors (Italian 202)
- Introduction to Phonetics and Phonology (Linguistics 110)
- Comparative and Historical Linguistics (Linguistics 145)
- Indo-European Comparative Linguistics (Linguistics 165)
- Linguistic Implications of Lexicography and Lexicology (Linguistics 229)
- Romance Historical Phonology, Infection, Derivation (Linguistics 235, 236, 237)
- Historical Linguistics (Linguistics 281)
- An Advanced Course in Hispanic Linguistics (Spanish 193)
- Historical Grammar of Ibero-Romance (Spanish 197)
- The Languages of the Iberian Peninsula in Romance Perspective (Spanish 207)
- Seminar in Hispanic Linguistics (Spanish 209)
- Introduction to Medieval Hispanic Literature (Spanish 220A–220B)

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**L&S:** Scandinavian / 193

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**Scandinavian**

**Department Office, 1305 Dwinelle Hall**

**Professor:** Eric O. Johansson, Ph.D.

**Associate Professors:**
- Baltzar Angelin, Ph.D.
- John Lindell, Ph.D.

**Assistant Professor:** Carol J. Close, Ph.D.

The Department of Scandinavian offers undergraduate majors in three Scandinavian languages, Danish, Norwegian, and Swedish, and courses in English in Scandinavian literature and culture, ancient and modern. A graduate program offering work leading to the M.A. and Ph.D. degree is also available.

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**The Major**

**Lower Division:** Four courses from the following course sequences:
- Scandinavian 1A–1B; 3A–3B; 4A–4B; 11A–11B; 13A–13B; 14A–14B; or the equivalents.

**Upper Division Courses:** Ten upper division courses, including at least two language and two literature courses from the following sequences:

**Honors Program:** Students must complete with distinction the courses required for the major as well as three quarters of course H195. A thesis is also required.

**Letters and Science List of Courses:** 182 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

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**NOTE:** For key to symbols, see page 36.
Graduate Degrees

For information regarding admission to the graduate program in Scandinavian and the specific requirements for the M.A. and Ph.D. degree, interested students should consult the Graduate Adviser.

The M.A. in Scandinavian. General requirements: 36 units of courses in Scandinavian, including courses in Old Icelandic, in history of the language, and in advanced composition. A comprehensive examination will test the student's knowledge of two Scandinavian literatures with special emphasis on the literature in his major language, at least one hour of emphasis on English and folklore are also available. For interdepartmental options, consult the Graduate Adviser.

Ph.D. in Scandinavian. After the master's degree there are no specific course requirements; each student, instead, plans a program that will best prepare him for the qualifying examinations and for the writing of his dissertation. There are two curricula leading to the Ph.D. degree in Scandinavian, one in the field of history and criticism of Scandinavian literature, the other in the field of Scandinavian languages and linguistics. A folklore program is also offered.

Lower Division Courses

1A–1B. Elementary Swedish. (5–5) Five classroom hours and at least 1-hour laboratory per week.

1A. Elementary grammar, conversation.

1B. Elementary grammar, conversation, easy prose reading.

(W)

3A–3B. Elementary Norwegian. (5–5) Five classroom hours and at least 1-hour laboratory per week.

3A. Elementary grammar, conversation.

3B. Elementary grammar, conversation, easy prose reading.

(W)

4A–4B. Elementary Danish. (5–5) Five classroom hours and at least 1-hour laboratory per week.

4A. Elementary grammar, conversation.

4B. Elementary grammar, conversation, easy prose reading.

(W)

41. Intensive Elementary Swedish. (10) Ten hours of lecture and two hours of laboratory per week. Elementary grammar, conversation, composition, reading. This course is equivalent to Scandinavian 1A and 1B.

11A–11B. Intermediate Swedish. (5–5) Five classroom hours per week. Prerequisite: course 1A or the equivalent. Intermediate grammar, extensive reading, conversation, composition. Ms. McKnight 11A (Sp); 11B (F)

13A–13B. Intermediate Norwegian. (5–5) Five classroom hours per week. Prerequisite: course 3A or the equivalent. Intermediate grammar, extensive reading, conversation, composition. Ms. Johns 13A (Sp); 13B (F)

14A–14B. Intermediate Danish. (5–5) Five classroom hours per week. Prerequisite: course 4A or the equivalent. Intermediate grammar, extensive reading, conversation, composition. 14A (Sp); 14B (F)

Upper Division Courses

Swedish and the equivalent. Reading and analysis of representative Swedish works.

141A: From 1700 to 1870.

141B: From Strindberg to World War I.

141C: From World War I to the present. Mr. Johannesson 141C (F); Mr. Larson 141A (Sp)

143A–143B–143C. Introduction to Norwegian Literature. (4–4–4) Three classroom hours per week. Prerequisite: 20 units of lower division courses in Norwegian or the equivalent. Reading and analysis of representative Norwegian works. 143A: From Holberg to 1870. 143B: From Ibsen to World War I. 143C: From World War I to the present. Mr. Nybo 143B (W)

144A–144B–144C. Introduction to Danish Literature. (4–4–4) Three classroom hours per week. Prerequisite: 20 units of lower division courses in Danish or the equivalent. Reading and analysis of representative Danish works. 144A: From Holberg to 1870. 144B: From Ibsen to World War I. 144C: From World War I to the present. Mr. Madsen 144A (W); 144B (Sp)

150. The Scandinavian Languages: History and Structure. (3) Three hours of lecture per week. Prerequisite: elementary knowledge of a Scandinavian language or an older Germanic dialect. An introduction to the Scandinavian language and history and the comparative study of all the Germanic languages, with reading of selected texts. Recommended for Scandinavian majors. Mr. Lindow (F)

H195. Special Study for Honors Candidates. (2–5) Fifteen credits by arrangement. Ms. Collins (F, W, Sp)

198. Directed Group Study for Advanced Undergraduates. (2–5) Prerequisite: at least two years of one of the Scandinavian languages. Advanced reading and interpretation of selected texts.

The Staff (Ms. Clover in charge) (F, W, Sp)

199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a pass/not pass basis. The Staff (F, W, Sp)

Courses in Scandinavian Literature and Culture

Courses listed below require no knowledge of a Scandinavian language. They are open to students with at least a junior standing and, with consent of instructor, to properly qualified students with sophomore standing.

107. The Plays of Ibsen. (4) Three 1-hour lectures per week. Reading and discussions of Ibsen's major plays.

Mr. Madsen (F)

108. Strindberg. (4) Three 1-hour lectures per week. Reading and discussion of Strindberg's major works with emphasis on his dramas and their significance.

Mr. Madsen (Sp)

109. Scandinavian Drama of the Twentieth Century. (4) Three 1-hour lectures per week. Reading of modern Scandinavian dramas in translation; discussion of the major novels.

Mr. Lindow (W)

110. Hans Christian Andersen. (4) Three 1-hour lectures and discussions per week. Emphasis will be on the tales and stories, but some attention will be given also to Andersen's novels, travel books, and autobiographies.

Ms. Clove (Sp)

112. Knut Hamsun. (4) Three 1-hour lectures and discussions per week. Reading and discussion of Hamsun's major works. Some attention will also be given to Hamsun's essays and articles.

Mr. Nybo (Sp)

114. Isak Dinesen. (4) Three 1-hour lectures and discussions per week. Reading and discussion of Dinesen's best stories and tales.

Mr. Johannesson (F)

120. The Novel In Scandinavia. (4) Three 1-hour lectures per week. Reading and discussion of great Scandinavian novels; lectures on the development of the novel. Five survey of the modern Swedish novel. May be repeated for credit with consent of instructor.

Mr. Nybo (Sp)

123. The Viking Age. (4) Three 1-hour lectures per week. A survey of early Scandinavian culture and civilization. Written works of the Norse sagas; reading of selected texts in English translation and discussion of problems connected with the nature of the sources and archaeological evidence.

Mr. Nybo (Sp)

125. Old Icelandic Literature. (4) Three 1-hour lectures per week. Reading and discussion of some of the most important poems with emphasis on the mythological and heroic portions.

Mr. Nybo (Sp)


Mr. Larson (W)

160. Scandinavian Mythology. (4) Three 1-hour lectures per week. Critical survey of mythology in ancient Scandinavia. Lectures and readings of selected material in English translation.

Mr. Lindow (Sp)

165. Scandinavian Folklore. (4) Three 1-hour lectures per week. A survey of Scandinavian folklore, with primary emphasis on oral narrative traditions (legends, fairy tales, and ballads), Proverbs, religious futharks, customs, and other folkloristic material, including folk music, will also be considered.

Mr. Lindow (Sp)

175. Kierkegaard, (Formerly 175A). Three hours of lecture and one hour of discussion per week. Prerequisite: courses 202 and the equivalent. One Old Icelandic saga and one or two poems of the Edda will normally be read in this course.

Mr. Nybo (W)

208. The Poems of the Poetic Edda. (4) Three 1-hour lectures per week. Reading of some of the important poems with emphasis on the mythological songs.

Ms. Clover (Sp)

215. Scandinavian Dialects. (4) Three 1-hour lectures per week. A survey of the Scandinavian dialects with special reference to their relation to the standard languages of the different countries.

Ms. Clover (Sp)

250. Seminar in Scandinavian Linguistics. (4) One 2-hour lecture per week. Conference work. Credit will be given for one of the topics listed above. One 1-hour lecture per week. Conference work. Credit will be given for one of the topics listed above.

Mr. Nybo (Sp)

Language Courses

201. History of the Swedish Language. (4) Three 1-hour lectures per week. Prerequisite: an A.B. degree with a major in Scandinavian. Phonology, historical grammar, texts.

Ms. Clover (F)

205. Runicology. (4) Three 1-hour lectures per week. Prerequisite: course 202 or the equivalent. Interpretation and discussion of runic inscriptions in the Germanic, Danish, and Swedish-Norwegian runic alphabets.

Mr. Lindow (Sp)

206. Readings of Old Icelandic Texts. (4) Three hours of lecture per week. Prerequisite: Scandinavian 202 (Old Icelandic) or the equivalent. One Old Icelandic saga and one or two poems of the Edda will normally be read in this course.

Ms. Clover (W)

208. The Poems of the Poetic Edda. (4) Three 1-hour lectures per week. Reading of some of the important poems with emphasis on the mythological songs.

Ms. Clover (Sp)

215. Scandinavian Dialects. (4) Three 1-hour lectures per week. A survey of the Scandinavian dialects with special reference to their relation to the standard languages of the different countries.

Ms. Clover (Sp)

250. Seminar in Scandinavian Linguistics. (4) One 2-hour lecture per week. Conference work. Credit will be given for one of the topics listed above. One 1-hour lecture per week. Conference work. Credit will be given for one of the topics listed above.

Mr. Nybo (Sp)

Literature Courses

210. Graduate Readings. (4) Graduate lecture course covering broad areas and directing students in wide reading. Offerings vary from year to year. May be repeated for credit with the permission of the Graduate Adviser and the instructor.

Ms. Clover (Sp)

220. The Icelandic Saga. (4) Three 1-hour lectures per week. Prerequisite: courses 202 and the equivalent. Reading and analysis of representative works with emphasis on problems of origin and on the comparative art.

Ms. Clover (F)

225. The Scandinavian Ballad. (4) Three 1-hour lectures per week. A comparative and historical study of the mediaeval ballad in Scandinavia, its later development and relation to the ballad traditions of the surrounding countries. Some attention will also be paid to modern folklore, broadsides, and the troubadour tradition from the time of Stelian to the present.

Mr. Nybo (Sp)

230. Eighteenth Century Scandinavian Literature. (4) Three 1-hour lectures per week. Reading and analysis of representative works.

Mr. Larson (F)


Mr. Larson (W)
Science and Mathematics Education

Group Office, 347 Birge Hall

Professors:
Max Allert, Ph.D. (Zoology)
Kathleen M. Fischer, Ph.D. (Genetics, U.C., Davis)
Walter J. Freeman, Ph.D. (Psychology)
Robert M. Glasser, Ph.D. (Medical Physics)
Paul A. Heist, Ph.D. (Chemistry)
Leon A. Henkin, Ph.D. (Mathematics)
William A. Jensen, Ph.D. (Botany)
Robert Karplus, Ph.D. (Physics)
John L. Kuehne, Ph.D. (Mathematics)

Associate Professors:
Martin V. Coving tongues (Physics)
Lawrence F. Lowery, Ed.D. (Education)

Lecturers:
David D. Cudaback, Ph.D. (Astronomy)

Watson B. Leetschi, Ph.D. (Botany)
Forest S. Mozer, Ph.D. (Physics)
George C. Pimentel, Ph.D. (Chemistry)
Alan M. Portis, Ph.D. (Physics)
Frederick Reid, Ph.D. (Physics)
Richard M. White, Ph.D. (Electrical Engineering and Computer Science)
Robert C. Siebens, Ph.D. (Zoology) (Emeritus)

201. Systematic Approaches to Instruction. (4) Two hours of lecture and two hours of discussion per week. Prerequisite: permission of instructor. Offered on a satisfactory/unsatisfactory basis.

210. Practicum in Science Education Research and Development. (1-4) One hour of lecture and 6 to 20 hours of laboratory per week. Prerequisite: enrollment in the course. Offered on a satisfactory/unsatisfactory basis. Staff (F)

220. Seminar. (2) Must be taken on a satisfactory/unsatisfactory basis.

225. Independent Study for Master's Students. (1-8) Individual study for master's students. The Staff (F, W, Sp)

235. Seminar in Scandinavian Folklore and Mythology. (4) One 3-hour class per week. Prerequisite: knowledge of Old Icelandic or of a modern Scandinavian language. Investigation of selected problems in Scandinavian Folklore and Mythology. (W)

236. Seminar In Scandinavian Folklore and Mythology. (4) Three 3-hour class per week. Prerequisite: knowledge of Old Icelandic or of a modern Scandinavian language. Investigation of selected problems in Scandinavian Folklore and Mythology.

Admission Requirements

Requirement for admission to the program is ordinarily a distinguished course record and a master's degree in a particular scientific discipline. Students without such a degree may express their intentions of joining the program while enrolling in the Berkeley science department of their field. Their application for formal admission to the program will then be considered after they obtain a master's degree from that department. More detailed information about the program and its requirements can be obtained from the group office.

240. Formulation of Educational Research. (1-3) Four hours of lecture per week. General criteria for useful educational research, discussed in a seminar format, with an emphasis on applying these criteria to develop viable plans for research on topics of interest to the participants. To be offered on a satisfactory/unsatisfactory basis.

245. Research. (1-12) Staff (F, W, Sp)

250. Individual Reading and Study. (1-5) Individual study under the supervision of a faculty member.

265. Seminar in Scandinavian Folklore and Mythology. (4) One 3-hour class per week. Prerequisite: permission of instructor. Research and development of systematic approaches to instruction, emphasizing those based on specific models and utilizing various new techniques or technologies. The course will include some practical work to supplement the lectures. Offered on a satisfactory/unsatisfactory basis. Staff (F)

270. Practicum in Science Education Research and Development. (1-4) One hour of lecture and 6 to 20 hours of laboratory per week. Prerequisite: enrollment in the course. Offered on a satisfactory/unsatisfactory basis. Research and development work as member of an educational research or development project on the UC campus or at a cooperating institution (Exploratorium, Oakland Museum, community college, and so on). Two-hour meetings every other week to discuss the students' experiences.

280. Seminar. (2) Must be taken on a satisfactory/unsatisfactory basis.

290. Seminar. (2) Two hours of lecture per week. Prerequisite: graduate standing in the Group or permission of instructor. Discussion of current educational research carried on by students and faculty members. Recommended to all students in the Group. Offered on a satisfactory/unsatisfactory basis.

295. Research. (1-12) Staff (F, W, Sp)

299. Independent Reading and Study. (1-5) Individual study and study under the supervision of a faculty member.

300. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field adviser, designed to prepare the student for examinations required of Ph.D. candidates. This course may be taken only on a satisfactory/unsatisfactory basis; it does not satisfy unit or residence requirements for the doctoral degree. Staff (F, W, Sp)

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NOTE: For key to symbols, see page 30.
The Department offers courses in the several Slavic languages and literatures and in Slavic linguistics, both for those pursuing the Department's own degree programs and for interested students from other departments. A large number of its literature courses require no knowledge of foreign language.

The undergraduate major program usually emphasizes Russian, but honor students may choose Czech, Polish, or Serbo-Croatian as their special field of study. For all students the major program includes an introduction to the cultural history and the literatures of other Slavic peoples and requires at least an elementary knowledge of Russian.

Under the auspices of the Department, courses in Slavic and non-Slavic languages and literatures of Eastern Europe are given as opportunity arises: Bulgarian, Czech, Hungarian, Lithuanian, Romanian, and Ukrainian.

The Major

Lower Division. Emphasis on Russian: courses 1, 2, 3, 4, 5, 6 or their equivalents; courses 45, 46, and 47, taken in sequence if possible. Emphasis on a Slavic language other than Russian: courses 1, 2, 3 and 12 units of the other Slavic language; courses 45, 46, and 47.

Upper Division. 45 units, including 15 units in the major. Four courses: 103A—103B—103C or 104A—104B—104C in the case of Russian) and, also for students majoring in Russian, course sequence 125A—125B, course 150, and one of the following: 166, 167A, 167B or 170A, 170B or 170C (see below). Students majoring in another Slavic language and literature are required to take course sequence 125A—125B, in addition to the 8-unit survey sequence.

Honors Program. With the approval of the major advisor, students with an overall grade-point average of 3.3 or higher and an average of 3.3 or higher in courses completed in the major may apply for admission to the honors program. This program will include course 119, in which a thesis will be written, and 10 units, in addition to those required for the major, in upper division language courses. For majors in Russian those are courses 104A—104B or, in special cases and with the permission of the Department, courses 125A—125B. Successful completion of the honors program requires a minimum grade of B+ in each of these three units and a grade-point average of 3.3 or higher in the major. A member of the Department must agree to direct the thesis. Applications for the program should be submitted through the major advisor.

Letters and Science List of Courses: 182 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Preparation for Graduate Study

Candidates for higher degrees must have completed the undergraduate major program in Slavic languages and literatures as required by the Department, or must present evidence that they have received equivalent training. For D. P. candidates, work in two Slavic languages or literatures, of which one must be Russian. Preparation in other European literatures (especially French, German, English), in comparative literature, in languages (especially French, German, Italian), and in Russian intellectual history is valuable for candidates in literature. For candidates in linguistics, preparation in French, German, Latin, and Greek is desirable. A general and comparative linguistics is desirable.

Graduate Programs

M.A. and Ph.D. programs are offered in Russian, Polish, Czech, and Serbo-Croatian, each with either linguistic or literary emphasis.

The M.A. requirements include: reading knowledge of French or German; 36 units of upper division and graduate courses approved by the Department, including

210A-210B; at least 12 units of a second modern Slavic language; and a final comprehensive examination, partly written and partly oral. Courses 104A—B—C (which may be passed by examination) and 125A are required of majors in Russian.

Ph.D. candidates must have an M.A. from this Department or show evidence of equivalent preparation. A reading knowledge of both French and German is required. Through course work and individual study as approved by the graduate adviser the student prepares for the general qualifying examinations, both oral and written.

Not all the courses listed below may actually be offered in 1979-80; further, the courses in a particular sequence may be given and its instructor may be changed. Students should consult the Schedule of Classes issued each quarter for more precise information, and the Department bulletin board for the specific topics of courses with variable subject matter.

Lower Division Courses

1. Elementary Russian, Beginners’ Course. (5) Five 1-hour meetings and two 1-hour laboratories per week. Prerequisite: course 15. J. Nichols in charge (Sp).

2. Elementary Russian, (5) Five 1-hour meetings and two 1-hour laboratories per week. Prerequisite: course 14. D. Crockett in charge (F, W).

3. Elementary Russian, (5) Five 1-hour meetings and one 1-hour laboratory per week. Prerequisite: course 2. J. Nichols in charge (Sp).

4. Intermediate Russian, (5) Five 1-hour meetings and one 1-hour laboratory per week. Prerequisite: course 4. D. Crockett in charge (F, W).

5. Intermediate Russian, (5) Five 1-hour meetings and one 1-hour laboratory per week. Prerequisite: course 5. J. Nichols in charge (W).

6. Intermediate Russian, (5) Five 1-hour meetings and one hour laboratory per week. Prerequisite: course 5. E. Leskovar (F, W, Sp).

9. Russian Language Workshop. (5-10) Prerequisite: course 1. Students who have accumulated more than five units in the course (whether in one quarter or two) are not eligible for re-enrollment. Individualized instruction covering the material of courses 2, 3, 4, 5, 6. Intended primarily for students whose programs prevent them from taking one, or two, of those courses when regularly scheduled. May be repeated for credit not exceeding an accumulated total of ten units. Unit credit to be assigned at the end of the quarter, depending on achievement. S. Kassatkin (F, W, Sp).

12. Elementary Russian Conversation. (2) Three hours of lecture per week. Prerequisite: course 1 or 2. Credit may be given concurrently with Slavic 2 or by consent of instructor. May be repeated up to a total of 30 units. J. Nichols in charge (F, W, Sp).

13. Intermediate Russian Conversation. (2) Three hours of lecture per week. Prerequisite: Slavic 4 or 5 or 6 (may be taken concurrently) or the equivalent or consent of instructor. May be repeated up to a total of 15 units. J. Nichols in charge (F, W, Sp).

14A—14B—14C—14D. Individualized Instruction in Russian, (1—4, 1—5, 1—5, 1—5) Self-paced courses covering the material of Slavic 1—4. Students may enter at any level. Any level may be repeated without duplication of credit. The student’s program, including this course, must meet the minimum study-list unit requirement; it units beyond those contracted for are completed, credit will be given. O. Astromoff in charge (F, W, Sp).

21A—21B—21C. Intensive Russian. (10—10—10) Ten 1-hour meetings and two 1-hour laboratories per week. This course, which is considered courses 1 through 6 and qualifies for admission to 103A. Sequence beginning (F) S. Kassatkin in charge (Sp).

23. Elementary Polish. (4) Four 1-hour lectures and one hour of laboratory per week. Prerequisite: course 25. F. J. Whittfield in charge (F, W, Sp).


29. Elementary Czech. (4) Four 1-hour lectures and one hour of laboratory per week. W. Schamschula in charge (F).

30A—30B. Intermediate Czech. (4—4) Four 1-hour meetings per week. Prerequisite: course 29. Sequence beginning (W), W. Schamschula in charge (F).

• 39. Great Writers of Russian Literature. (4) Four 1-hour meetings per week. Prerequisite: course 25. L. Hughes in charge (Sp).

102. Readings in Russian Expository Prose. (3) Three hours of lecture per week. Prerequisite: Slavic 6 or the equivalent. Selections from Russian (philosophical and technical), journalistic and business styles to familiarize the student with the peculiarities of these styles with respect to vocabulary and syntax. May be repeated without duplication of credit. S. Kassatkin (F, W, Sp).

103A—103B—103C. Advanced Russian. (5—5—5) Five 1-hour meetings per week. Prerequisite: course 2 or 21C. Sequence beginning (F), The Staff.

104A—104B—104C. Russian Composition and Style. (5—5—5) Three 1-hour meetings per week. Sequence beginning (F), The Staff.

108A—108B. Polish Reading, Grammar, and Composition. (5—5) Three 1-hour meetings per week. Prerequisite: course 24B. Sequence beginning (F), F. J. Whittfield.

112A—112B. Serbo-Croatian Reading, Grammar, and Composition. (5—5) Four 1-hour meetings per week. Prerequisite: course 26B. Sequence beginning (F), R. Alexander.

116A—116B. Czech Reading, Grammar, and Composition. (5—5) Four 1-hour meetings per week. Prerequisite: course 30B. Sequence beginning (F), W. Schamschula.

120A—120B—120C. Advanced Russian Conversation. (2—2—2) Open to students enrolled in courses 103A or 104 or who have completed equivalent courses. Two 1-hour classes and one 1-hour laboratory per week. Recommended for majors.

125A—125B. Introduction to Descriptive Russian Grammar. (5—5) Three 1-hour meetings and one 1-hour discussion section per week. Prerequisite or corequisite: course 125A (to 125A), course 125B (to 125B). Phonology, morphology, and syntax of standard literary Russian. Recommended for prospective teachers. Though it is not a prerequisite, students are urged to take Linguistics 20 before taking this course. D. Crockett (W), J. Nichols (Sp).

126A—126B. Readings in Russian Literature. (5—5) Four 1-hour lectures, seminars and discussion per week. Prerequisite: 125A: course 103A (to 125A), course 103B (to 125B). F. J. Whitfield.

129A—129B. Readings in Czech, Polish, and Serbo-Croatian Literatures. (5—5) Individual or group conferences. Prerequisite or corequisite: courses 102A or 125B. Sequence beginning (W), J. Elsworth.

130. Medieval Russian Culture. (3) Three hours of lecture, discussion and slide presentation per week. Introduction to the Eastern Orthodox culture, literature, iconography, and other visual arts. O. Hughes (Sp).

132. Topics in Twentieth Century Russian Literature. (4) Formerly 130. Three 1-hour lectures per
133A–133B–133C. The Russian Novel and Litera-
ture. (4–4–4) Three 1-hour lectures per week. Dis-
cussion section to be arranged. Prerequisite: to 133A: 133A or permission of the in-
structor; to 133B: 133B or permission of the in-
structor. J. Grossman

133A. Sentimentalism and Romanticism (F)
133B. Romanticism and Realism (W)
133C. Realism (Sp)

*134A. Gogol. (Formerly 134G) Three 1-hour lec-
tures per week. Discussion section to be arranged. A study of the writer's principal artistic works, treated chronologi-
ically in relation to his life and to developments in Rus-
sian and European literature. C. Milosz (W)

134D. Topics in Dostoevsky, (4) Three 1-hour lec-
tures per week. Discussion section to be arranged. Close study of individual works, periods or themes in Dostoevsky's career. Content varies from year to year. May be repeated for credit with permission of instructor. C. Milosz (W)

*134E. Tolstoy. (Formerly 134B) Three 1-hour lec-
tures per week. Discussion section to be arranged. A study of the writer's principal artistic works, treated chronologically in relation to his life and to develop-
mments in Russian and European literature. C. Milosz (W)

134F. Topics in Tolstoy, (4) Three 1-hour lectures per week. Discussion section to be arranged. Close study of individual works, periods or themes in Tolstoy's career. Content varies from year to year. May be repeated for credit with permission of instructor. (W)

134G. Chekhov, (4) Formerly 134C. Three 1-hour lec-
tures per week. Discussion section to be arranged. S. Karlinsky (F)

*134N. Studies in Russian Literature. (4) Three 1-hour lectures per week. Discussion section to be arranged. S. Karlinsky (Sp)

135. Russian Drama from the Seventeenth to the Twentieth Century. (8) Three 1-hour lectures per week. Discussion section to be arranged. The Staff (F)

140. Tennyson. (4) Three 1-hour lectures per week. Discussion section to be arranged. W. Schamschaul (F)

147. Slavic Folklore. (4) Three hours of lecture per week. Discussion section to be arranged. The course will be concerned chiefly with oral traditional literature (tales, epics, lyrics, proverbs), but customs, beliefs, and other forms of folklore will also be discussed. R. Augyst (Sp)

*149B. Theory and Practice of Translation. (4) Three 1-hour lectures per week. Discussion section to be arranged. Lectures and assigned readings on translation theory. Critical reports on selected English trans-
lations. Class discussions of translations prepared by members of the class. F. Whitfield (W)

*150A–150B. Polish Literature and Intellectual Trend, (4–4) Three 1-hour lectures per week. Discussion section to be arranged. No knowledge of Polish re-
quired. 150A. Ten to 15th century, 1848 to the present. Sequence beginning (W), C. Milosz
156. The Polish Theater, (4) Three 1-hour lectures per week. Discussion section to be arranged. No knowledge of Polish required. C. Milosz (W)

159A. Contemporary Polish Poetry and Fiction. (4) Three 1-hour lectures per week. Discussion section to be arranged. No knowledge of Polish required. C. Milosz (F)

160A–160B. Masterworks of Czech and Slovak Litera-
ture, (4–4) Three 1-hour lectures per week. Dis-
cussion section to be arranged. No knowledge of Czech or Slovak required. Sequences beginning (F), W. Schamschaul

*170A–170B. Survey of Serbian and Croatian Litera-
ture, (4–4) Three 1-hour lectures per week. Dis-
cussion section to be arranged. No knowledge of Ser-
bo-Croatian required. Sequence beginning (F)

Lecture Courses Requiring Knowledge of Russian

180. Studies in Russian Literature, (5) Three 1-hour lectures and one hour of discussion per week. Variable subject matter. Course may be repeated with the con-
sent of the instructor without duplication of credit. J. Elsworthy (W)

*181. Pushkin. (Formerly 134F) Three 1-hour lec-
tures and one hour of discussion per week.

*185. Nineteenth Century Russian Literary Crit-
icism, (5) Three 1-hour lectures in Russian and on-
one hour of discussion per week. Prerequisite: course 103B (may be taken concurrently) or consent of the instructor. O. Sorokin-Vasiliev (Sp)

187A–187B. Russian Poetry, (5–5) Three 1-hour lec-
tures in Russian and one hour of discussion section per week. Prerequisite: course 103B (may be taken concurrently) or consent of instructor. Survey of tech-
iques of Russian versification and history of Russian poetry. 187A: eighteenth century to 1890; 187B: 1890 to the present. Sequence beginning (W), S. Karlin-
sky (F)

185. Russian Prose, (8) Three 1-hour lectures in Rus-
sian and one hour of discussion section per week. Prerequisite: course 103C (may be taken concurrently) or consent of instructor. Reading, analysis, and inter-
pretation of prose fiction from the nineteenth century to the present. All readings in the original. Course may be repeated without duplication of credit. Top-
ics to be changed every semester. O. Sorokin-Vasiliev (F, Sp)

189. History of the Russian Literary Language, (5) Three 1-hour lectures per week. Discussion section to be arranged. O. Hughes (Sp)

*190. Undergraduate Seminar, (4) Three 1-hour meetings per week. Close reading of one or more ma-
JOR pieces of Russian fiction. Readings will be in En-
lish. To be arranged with a close reading of the work, stud-
ents will read some criticism. O. Hughes (W)

195. Honors Seminar, (5) Two 2-hour discussions, or individual meetings with the instructor per week. Advanced study for seniors in each honors program, culminating in the writing of a thesis. The Staff (F, W, Sp)

199. Supervised Independent Study and Re-
search, (1–5) Enrolled subject to regulations listed on page 36. Additional limitation: overall grade- point average of at least 3.00. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

Graduate Courses

Graduate Colloquium, (No Credit) Three meetings per quarter. Reports on current scholarly work by fac-
tulty, graduate students, visitors. Graduate stu-
dents are expected to attend. 210A–210B. Old Church Slavic, (3–3) Two 1 1/2-
hour meetings per week.

211. Readings In Old Russian, (4) Prerequisite: Slavic
210A–210B. Old Church Slavic. (F) F. Whitfield (F)

220. Comparative Slavic Linguistics. (4) Two 1 1/2-
hour meetings per week. Prerequisite: courses 210A–210B.

226. Historical Russian Grammar, (4) Three 1-hour meetings per week. Prerequisite: courses 210A–210B. The Staff (Sp)

229. Russian Oral Tradition. (4) Three hours of lec-
ture per week. Prerequisite: much knowledge of nonstandard Russian, and requires a good command of the language. Major emphasis will be placed on the in-
to and effects of oral narrative. The written word will be discussed. H. McLean (F)

*230A–*230B–*230C. Old Russian Literature, (4–4–4) Three hours of lecture per week. Prerequisite: reading knowledge of Russian. The Staff (Sp)

*230A. Eleventh through thirteenth century. O. Hughes, H. McLean

*230B. Fourteenth through sixteenth century. O. Hughes (W)

*230C. Seventeenth century. O. Hughes (Sp)

231. Eighteenth Century Russian Literature, (4) Three hours of lecture per week. S. Karlinsky (Sp)

280. Studies In Slavic Literatures and Linguistics, (4) One 2-hour meeting per week. Advanced studies in the several fields of Slavic literatures and linguistics. Course content varies. Course may be repeated without duplication of credit. The Staff (W, Sp)

281. Proseminar; Alms and Methods of Literary Scholarships, (4) Two 1 1/2-hour lectures per week. Course designed particularly for new graduate stu-
dents in the Department whose programs will empha-
size the study of Slavic literatures. R. Hughes (F)
Field Major in Social Sciences: the Major Program

The field major in social science is especially devised for those students who wish to acquire a liberal arts education in the social sciences. The major combines breadth — courses drawn from a number of disciplines — with an individual area of concentration tailored to the needs of the individual student. Students are responsible for developing their own program of studies with the advice and approval of a member of the staff who will act as their official adviser.

The field major is administered by a Faculty Advisory Committee and is one of the programs of the Division of Special Programs. All questions concerning the major should be addressed to Associate Dean W. B. Sottman, 301 Campbell Hall.

Lower Division Requirements. One year of Western Civilization (SP44) or three courses in the History 4 sequence. With consent of the adviser three upper-division courses in History may be substituted.

Upper Division Course Requirements. A minimum of 45 approved upper division units in the areas listed below (approved lower division courses may occasionally count as part of the minimum total of 45 upper division units): (1) a total of six courses drawn from three of the following fields or disciplines (at least five of these courses in the social sciences): Afro-American Studies, Anthropology, Art History, Chicanos Studies, Economics, Environmental Studies, Film, Geography, History, Linguistics, Native American Studies, Philosophy, Political Science, Psychology, Religious Studies, Rhetoric, Social Welfare, Sociology, Women's Studies; (2) Social Science 103A-103B, the core course for juniors; (3) Social Science 190A-190B, the senior thesis course. Upon entering the major, each student must define an individual area of concentration that will provide a focus for his or her work in the major and will prepare the way for the senior thesis project.

Although the foregoing requirements will normally be satisfied by courses in the College of Letters and Science, the Board of Advisers will consider petitions to substitute courses offered by other colleges and schools.

Honors Program. Upper division students with an overall grade point average of 3.3 and a trade point average of 3.5 in the major may, upon approval of the adviser, enroll in the honors program. They may substitute H198A-H198B for Social Science 190A-190B. Each honors candidate must submit a detailed research proposal with a preliminary bibliography to the prospective thesis supervisor. They must also obtain the prior agreement of two faculty members (in addition to the supervisor) to read and evaluate the completed thesis.

Upper Division Courses

103A—103B. Theory, Methods and Applications of the Social Sciences, (4—4) Three hours of lecture per week. Introduction to the methodological principles and key concepts of the social sciences. 103B will study the applications of these theories to problematic contemporary society.

103A. The Staff (W, F)
103B. The Staff (W, Sp)

190A—190B. Problems in the Social Sciences. (4—4) Prerequisite: senior standing and completion of the 103 sequence. This is a two quarter sequence consisting of a senior seminar (Social Science 190A) and a tutorial course (190B) that will assist the student in the preparation and writing of the senior thesis.

The Staff (W, F, Sp)

198. Directed Group Study for Upper Division Students. (1—5) Directed group study on topics approved by the Division.

Social Welfare

Group Major Office, 117 Haviland Hall
Major Advisers: Mr. Neil Gilbert, Mr. James R. W. Lebby
Staff and courses are listed under the School of Social Welfare.

Group Major in Social Welfare

The group major in social welfare, leading to the degree of Bachelor of Arts in the College of Letters and Science, offers a social welfare sequence of general interest to liberal arts students. It provides students with an opportunity to test their career interest in social work prior to pursuing graduate professional education and prepares them for community service positions beginning directly after graduation. Applications to the major are considered in fall on a first-come-first-served basis. The number of units and prerequisite courses completed are considered for admission.

Major Requirements

Lower Division: Psychology 1, Sociology 1A, and Statistics 2. Recommended: Anthropology 3, Economics 1, Political Science 1, Political Science 2. Recommended: three courses in either statistics or logic prior to entrance into the major.

Upper Division: Social Welfare 102A—102B (3–3), 103A—103B (2—2), 110A—110B (5–5); and a minimum of five courses chosen from the following list, with three of the courses taken in one department and two selected from the other departments: Anthropology 140, 142, 144, 149, 150, 152; Economics 100A, 100B, 133, 134, 135, 137; History 107, 108, 120, 121, 129, 130, 132, 140, 142, 157, 160, 162, 183.

Honors Program. Eligible social welfare majors, upon recommendation of their advisers, may enroll in the honors program. A student in the honors program must complete an honors seminar in social welfare and social work problems (Social Welfare H195A—H195B—H195C). A senior thesis is part of the work of the honors seminar. The essay, which will be of a creative and integrative nature, will be the culmination of an individual library research project on a topic of special interest to the student. It will meet criteria established to assure breadth and depth and will be produced with reference to a timetable for completion. Some time in the senior seminar is devoted to the planning and writing of the essay.

Sociology

Department Office, 410 Barrows Hall
University Professor: Neil J. Smelser, Ph.D.

Professors:
Robert N. Bellah, Ph.D. (Ford Professor of Sociology and Comparative Studies (Chairs))
Robert Blau, Ph.D.
Kenneth E. Bock, Ph.D.
Troy Dwyer, Ph.D.
William Kohnthal, Ph.D.
David Matza, Ph.D.
H. Franz Schummner, Ph.D.
Philip Selznick, Ph.D.
Guy E. Swanson, Ph.D.
Harold L. Wilensky, Ph.D.
Herbert Blumer, Ph.D., D.Sc., L.0.O., Emeritus
Kingsley Davis, Ph.D. (Ford Professor of Sociology and Comparative Studies (Emeritus))
William Eberhard, Ph.D. (Emeritus)
Charles Y. Glock, Ph.D. (Emeritus)
Gertrude Jaeger, (Emeritus)
Leonard Soberg, Ph.D. (Emeritus)

Associate Professors:
Harry Edwards, Ph.D.
Claude S. Fischer, Ph.D.
Barbara Meyers, Ph.D.
Alone R. Hochschild, Ph.D.

Assistant Professors:
Troy Dwyer, Ph.D.
Michael Burovay, Ph.D.
Ronald Burt, Ph.D.

Visiting Professors:
Allan Blanchard, Ph.D.
David Fireman, M.A.

Affiliated Professors:
Ralph B. Bennett, Ph.D.
William A. Wilson, Ph.D.

Affiliated Assistant Professor:
Donald Hansen, Ph.D. (Education)

Lecturers:
Carol Huffman, Ph.D.

The Major

Students intending to major in sociology are advised to prepare themselves by taking background work in such areas as history, philosophy, cultural anthropology, psychology, economics, and political science.

Prerequisite Courses in the Major: A student must have successfully completed Sociology 1 and a course in either statistics or logic prior to entrance into the major.

Lower Division: Sociology 5, Evaluation of Evidence. No prerequisite required for completion of the major and students should take this course in their sophomore year. The Sociology 5 requirement may be waived if the student completes Sociology 105A—105B after declaring the major.

Upper Division: A student must take not less than 13 upper division units in sociology (and not less than nine upper division courses) selected to fulfill the following requirements:

2. Sociology 105A—105B if the student has not completed the statistics or logic prerequisite and Sociology 5.
3. Three courses from the following core list: 107 or 119, 110A or 110B, 118, 120, 124, 129, 130, 132, 140, 146, 148 or 149, 178 or 179.
4. Five elective upper division or graduate courses. Two of these may be elected from the category of Sociology 191, 197, 198, 199, or courses taken in other departments. At least one course in each of the five elective courses, two may be taken pass/no pass; not more than one of these may be approved courses taken in other departments to be counted for major credit.

Honors Program: Majors who enter their senior year with a 3.3 grade-point average overall and a 3.3 grade-point average in the major may join the honors program, after conferring with a major adviser, by enrolling in 190A, and meeting the requirements for the major.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

The Graduate Major

Facilities for graduate study and research, leading to the M.A. and Ph.D. degrees, include courses, seminars, colloquia, workshops, and research centers.

Note: students who wish to take both those core courses which are designated or (e.g., 148 or 149) may do so; however, only one will be counted toward fulfilling the core requirement. The other course may be used toward fulfilling the five elective course requirement.
ners, and research training under faculty supervision in the social sciences, social institutions, deviance, educational sociology, industrial sociology, methodology, political sociology, race relations, social change, social psychology, social stratification, sociology of culture, of crime and medicine, of law, of religion, and urban sociology.

Applications are considered once a year for fail quarter admission only. Candidates for admission must apply by February 1, except those applying for a fellowship, who must apply by December 1. Applications will be screened from the files of the Department of Sociology, 410 Barrows Hall, after September 1. Applicants must take aptitude test of the Graduate Record Examination (apply to Educational Testing Service, 170 East Washington Street, Berkeley, California 94704, or at Box 955, Princeton, New Jersey 08540). Applicants are encouraged to take the Graduate Record Examination administered in October rather than waiting for the December examination. The under-graduate major need not have been in sociology. The character and quality of the individual's prior education and experience are more important than the actual field of study.

M.A. Degree Requirements. 36 units of course work are required, as follows:

One course or seminar in sociological theory.

Sociology 27A-27B and Statistics 131. These courses must be passed with grade B or better. Students coming into the program with prior work in research methods and students undertaking such study independently may fulfill this requirement by passing, with grade B or better, examinations.

At least 16 units in graduate Sociology courses or seminars other than Sociology 299.

A maximum of 12 units of work taken in upper division Sociology courses 299, and 36 units of course work in other departments may be counted toward the 36 unit requirement. With permission of both the personal adviser and the Graduate Advisers, 4 additional units from this category may be applied to the 36 unit requirement. No units in Sociology 601 may be counted toward the 36 unit requirement.

Deadlines for Completion. During the first five quarters of residence the student is expected to complete (a) the theory and method requirements, including a paper in each of these areas; (b) at least three additional additional courses other than those for whom the theory and methods papers were written. The three additional papers may or may not be written as assignments in sociology courses, but the final paper must be submitted for approval to an instructor in the Department. (c) 36 units as above.

There is no foreign language requirement for the M.A. degree.

Ph.D. Degree Requirements. A master's degree is required. Students who have taken the M.A. at another university must meet the basic course requirements for M.A. students at Berkeley by passing the courses or documenting that they have had courses comparable to those required by the Department.

Before the qualifying examination, the student must have passed (or beyond any other taken for the M.A.) 2 graduate sociology courses or seminars (excluding Sociology 299). Minimum competence in methodology is to be documented as follows: Students choosing quantitative methods will take two additional courses or seminars from the designated list of appropriate offerings (to be passed with grade B or better) and prepare an acceptable research paper. Students choosing qualitative methods will take two additional courses or seminars from the designated list of appropriate offerings in which they can gain experience in the use of such methods but are required only to prepare an acceptable research paper. The student will be required to take written examinations to determine the acceptability of the research paper.

A foreign language may be required by the student's qualifying examination committee if deemed necessary for the dissertation research. Before formal advance to candidacy for the Ph.D., the student must have written and received approval from the proposed committee of a dissertation prospectus.

Within a period of no more than five years from the date of admission, the student is expected to complete and file his/her dissertation. Under special circumstances, the department may recommend to the Graduate Division an exception to the five-year limit if the extension has been approved by the dissertation committee chairperson and the Graduate Adviser.

Lower Division Courses

1. Introduction to Sociology. (4) Two hours of lecture and 2 hours of discussion per week. Prerequisite: not available for credit to students who have taken 2 or more upper division courses in Sociology, or to students who have taken Sociology 1A or 1B. Sociological approaches to the study of the fundamental problems of group life—social organization, culture, interaction, social behavior, socialization, the dynamics of modern society.

2. M. Edwards, (F).

3. Evaluation of Evidence. (5) Three hours of lecture and one hour of discussion per week. Prerequisite: not open to students who have received credit for course 104 prior to Fall 1975. A review of methodological problems in assessing data relating to social life. Topics to be covered include: sociological problems, gaining access to data, measuring, establishing correlation and causation among data, and relating data to theoretical propositions.

4. M. Fischer (F); M. Burt (W); M. Fischer (Sp)

Upper Division Courses

100. Social Evolution. (4) Three lecture hours per week. Prerequisite: lower division sociology course, or consent of the instructor. Theories of social and cultural change, progress, and evolution. History and analysis, primarily from and into the various doctrines of cycles to current sociology. Alternatives to social evolutionism.

Mr. Bock (F)

105A-105B. Introduction to Sociological Methods, (6-6) Four lecture hours per week and one consultation hour per week. Prerequisite: one lower division sociology course, or consent of the instructor for those who have not taken a course. An introduction to the methods of sociological inquiry, with attention to both qualitative and quantitative studies. Problems of research design, measurement, and data collection, processing, and analysis, will be considered. Credit and grade will be given only upon completion of the full sequence (105A, 105B).

107. Deviance and Social Control. (4) Three lecture hours per week. Prerequisite: restricted to majors in sociology and to those non-majors who have completed two upper division sociology courses, or permission of instructor. A study of social control, with attention to the functional and structural aspects of the various groups. Contemporary trends and future possibilities in relations between the group and the control apparatus; the dynamics of the future. Utopias, anti-utopias and proposed and possible social innovations will be analyzed through research and application.

Ms. Hochschild (Sp)

110A. Ethnic and Racial Relations: Theoretical Perspectives. (4) Three lecture hours per week. Some of the important theories and concepts in the field will be examined. Problems areas include the emergence of ethnic and racial minorities through such historical processes as colonialism, slavery, immigration, racism, its elements, dynamics, functions, ethnocentrism, ethnicity and related concepts.

110B. Peoples of Color: Continuities, Conflict, and Change. (4) Three lecture hours per week and one discussion hour per week. Prerequisite: course 110A recommended but not required. Focus on experience of major third world groups as represented in the United States: African-Americans, Chicano, Puerto Ricans, Asian Americans. Topica include historical emergence of subject groups, dynamics of everyday social position of the various groups; contemporary trends and future possibilities in relations between the group and the control apparatus; the dynamics of the future. Utopias, anti-utopias and proposed and possible social innovations will be analyzed through research and application.

Mr. Edwards (W)

110C. Selected Topics in Ethnic and Racial Relations. (4) Three lecture hours per week. Prerequisite: course 110A. Course subject matter not required. There will be variation in focus of attention, depending on the instructor in charge. Possibilities include an examination of a specific group, consideration in depth of specific theoretical issues, or an examination of race relations from an international comparative perspective.

113. The Sociology of the Possible. (4) Three lecture hours per week. Prerequisite: one lower division and two upper division sociology courses, or permission of the instructor. Analysis of social thought about the possible social arrangements from the writings of modern social science fiction and planners of the future. Utopias, anti-utopias and proposed and possible social innovations will be analyzed through the application of sociological theory.

115. Policy, Economy, and Society. (4) Three lecture hours per week. Prerequisite: Sociology 1A or 1B or consent of the instructor. The impact of economic policies of the contemporary United States: Government, Resources, and Cities. Stress on the importance of the training that comes from the study of how each sector is influenced by policy currents, economic trends, and social conflicts.

Mr. Schumann (F)

116. Sport as a Social Institution. (4) Three hours of lecture per week. Prerequisite: course 1A or 1B or consent of instructor. Credit will not be given to students who have already taken Sociology 107. An analysis of sport as social institution, its structure and functions: male-female role contrasts, race and sport; economics of sport; the roles of coach, athlete, fan—their interpersonal relationships and complexities; current turmoil in sport and the ideological struggle which has developed.

Mr. Edwards (Sp)

117. American Sociology: A Comparative Analysis. (3) Three lecture hours per week. Prerequisite: restriction to majors in sociology and those non-majors who have completed two or more upper division sociology courses, or permission of instructor. Various aspects of American values and behavior patterns over time; sources of differences from other developed nations.

Mr. Matza (Sp)

118. Introductory Political Sociology. (4) Three lecture hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Political processes in organizations; structure and politics of power. The role of social classes, occupational groups, and religious groups, and the influence of culture in the making of political attitudes.

Mr. Komarav (F)

119. Law and Society. (6) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Selected legal rules, principles, and institutions treated from a sociological perspective. Influence of society on law, and social change in shaping law in social change: social aspects of the administration of justice; social knowledge and the law.

Mr. Matza (Sp)

120. Organizations and Institutions. (4) Three lecture hours per week. Prerequisite: one lower division sociology course, or permission of the instructor. Administrative organizations and voluntary associations; major social institutions in industry, government, religion, and education.

124. Sociology of Education. (4) Three lecture hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. The role of formal education in modern societies. Educational systems in relation to the religious, cultural, economic, and political forces shaping their character.

125. Sociology of Science. (4) Three lecture hours per week. Prerequisite: 1A-1B or consent of the instructor. Introduction to sociological issues in the practice of science. The institutional organization of science, the scientific community as a social system and the informal social context. The methods by which rewards are distributed to scientists and the growth of knowledge as a consequence of scientists pursuing careers within this context.

126. Industrial and Occupational Sociology. (4) Three lecture hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Socialization, social control, role conflict, social structure; social control within and of occupations and professions; occupational associations versus labor unions, codes of ethics, legal controls; structural social of the workplace, work experience; participation, relations, class, race, sex, and community.

Mr. Wilensky (Sp)

130. Sociology of the Family. (4) Three lecture hours per week. Prerequisite: one lower division sociology course, or consent of instructor. Analysis and comparative analysis of family structure and change: marriage, reproduction, child-rearing, marital dissolution.
209A–209B. Advanced Interpersonal Behavior. (4–4) Two hours of lecture or seminar plus two tutorial hours per week. Prerequisite: course 209A is recommended but not prerequisite to 209B. Students may take the lecture course 209A or the seminar 209B, or they may take 209A–209B in sequence, with credit and grade assigned upon completion of the full sequence. An intensive study of selected topics in interpersonal behavior and small group processes: evolution of power and conflict, communication and exchange processes, interpersonal conflict, and social influence processes.

209A: Mr. Ofshe (F)

210A–210B. Racial and Ethnic Minorities. (4–4) Two hours of lecture and two hours of tutorial per week. Prerequisite: course 210A is recommended but not prerequisite to 210B. Students may take the lecture course 210A or the seminar 210B, or they may take 210A–210B in sequence, with credit and grade assigned upon completion of the full sequence. Discussion of minority groups, their relations with dominant members of society. Stresses processes of subjugation, accommodation, and mobilization. Different kinds of minorities compared to convey the range of differences as well as similarities.

210A: Mr. Blauner (Sp), 210B: Mr. Edwards (W)

212. Deviance and Social Control. (4) Two lecture hours and two consultation hours per week. Functions of law in social control. Emphasis on comparative materials.

213. Research Techniques and Applications. (4) Two seminar hours and two consultation hours per week. Methodological issues and special emphasis on comparative materials.

241. Organizations and Institutions. (4) Two lecture hours and two consultation hours per week. Prerequisite: course 241A is recommended but not prerequisite to 241B. Students may take the lecture course 241A or the seminar 241B, or they may take 241A–241B in sequence, with credit and grade assigned upon completion of the full sequence.

246. Sociology of Religion. (4) Two lecture hours and two consultation hours per week. Prerequisites: consent of the instructor.

276. American Society. (4) Two lecture hours and two tutorial hours per week. American institutions beginning during the cold war and subsequent development of domestic and international arrangements. Emphasis on relationships among labor, the economy, international affairs. Background on the period before World War II, especially the depression years, for understanding the post-war era.

309. Seminars in Research Methods. (4) Two seminar hours and two consultation hours per week. Prerequisites: consent of the instructor. Course may be repeated for credit.
The Department offers programs of both undergraduate and graduate instruction and research in the languages and civilizations of South Asia from the most ancient period to the present. Instruction includes (a) intensive training in several of the major languages of the area: Sanskrit (including Buddhist Sanskrit), Pali and Prakrit, Hindi and Urdu, Tamil, Malay-Indonesian, and Thai, (b) specialized training in 100A-100B-100C; (c) South Asian literature, philosophy and religion, and archaeology; and (c) general cross-disciplinary studies of the civilizations of South and Southeast Asia.

The program maintains a balance between ancient and modern studies, and between linguistic and cultural disciplines. Programs of study thus be devised to fit the needs of students with a wide range of interests. Opportunities exist for a limited number of students to participate in both archaeological projects and language training programs in Pakistan. The department has at its disposal the resources of the Center for South and Southeast Asia Studies, the South/Southeast Asia Library Service, and is closely related to the inter-disciplinary group in South Asia Studies Ph.D. program.

Major Program

A major is offered in South and Southeast Asian Studies with emphases on South Asian language, archaeology, or civilization, and Southeast Asian language (Malay-Indonesian) or civilization.

General requirements for the South Asian emphases are: lower division: South Asian 10A-10B; South Asian 15; upper division: South Asian 100.

In addition, specific requirements for each South Asian emphasis are as follows:

I. South Asian Language

A. Hindi-Urdu: (1) Hindi-Urdu 1A-1B-1C; (2) Hindi-Urdu 100A-100B-100C; (3) Hindi-Urdu 123; one other South Asian literature course in translation or one course from List IV below.

B. Sanskrit: (1) Sanskrit 100A-100B-100C; (2) Sanskrit 101, 102, 103; (3) 10 upper division units to be chosen from Lists I through V below.

C. Tamil: (1) Dravidian 1A-1B-1C; (2) Dravidian 100A-100B-100C; (3) 21 upper division units to be chosen from Lists I through V below.

II. South Asian Archaeology

A. South Asian language 100A-100B-100C plus 25 upper-division units or one year of a modern South Asian language (preferably modern): prerequisite, 15 lower division units of a South Asian language, 2 South Asian 123, one other South Asian language course in translation or one advanced Hindi-Urdu literature course; 4) 13 upper division units to be chosen from Lists I through V below.

B. Sanskrit: (1) Sanskrit 100A-100B-100C; (2) Sanskrit 101, 102, 103, 104; (3) 10 upper division units to be chosen from Lists I through V below.

C. Tamil: (1) Dravidian 1A-1B-1C; (2) Dravidian 100A-100B-100C; (3) 21 upper division units to be chosen from Lists I through V below.

III. South Asian Civilization

A. South Asian language 100A-100B-100C plus 25 upper-division units or one year of a modern South Asian language (15 lower division units) plus 31 upper-division units distributed as follows: (a) one literature course from List II below; (b) one course in religion or philosophy from List II below; (c) one course in history or social science from List III below; (d) one course in the fine arts from List IV below; (e) remainder of required upper-division units (either 25 or 31 as indicated above) to be selected from Lists I through V below.

Courses recommended for fulfillment of the upper division unit requirement for the South Asian emphases:

List I. Literature: South Asian 122, 123, 124, 125, 142

List II. Religion and Philosophy: South Asian 127, 131, 140, 141, 160; Interdepartmental Studies 155

List III. History and Social Science: History 187A, 187B, 187C; Anthropology 186A, 186B; Political Science 145A, 145B

List IV. Fine Arts: History of Art 136A, 136B, 136C; Music 133A, 133B (with consent of instructor)

List V. Archaeology: Relevant courses in Anthropology, Geography, Geology, Statistics, or other departments as the student’s specific field of archaeology requires.

With written permission from the student’s adviser, other relevant courses may be substituted for not more than two of the courses listed above, particularly in the event that certain of these courses may not be offered or new courses may be added to the curriculum. For the language emphasis, a minimum of two upper division courses in literature or literature in translation must be taken in fulfillment of the general upper division requirement.

General requirements for the Southeast Asian emphases are: lower division: Southeast Asian 10A-10B; upper division: Southeast Asian 100.

In addition, specific requirements for each Southeast Asian emphasis are as follows:

I. Southeast Asian Language

A. Malay-Indonesian: (1) Malay-Indonesian 1A-1B-1C; (2) Malay-Indonesian 100A-100B-100C; (3) Malay-Indonesian 130A-130B; (4) two lecture courses from List I below; (5) 6 upper division units to be chosen from Lists II through IV below; (6) Linguistics 20 is recommended.

II. Southeast Asian Civilization

A. One year of a Southeast Asian language (15 lower division units); (2) 35 upper division units distributed as follows: a) two courses from List I below; b) one course from List II below; c) one course from List III below; d) one course from List IV below; e) remainder of required upper-division units to be selected from Lists I through IV below.

Courses recommended for fulfillment of the upper division unit requirement for the Southeast Asian emphases:

List I. Literature: Malay-Indonesian 130A-130B; Southeast Asian 110, 124, 128;

List II. Religion and Philosophy: South Asian 124; Interdepartmental Studies 155

List III. Social Science: Anthropology 159, 160 (with consent of instructor), 189A, 189B; Geography 163; Political Science 143D, 143E;

List IV. Fine Arts: History of Art 137; Music 133A (with consent of instructor), Music 140 (with consent of instructor).

With written permission from the student’s adviser, other relevant courses may be substituted for not more than two of the courses listed above, particularly in the event that certain courses may not be offered or new courses may be added to the curriculum.

Honors Program. To be eligible for admission to the honors program, a student must attain a 3.3 grade-point average or higher in courses completed in the major and in all courses completed in the University. An honors thesis is required. Students who wish to participate must choose a thesis topic in consultation with an advisor and apply for admission to the program through the departmental office no later than the first week of winter quarter of the senior year. Additional information concerning the honors program is available in the departmental office, Room 411D Dinwille.

Letters and Science List of Courses: 162 units from the list must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Study

Programs of graduate study and research leading to the M.A. degree are offered with emphases on Dravidian (Tamil), Hindi and Urdu, Sanskrit, South Asian archaeology, and South Asian civilization. Programs leading to the Ph.D. degree are offered with emphases on Dravidian (Tamil), Modern Indo-Aryan...
Hindi and Urdu, Sanskrit, and South Asian archaeology.

**Degrees.** All students admitted to programs leading to a graduate degree will be expected to have, in addition to a B.A. or its equivalent, some formal academic background in South or Southeast Asian languages and area studies. Students should in general be prepared to have undergone training equivalent to that required of the departmental major in one of the various areas. M.A. candidates with insufficient preparation may be required to make up deficiencies without credit. The Ph.D. requires one year's full-time study.

The M.A. degree is offered under Plan II (see Index under Graduate Division) which requires the student to take courses totaling at least 36 upper division and graduate units, of which at least 18 must be graduate. The distribution of courses is determined in consultation with the student's advisor, following the specific requirements for each emphasis.

As part of the M.A. requirement, the student must pass a reading examination in a non-South or Southeast Asian language which the student and his or her advisor decide is relevant to the student's program, i.e., Dutch, Finnish, Greek, Japanese, Russian. For this first-year proficiency in a second area-related language is required for the M.A. emphasis in Hindi and Urdu, Sanskrit, and Tamil, to be satisfied by passing a reading examination or by obtaining a satisfactory grade (B— or better) in an advanced course.

Before being admitted to the comprehensive examination, students are required to submit to the graduate advisor two acceptable scholarly papers, prepared either independently or in connection with graduate courses, and to fulfill the language requirement.

Students must then pass a written examination in a major area and two minor areas of specialization (toward which they have directed their reading and coursework) and a final oral examination. Except in unusual circumstances, a student must complete the M.A. program in at most six quarters. Further information about University degree regulations can be found in the General Catalog.

The general prerequisites for admission to the Ph.D. program are the requirements for the M.A. degree in the appropriate field. Students without such an M.A. degree would normally be advised to apply for admission to the M.A. program, even though they may have completed the first year's full-time study of the M.A. program, they will be informed as to whether they are eligible for admission to the Ph.D. program. Students with an M.A. degree from another university will be examined for specific deficiencies in preparation and to fulfill the requirements for the M.A. degree in this department, except for the comprehensive examination.

The Ph.D. degree is offered according to Plan B. Beyond the course requirements for the M.A., students will complete a course in Indic-Aryan or Indo-European linguistics. In addition, they must demonstrate a second-year proficiency in a second-area-related language. This requirement may be satisfied by passing a reading examination or by obtaining a satisfactory grade (B— or better) in relevant coursework. They are expected to plan a program that will best prepare them for the qualifying examination. The General Catalog should be consulted for further information and regulations.

Students must demonstrate a reading knowledge of two languages relevant to the major field of interest. These languages will normally be selected from the following: Arabic, Chinese, Dutch, French, German, Japanese, Russian. Under special circumstances, students may offer another language with the approval of the advisor. The foreign language requirement is normally met by passing a reading examination in each language. This requirement must be met before a student can take the qualifying examinations.

Before being admitted to candidacy for the Ph.D., a student must demonstrate competence in the languages on his or her programs, and must pass a written and oral qualifying examination in three fields of specialization. One of these fields may be in an area of study outside the department. Examples of fields within the department are Hindi literature, Dravidian linguistics, Vedic, Prakrit, the Sanskrit grammarians; outside the department examples are Indian history and Indian art. Fields such as Indian philosophy and Buddhism can be studied both within and outside the department. Early in the Ph.D. program, students should consult with the graduate advisor and then submit a "state-ment of field," indicating how they will prepare themselves through courses and examinations for the qualifying examinations. The examinations will be administered by a committee appointed by the Graduate Council.

After admission to candidacy, the student will complete the Ph.D. dissertation according to Plan B. The dissertation will conform to procedures and regulations set by the Graduate Division and the Graduate Council.

### South Asian Lower Division Course

10A. Introduction to the Civilization of India. (5) Four and one-half hours of lecture per week. Readings, lectures, and discussions on the development of the major regions of India from the Indus valley and Brahmanic civilization to the advent of Islam. Special emphases on the development of religious, philosophical, and aesthetic systems of traditional India.

Staff (F)

10B. Introduction to the Civilization of India. (5) Four and one-half hours of lecture per week. Pre-requisite: 10A. Readings, lectures, and discussions in the development of Indian culture from the advent of Islam to the present. Special emphases on the religious movements of Bhakti and Indian Islam and the conflict of traditional and modern values in contemporary India.

Staff (F)

15. Great Books of India. (4) Three hours of lecture per week. Reading and discussion of 10 classic works of Indian literature in translation. The books ranging from the Sutras to the Bhagavad Gita, representative of different historical periods, regions, and languages and genres. Each book, however, has been chosen because it exemplifies or speaks for a central element of Indian culture.

Staff (Sp)

**Upper Division Courses**

100. Methods for Reading South and Southeast Asian Texts. (5) Four and one-half hours of lecture per week. Prerequisite: one year of a South Asian or Southeast Asian language is recommended. Texts from the areas covered in the study of Biblical and Hindu literature. Students will be introduced to those regularly taught in the department, such as Hindi-Prakrit, Sanskrit, and Pali, with an emphasis on translations from the Vedas, Sanskrit drama, Sanskrit and Prakrit poetry.

Staff

104A—104B. South Asian Archaeology: Problem of Ancient India. (4) Four and one-half hours of lecture per week. Prerequisite: introductory level of knowledge in the required area. Historical survey of selected translations from the Vedas, Sanskrit drama, Sanskrit and Prakrit poetry.

Staff

104C—104D. South Asian Archaeology: A Recounting of Ancient India. (4) Four and one-half hours of lecture per week. Prerequisite: introductory level of knowledge in the required area. Historical survey of selected translations from the Vedas, Sanskrit drama, Sanskrit and Prakrit poetry.

Staff

112. Medieval Indian Religious Poetry. (4) Three hours of lecture per week. A study of medieval poetry of devotional Hinduism and Indian sufism, through readings in English translation. Emphasis on works in the regional spoken languages, and on the role of devotional and mystical movements in the development of regional literatures.

Ms. Schomer


Ms. Schomer

124. Modern Indian Literature. (4) Three hours of lecture per week. Lectures and discussion of 19th and 20th century Indian literature in the major regional languages of India such as Hindi, Bengali, Tamil, and Malayalam, in English or in English translation. Stress is placed upon the interpretation of contemporary India society and culture through the literature.

Ms. Simon (W)

125. Tamil Literature in Translation. (3) Three 1-hour lectures per week. Prerequisite: no previous knowledge of Tamil. A study of the major Tamil authors and themes of the 20th century, with a focus on the language, literature, and culture of Tamil-speaking India. An analysis in depth of a few representative works with special emphasis on the nature-lore poetry of the earlier period of Saivite religious poetry.

Staff

127. Brahmanism and Hinduism. (4) Three hours of lecture per week. Readings in selections from the Hindu scriptures—the Vedas, the Brhamans, the Upanishads, the Epics (the Gétā) and the Sutras of the traditional systems of Indian philosophy. Student (F)

130. Historical Survey of Indo-Aryan Languages. (4) Four and one-half hours of lecture per week. One year of an Indo-Aryan language or Linguistics 20 or consent of instructor. Relationship of Indo-Aryan to Indo-European languages, linguistic development of Old Indo-Aryan (Vedic and Sanskrit), Middle Indo-Aryan (Pali, Prakrit, Abharambhas) and Modern Indo-Aryan (Hindi, Urdu). The rise of Dravidian languages in South Asia as a linguistic area. Mr. Pray, Mr. van Nooten

131. Indian Buddhism. (4) Three hours of lecture per week. General introduction to the systems of Buddhist thought in India. Selected Mahayana and Mahayana scriptures in translation. Brief survey of the historical development of the Buddhist samgha and its impact on the peoples of South and Southeast Asia.

Mr. Jaini (W)

140. Hindu Mythology. (4) Three 1-hour lectures per week. Literary and religious aspects of Hindu myths. Reading of selected mythological literature.

Mr. Goldman (Sp)

141. Religion in South India. (4) Three hours of lecture per week. The development and practice of religion in South India and its translation directly from Indian languages. Subjects covered include: the indigenous religion, the effect of Buddhism, Christianity, and Islam on the practice of Hinduism in modern South India.

Staff

142. Indian Poetry in Translation. (4) Four and one-half hours of lecture per week. Lectures and discussions on ancient Indian religious, devotional, and secular poetry. Selections of translated selections from the Vedas, Sanskrit drama, Sanskrit and Prakrit poetry.

Staff

149A—149B—149C. Studies in South Asian Languages. (4, 2—4, 4) Four and one-half hours of lecture per week. Prerequisite: Consent of instructor. Directed study in modern South Asian languages other than those regularly taught in the department, such as Dravidian, Sanskrit. For students who wish to study another South Asian language such as Bengal, etc.

Staff

160. Jainism and Other Hetarodacious Systems. (4) Five and one-half hours of lecture per week. Prerequisite: course 131 and/or consent of instructor. Selected readings from the Jain scriptures and commentaries culminating in the 12th century A.D. Rise of other heterodoxies, particularly in the Visrävas in the South and the Nathas and Sídhas in the North. General introduction to the various aspects of the non-Buddhist religious movements of ancient and medieval India. Mr. Jaini (Sp)

162. Problems of Asian Mysticism. (4) Three hours of lecture per week. Readings in Hindu, Buddhist, and Sufism. The methodology of research in this area; meditation and other mystical practices.

Mr. Staal

175. Sanskrit Bibliography. (4) Three hours of lecture per week. A survey of the bibliography of source materials of the past fifty years with emphasis on present sources of information.

Staff

192A—192B. South Asian Prose Literature. (4—4) Three hours of lecture per week. A survey of archaeological discoveries in India, Pakistan, Ceylon, and Afghanistan relating to the Stone Age and Chalcolithic periods. Emphasis will be placed on the factors leading up to the rise of South Asia's earliest civilization.

Mr. Dalessi

193A—193B. South Asian Archaeology: Protohistoric and Early Historical Periods. (4—4) Three hours of lecture per week. A survey of archaeological discoveries in India, Pakistan, Afghanistan and religious practices of the Harappan (Indus) civilization and the rise of the Rig-Veda. Mr. Dalessi

193C. The Archaeology of North India from the Vedic to the Mauryan Period. (4) Three 1-hour lectures per week. Survey of the archaeological evidence of the Vedic period with the gradual rise of towns and cities; correlated with the evidence contained in Vedic, Epic, and early Buddhist literature.

Mr. Dalessi

194. Field Project in Pakistan. (10-15) Four to six hours of lecture per week. A study of the archaeological sites of the Indus valley and the渐渐 rise of towns and cities; correlated with the evidence contained in Vedic, Epic, and early Buddhist literature.

Mr. Dalessi

Note: For key to symbols, see page 36.
requirements for a Master's degree. Must be taken on
Southeast Asia as a discrete area of scholarly inquiry.

219. Directed Group Study for Upper Division Students. (1-4) Hours of meeting are variable. Tutorial instruction in areas not covered by regularly scheduled courses. Staff (F, W, Sp)

290A-290B-290C. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A. South Asian Studies. 290B. Dravidian. 290C. Hindi-Urdu. 290D. Malay-Indonesian. 290E. Southeast Asian Studies. 290F. Sanskrit. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one quarter may not exceed 12. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A. South Asian Studies. 290B. Dravidian. 290C. Hindi-Urdu. 290D. Malay-Indonesian. 290E. Southeast Asian Studies. 290F. Sanskrit. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one quarter may not exceed 12. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

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290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A. South Asian Studies. 290B. Dravidian. 290C. Hindi-Urdu. 290D. Malay-Indonesian. 290E. Southeast Asian Studies. 290F. Sanskrit. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one quarter may not exceed 12. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A. South Asian Studies. 290B. Dravidian. 290C. Hindi-Urdu. 290D. Malay-Indonesian. 290E. Southeast Asian Studies. 290F. Sanskrit. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one quarter may not exceed 12. Staff (F, W, Sp)

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290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

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290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A. South Asian Studies. 290B. Dravidian. 290C. Hindi-Urdu. 290D. Malay-Indonesian. 290E. Southeast Asian Studies. 290F. Sanskrit. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one quarter may not exceed 12. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A. South Asian Studies. 290B. Dravidian. 290C. Hindi-Urdu. 290D. Malay-Indonesian. 290E. Southeast Asian Studies. 290F. Sanskrit. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one quarter may not exceed 12. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A. South Asian Studies. 290B. Dravidian. 290C. Hindi-Urdu. 290D. Malay-Indonesian. 290E. Southeast Asian Studies. 290F. Sanskrit. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one quarter may not exceed 12. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A. South Asian Studies. 290B. Dravidian. 290C. Hindi-Urdu. 290D. Malay-Indonesian. 290E. Southeast Asian Studies. 290F. Sanskrit. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one quarter may not exceed 12. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)

290A. South Asian Studies. 290B. Dravidian. 290C. Hindi-Urdu. 290D. Malay-Indonesian. 290E. Southeast Asian Studies. 290F. Sanskrit. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one quarter may not exceed 12. Staff (F, W, Sp)

290A-290B-290C-290D-290E-290F. Special Studies. (1-5) Hours of meeting variable. Consent of instructor. Staff (F, W, Sp)
from year to year. The course may be repeated for credit with consent of instructor. Mr. van Nooten (F).

106. Buddhist Sanskrit. (5) Four and one-half hours of lecture per week. Prerequisite: course 100C or consent of instructor. Introduction to grammar of Buddhist Sanskrit and readings of Buddhist Sanskrit texts. Mr. van Nooten (F).

1150. Sanskrit Prose Composition. (3) Three hours of lecture per week. Prerequisite: course 100C or equivalent. Practice in translation from English to Sanskrit. Consolidation of basic grammatical skills through composition. Discussion and evaluation of the composition will be conducted in Sanskrit. Staff.

198. Senior Honors. (1–4) Hours of meeting are restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. Staff (F, W, Sp).

Graduate Courses

200. Readings In Sanskrit. (5) Four and one-half hours per week. Advanced reading of Buddhist and modern Sanskrit texts. May be repeated for credit when subject matter differs. Mr. Goldman (Sp).

203. Advanced Sanskrit, (5) Four and one-half hours per week. Readings of advanced Sanskrit texts with linguistic emphasis. The texts to be read will vary from quarter to quarter. May be repeated with consent of the instructor. Mr. van Nooten (Sp).

204. Introduction to Vedic Ritual. (3) Three hours of lecture per week. Prerequisite: two years of Sanskrit or consent of instructor. The main types of domestic (grhya) and srauta ritual. Sources for the study of the ritual. The Vedic schools and their principal texts. The Soma sacrifice, principal recitations, chants, and offerings. Discussion of representative textual passages and recordings. Staff (F, W).

2050. Middle Indic. (5) Four and one-half hours per week. Prerequisite: two years of Sanskrit, or consent of instructor. A study of Sanskrit orate poetry with emphasis on the canons of poetic analysis of the Indian aesthetic tradition. Staff (F, W).

2060. Middle Indic. (4) Four and one-half hours of lecture per week. Prerequisite: course 105, or 106, or an equivalent introduction to Middle Indic. Selected readings of texts in one or more of the Prakrit dialects. Mr. van Nooten (F).

Thai

1A–1B. Introductory Thai. (5–5) Five hours of lecture and one-hour laboratory per week. Survey of grammar, graded exercises and readings drawn from Thai literature, leading to a mastery of basic grammatical patterns, essential vocabulary and achievement of basic reading and writing competence.

198. Directed Group Study in Thai Literature. (1–4) Variable hours of lecture per week. Prerequisite: reading knowledge of Thai. Selected readings in Thai literature, from early poetical works to modern fiction. Staff (F, W).

Spanish and Portuguese

Department Office, 4326 Dwinelle Hall

Professors: Arthur A. Sorkin, Ph.D. (Chairman)

G. Arnold Chapman, Ph.D.

J. M. Hammond, Ph.D.

José Durán, Doctor en Filología

Luis A. Martín, Ph.D.

John H. R. Post, Ph.D.

K. Walsh, Ph.D.

Benjamin M. Woodward, Jr., Ph.D.

Luis Monguió, Licenciado en Derecho, LL.D. (Emeritus)

Associate Professors: Charles B. Faulhaber, Ph.D. (Emeritus)

G. Arnold Chapman, Ph.D.

Robert A. Spaulding, Ph.D. (Emeritus)

Assistant Professors: Emil H. Avendano, Ph.D.

Charles B. Faulhaber, Ph.D.

Dra. Gonzalez, Ph.D.

Departmental Major Advisers: Option A: Mr. Chapman, Mr. Durand, Mr. Dougherty; Option B: Mr. Askins (F), Mr. Moises (W). The sequence of undergraduate and graduate programs of the Department of Spanish and Portuguese is designed to lead to the acquisition of competence in written and spoken languages, through an acquaintance with the structure and history of one or both of these languages and a critical understanding of the development and achievements of their literatures in the Old World and in the New, to training in advanced study and independent research. The Department's policy is to maintain a balanced strength between language and literature and between Peninsular and Hispanic-American facets of a unified field.

The Major In Spanish

Option A: Spanish and Spanish American

Lower Division. Courses 1, 2, 3, 4, 5, and 25 (or their equivalents). Students transferring from other institutions with advanced standing and intending to major in Spanish must present evidence (by examination or otherwise) that their preparation includes the equivalent of Spanish 25.

Upper Division. 45 units of upper-division work in the Department, including the core courses Spanish Courses B, 101, 106, 105A-105B, 107A–107B–107C, and 105C. In addition, four upper-division courses in Spanish other than core courses taken under the following conditions: Spanish 100 to be completed before enrollment in any of the elective courses; Spanish 104A–104B–104C or Portuguese 104A–104B–104C to be completed before enrollment in any elective course in Spanish American or Spanish literature, respectively; and Spanish 141 and 142 not to be included as one of the four upper-division courses. The upper-division course in Brazilian Portuguese literature may be substituted for one of the four elective courses. In addition, students are required to complete two courses (upper- or lower-division) specifically related to the major, but outside the Department.

Students will normally complete the core courses in the first four quarters of study and the elective courses within the Department in the final two quarters of study. Recommended: further study in Western European and Latin American history, languages, and literatures. Candidates for the teaching credential in Spanish as a single subject are advised to include courses 112, 113, and 125 in their program.

Option B: Spanish, Spanish American, and Luso-Brazilian

Lower Division. Courses Spanish 5 (or equivalent) and Portuguese 4 (or equivalent). Students transferring from other institutions with advanced standing and intending to enroll in the program must present evidence (by examination or otherwise) that their preparation includes the equivalents of Spanish 5 and Portuguese 4.

Upper Division. 45 units of upper-division work in the Department, including the core courses Spanish Courses 100, 104A–104B, 107A–107B–107C, and 105C. In addition, four upper-division courses, including two courses from among Spanish 104A–104B and 107A–107B–107C, but excluding Portuguese 101. Portuguese 122A–122B–122C or Portuguese 123A–123B to be completed before enrollment in any elective course.
course in Portuguese or Brazilian literature, respective-
ly. Students are required to complete two courses (up-
per- or lower-division) specifically related to the major,
but outside the Department, unless these courses
would bring the total work for the major to more than
90 units.

Honors Program. To be admitted to the honors
program in Spanish, Option A or Option B, students
shall have completed at least three quarters of work on
this campus with an overall grade-point average of at
least 3.3 and a grade-point average of at least 3.3 in
courses in the major. Students must also have the ap-
proval of the major adviser in consultation with other
members of the Department.

Students admitted to the honors program shall com-
pete, preferably before, but not later than, the first
quartermay refuse to qualify for either Option A or Option B, or give evidence, by spe-
cial examination, of equivalent preparation. Students
passing an examination in lieu of any of the required
courses will be deemed to have satisfied the cor-
responding requirement for the major, though without
obtaining unit credit.

Students in the honors program shall complete the
special honors course or two graduate courses, preferably
in sequence, which require the writing of a major re-
search paper. Students may substitute courses Spanish
195A-195B for Option A, Portuguese 195A-195B for Option B) shall be offered each quarter. This
course shall consist of independent study and the writ-
ing of a research paper under the direction of an appro-
priate member of the Department.

Letters and Science List of Courses: 162 units from
the List must be included in the 180 required for
graduation. See the Announcement of the College of
Letters and Science for courses on the List.

Graduate Study

Preparation for Graduate Study. Students who
may wish to pursue work toward advanced degrees in
the Department should note that two quarters of col-
lege Latin (or equivalent) are prerequisite for such
work, while a minimum of one year of college Latin (or
equivalent) is strongly recommended. They should
note that the M.A. degree program in Spanish also
requires a reading knowledge of another language
that the Ph.D. degree program in Romance Languages
and Literatures requires a reading knowledge of Latin,
French, and Italian, and an additional modern foreign
language pertinent to Hispanic scholarship.

Students other than Berkeley A.B. Spanish majors
applying for admission to graduate work in the Depart-
ment of Spanish and Portugese should have an under-
graduate preparation reasonably approximating that of
the undergraduate major in Spanish at Berkeley.

The Graduate Programs. The requirements for an
M.A. degree in Spanish are: an A.B. degree with a
major in Spanish equivalent to the undergraduate ma-

or in Spanish American literature and familiarity with
Romance philology, with emphasis on Spanish. Plan I fur-
ther requires a knowledge of a second Romance litera-
ture as a collateral, and of prescribed masterpieces in
the third. Plan II requires a command of one broad,
integrated field (period, movement, genre) in both
Italian and French literatures. Students whose principal
interest is philological should see the statement under
Romance Philology.

II. The program in Hispanic Literatures. Prerequisites
for admission are the following: (a) An A.B. degree with
a major in Spanish equivalent to the undergraduate
major at Berkeley (Option A or Option B, or with a
corresponding major in Portuguese; (b) the completion
of 36 post-baccalaureate quarter units (or the equiv-
alent) in Hispanic literatures and/or philology, of which
at least 24 units must be in strictly graduate courses;
and (c) work at an advanced level in an appropriate
collateral literature. There are no specific course or unit
requirements beyond those already described. Students
who take the Qualifying Examination and so advance to
candidacy the student will fulfill the following re-
quirements, by means of course work or examination unless
otherwise indicated: (1) a comprehensive knowledge of
Spanish and Spanish American or of Luso-Brazilian
literature. (The Chairman, in consultation with the stu-
dent's Graduate Adviser, will appoint a committee
which, during the student's first term in the program,
will evaluate his or her previous preparation and deter-
mine what additional courses and/or examinations, if
any, will be required; (2) a reading knowledge of Lat-
in, French, and one additional modern foreign lan-
guage pertinent to Hispanic scholarship; (3) a knowl-
edge of the history of the Spanish or of the Portuguese
language. The Qualifying Examination will test the stu-
dent's knowledge of a specific, emphasized field of
Hispanic literature. Students will be in consultation with
the graduate adviser from among four fixed areas, and
the student's knowledge of selected collateral litera-
tures pertinent to the main field.

For further details on the requirements for the M.A.
degree in Spanish and in the two doctoral programs ad-
ministered by the Department of Spanish and Portu-
guese, see the Graduate Division section of this cata-
log, and consult the Graduate Secretary in Spanish,
4321 Dwinelle Hall.

The Department of Spanish and Portuguese also col-
laborates in the doctoral program in Romance Philol-
ogy.

Spanish

Lower Division Courses (Mr. Azevedo in charge)

Evaluation of Credit Previously Earned. The
first year of secondary-school credit in Spanish is con-
tinued each successive year of credit is equal to one addi-
tional course (5 units) in a sequence of four quarter
courses in college.

1. Elementary Spanish (Beginner's Course). (5)
   Five 1-hour class meetings per week. Prerequisite:
course 1 or equivalent. (F, W, Sp)

2. Elementary Spanish (Continuation of 1). (6)
   Five 1-hour class meetings per week. Prerequisite:
course 1 or equivalent. (F, W, Sp)

3. Elementary Spanish (Continuation of 2). (6)
   Five 1-hour class meetings per week. Prerequisite:
course 2 or equivalent. (F, W, Sp)

4. Intermediate Spanish (Continuation of 3). (5)
   Five 1-hour class meetings per week. Prerequisite:
course 3 or equivalent. (F, W, Sp)

5. Intermediate Spanish (Continuation of 4). (5)
   Five 1-hour class meetings per week. Prerequisite:
course 4 or equivalent. (F, W, Sp)

8A. Spoken Spanish. (4) Five 1-hour class meetings
per week. Prerequisite: course 3 or equivalent. May
be taken in conjunction with course 4, 5, or 25. Course
designed to increase vocabulary and to improve gram-
mar and pronunciation by means of oral exercises.
(F, W, Sp)

8B. Spoken Spanish. (4) Five 1-hour class meetings
per week. Prerequisite: course 8A or equivalent. A con-
tinuation of Spanish 8A. May be taken in conjunction
with course 4, 5, or 25. Course designed to increase
vocabulary and to improve grammar and pronunciation
by means of oral exercises.
(F, W, Sp)

12A. Beginning Spanish. Intensive Courses. (10)
   Ten 1-hour class meetings per week. Two hours per
   week obligatory laboratory attendance. An intensive
   course in beginning Spanish, equivalent to Spanish
   2 and Spanish 2.
   (F)

12B. Intermediate Spanish. Intensive Course. (10)
   Ten 1-hour class meetings per week. Two hours per
   week obligatory laboratory attendance. An intensive
   course in intermediate Spanish, equivalent to Spanish
   3 and Spanish 4.
   (W)

12C. Advanced Spanish. Intensive Course. (10)
   Ten 1-hour class meetings per week. An intensive
   course in advanced Spanish, equivalent to Spanish 5
   and Spanish 25.
   (Sp)

14A--14B--14C. Individualized Instruction in
Elementary Spanish. (1, 5; 4, 5) Hours to be deter-
mined on an individual basis. Prerequisite: open to any
student whose program, including this course, meets
the demands of study to demonstrate a reading know-
lage of Spanish 1--3. Divided into 15 units (14A: 1--
5 units; 14B: 1--5 units; 14C: 1--5 units). Students
may enter at the beginning of any level for which they
are qualified. They are strongly urged to enroll for no
more than the 2-unit minimum; single-unit enrollments
are allowed only in order to complete any of the three
levels. Students may complete additional units as they
wish and will be given credit for any additional units
that are successfully completed. All units contracted
for must be completed during the quarter the student
is enrolled in the course.
(F, W, Sp)

25. Advanced Spanish. (8) Four 1-hour class meet-
ings per week. Prerequisite: course 5 or equivalent.
   Reading and analysis of literary texts, with ample re-
view of grammar, and practice in composition.
(F, W, Sp)

Lower-Division Courses in English Translation

99. Spanish and Spanish American Literature in
English Translation. (4) Three class hours per week.
   Open to students in all departments of the University.
   No knowledge of Spanish necessary.
   *39A. Spain: Medieval Period, Renaissance, and
   Golden Age.
   *39B. Spain: Neo-Classical Period to Present Day.
   *39C. Spanish America: To the end of the Nineteenth
   Century.
   *39D. Spanish America: Modernism and the Con-
   temporary Period.

40. Hispanic Culture. (3) Three 1-hour lectures per
   week. Prerequisite: course 4 or equivalent. Read-
   ing and analysis of literary texts, with ample re-

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Spanish for Native Speakers

70. Spanish for Bilingual Students. First Course.
   (4) Four 2-hour class meetings per week. This course
   is designed to bring Spanish-speaking students up
   to course level. This course is offered only to his-
   panic students who are learning college level
   Spanish. Prerequisite: permission of instructor. A
   course taught in the Washington, D.C. area.

100. Introduction to Spanish Linguistics. (3) Three
   class hours per week. Mr. Azevedo (F)

Upper-Division Courses

Prerequisite to all upper-division courses: Spanish 25
or equivalent, unless otherwise noted.

101. Advanced Grammar. (3) Formerly 116. Three
   class hours per week. Prerequisite: course 4 or
equivalent. A course in advanced Spanish grammar,
   with emphasis on the use of infinitives and the
   subjunctive, and the history and development of
   the language.
   (F, W, Sp)

102. Advanced Compositions. (3) Formerly 117.
   Three class hours per week. Prerequisite: course 101
   (Formerly 116). (F, W, Sp)

104A--104B. Survey of Spanish American Litera-
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104A. Spanish American literature to 1850. (4) Three class hours per week. Mr. Chapman (F); Mr. Durand (W)
104B. Spanish American literature, 1850 to the present. Mr. Chapman (W), Miss Maisello (Sp)

107A-107B-107C. Survey of Spanish Literature. (4-4-4) Three class hours per week. Sequence beginning (F, Sp)
107A. Peninsular literature to 1500. Mr. Walsh (F, Sp)
107B. Peninsular literature, 1500—1700. Miss Bergmann (F), Mr. Walsh (W)
107C. Peninsular literature, 1700 to the present. Mr. Polt (W), Mr. Dougherty (Sp)

*110B. Introduction to the Ballad. (4) Three class hours per week. Mr. Askins

110. Spanish Drama of the Sixteenth and Seventeenth Centuries. (4) Three class hours per week. Miss Bergmann (F)

111A-111B. Cervantes. (4-4) Three class hours per week. Sequence beginning (Sp). Mr. Murillo

112. Studies in Spanish Culture. (4) Three class hours per week. Miss Bergmann (W)

113. Studies in Latin American Culture. (4) Three class hours per week. Mr. Durand (Sp)

*114A-114B. The Contemporary Spanish American Novel. (4) Three class hours per week. Mr. Chapman

115. A Survey of Spanish Lyric Poetry. (4) Three class hours per week. Mr. Polt (W)

*119B. Modern Penseruzzian Drama: From the Romantic Period to the Present. (4) Formerly 105. Three class hours per week. Mr. Murillo

*119A. Nineteenth Century Spanish Fiction. (4) Formerly 103. Three class hours per week. Mr. Dougherty

125. Spanish Phonetics. (4) Three class hours per week. Mr. Dougherty. Training in the use of phonetic symbols in transcription and in recognition of phonological rules. Course will include practice in pronunciation (with remedial work, where necessary) and contrastive (Spanish-English) phonetics. Laboratory attendance will be required. Mr. Azevedo (W)

126. Medieval Spanish Literature. (4) Three class hours per week. Mr. Dougherty

*127. Eighteenth-Century Spanish Literature. (4-4-4) Three class hours per week. Mr. Polt

*128. Contemporary Spanish Literature. (4) Three class hours per week. Mr. Dougherty

*129. The Spanish American Essay. (4) Three class hours per week.

*130. Twentieth-Century Spanish American Poetry. (4) Three class hours per week.

*131. Spanish American Short Story (Twentieth Century). (4) Three hours of lecture per week. Brief panorama of the Spanish American short story, beginning with Modernism (c. 1885), with emphasis, each time the course is given, on two or three different authors or types of short story, such as the fantastic, realistic, or humorous, etc. Course may be repeated for credit when topic changes. Mr. Durand

171. Advanced Spanish For Bilingual Students. (4) Three class hours and one laboratory hour per week. Permission of instructor. A study of phonetics, grammar, lexicon, and composition. Primarily for students whose native language is Spanish.

181A-181B. The Indian In Spanish American Literature. (4-4-4) Three 1-hour lectures per week. Mr. Durand

201. Applied Linguistics and Foreign Language Acquisition. (3-3) Three hours of lecture per week. Applied linguistics as a field of research and its relationship to theoretical linguistics and problems of second language acquisition. Emphasis on contrastive analysis of selected aspects of English, Spanish, and Portuguese. Students may not receive credit for both Portuguese 201 and Spanish 201.

202A-202B. Historical Grammar of Ibero-Romance, (3-3) Formerly 212A-212B. One 2-hour meeting per week. Sequence beginning (F). Mr. Craddock

205. History of the Spanish Language Since the Middle Ages. (3-3) Formerly 217. One 2-hour meeting per week. Prerequisite: Course 202A-202B.

*207. The Languages of the Iberian Peninsula in Romance Perspective. (3-3) One 2-hour meeting per week. Prerequisite: course 202A-202B or consent of instructor. Mr. Craddock

*209. Seminar In Hispanic Linguistics. (3) One 2-hour meeting per week. Prerequisite: course 202A-202B or consent of instructor. Course may be repeated for credit when topic changes. Mr. Craddock

220A-220B. Introduction to Medieval Hispanic Literature. (3-3) Formerly 196A-B. Three hours of lecture per week and one 2-hour meeting per week. Sequence beginning (W). Mr. Walsh

221A-**221B. Major Prose Authors of the Golden Age. (3-3) Two hours of lecture per week. Mr. Murillo (Sp)

222A-**222B. Major Poets of the Golden Age. (3-3) Two hours of lecture per week. Mr. Murillo (F)

223A-**223B. Major Poets of the Golden Age. (3-3) Two hours of lecture per week. Mr. Murillo (Sp)

224A-**224B. Major Dramatists of the Golden Age. (3-3) Three 2-hour meetings per week. Sequence beginning (W). Miss Bergmann

225A-**225B. Spanish Enlightenment and Romanticism. (3-3) Two hours of lecture per week. Mr. Mohamed

226A-**226B. Spanish Enlightenment and Romanticism. (3-3) Two hours of lecture per week. Miss Bergmann

227A-**227B-**227C. The Spanish Novel Since 1850. (3-3) Three 2-hour meetings per week. Sequence beginning fall quarter. Mr. Polt

229A-**229B. Modern Spanish Poetry (After Romanticism). (3-3) Two hours of lecture per week. Mr. Grenier (W)

232A-**232B. Colonial Spanish American Literature. (3-3) Two hours of lecture per week. Mr. Chapman

234A-**234B-**234C. Modern Spanish American Poetry. (3-3) Two hours of lecture per week. Sequence beginning (W). Mr. Chapman

236A-**236B-**236C. Modern Spanish American Prose. (3-3) Two hours of lecture per week. Mr. Chapman

246. Hispanic Paleography. (3) Formerly 2030. Three 2-hour meetings per week.

250. Medieval Epic Poetry. (3) Formerly 206A-206B-206C. Three 2-hour meetings per week. Course may be repeated for credit when topic changes.

251. Libro de buen amor. (3) One 2-hour meeting per week. Mr. Walsh

252. La Celestina. (3) One 2-hour meeting per week. Mr. Faulhaber

254A-**254B. A Single Author or a Special Topic. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes.

255A-**255B. La Comedia y Related Minor Genres. (3-3). One 2-hour meeting per week. Course may be repeated for credit when topic changes.

256A-**256B. Lyric Poetry. (3) One 2-hour meeting per week. Course may be repeated for credit when topic changes.

257A-**257B. The Ballad. (3-3) Formerly 209A-209B. One 2-hour meeting per week. Mr. Murillo

258. Epic Poetry. (3) One 2-hour meeting per week. Mr. Askins

262A-**262B. A Single Author or a Special Topic. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes.

263A-**263B. The Enlightenment. (3-3) Formerly 206A-206B-206C. One 2-hour meeting per week. Course may be repeated for credit when topic changes.

269A-**269B. The Enlightenment. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Askins

Modern Spanish

285A-**285B. Narrative and Expository Prose. (3-3) Two 2-hour meetings per week. Course may be repeated for credit when topic changes.

286A-**286B. Lyric Poetry. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes.

287A-**287B. Drama. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Topic for Spring 1979: From Goldós to Lorca. Mr. Dougherty

299A-**299B. A Single Author or a Special Topic. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes.

Spanish American

270A-**270B. The Colonial Period. (3-3) One 2-hour meeting per week. Mr. Durand

272A-**272B-**272C. The Modern Period. (3-3) One 2-hour meeting per week. Mr. Polt

NOTE: For key to symbols, see page 30.
**190. Introduction to Portuguese Linguistics.** (3) Three class hours per week. Prerequisite: consent of instructor. Analysis of selected problems of the Portuguese language, in an effort to contrast it with Spanish and with other varieties of Romance speech. Mr. Woodbridge

**193A-193B. Brazilian Literature in English Translation.** (3) Formerly 109A-109B. Formerly course 123. Three class hours per week. An intensive course for students with the equivalent of Portuguese or another Romance language. Emphasis on contrastive analysis of selected aspects of English, Spanish, and Portuguese. Mr. Azevedo

**195A-H195B. Portuguese Honors Course.** (3-4) Honors thesis. Credit and grade will be awarded on completion of the sequence. (F, W)

**199. Supervised Independent Study and Research.** (2-6) Enrollment is restricted by regulations listed on page 56. Restricted to senior honor students with an adequate preparation for the subject proposed for special study, and by previous arrangement with members of the Departmental Staff. Must be taken on a pass/no pass basis. Mr. Askins, Mr. Azevedo, Mr. Moises, Mr. Woodbridge (F, W, Sp)

**Linguistics**

**201. Applied Linguistics and Foreign Language Acquisition.** (3) Two class hours per week. Applied linguistics as a field of research and its relationship to theoretical linguistics and problems of second language acquisition. Emphasis on contrastive analysis of selected aspects of English, Spanish, and Portuguese. Students may not receive credit for both Portuguese 201 and Spanish 201.

**Literature: Comprehensive Courses**

**220. Early Portuguese Literature.** (3) Formerly 200. One 2-hour meeting per week. Mr. Askins

**Literature: Studies**

**226. A Single Author or Special Topic In Portuguese Literature.** (3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Askins, Mr. Moises

**276. The Brazilian Novel.** (3) Formerly 201. One 2-hour meeting per week. Mr. Woodbridge

**279. Author or Special Topic in Brazilian Literature.** (3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Woodbridge

**Special Programs**

**Division Office: 301 Campbell Hall**

**Professors:**
Gone A. Brucker, Ph.D. (history)
Stephen J. Greenblatt, Ph.D. (English)
Erich B. Gruen, Ph.D. (History)

Mr. Azevedo

**Teaching Course**

**301. Teaching Spanish in College.** (2) Two hours of lecture and one hour of language laboratory per week. Preparation for the graduate reading examinations. Grading to be on a satisfactory/unsatisfactory basis. Mr. Azevedo (F)

**302.дель Spanish in College.** (1-8) Individual study in consultation with the major field advisor. May not be used for the undergraduate major in Spanish. Mr. Azevedo, Mr. Woodbridge (F, W, Sp)

**Portuguese**

**Lower-Division Courses (Mr. Azevedo in charge)**

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title</th>
<th>Units</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>114</td>
<td>The Modern Brazilian Novel</td>
<td>3</td>
<td>Special tutorial or seminar. Requires previous study of Portuguese. (W, \text{Sp})</td>
</tr>
<tr>
<td>201</td>
<td>Applied Linguistics and Foreign Language Acquisition</td>
<td>3</td>
<td>Applied linguistics as a field of research and its relationship to theoretical linguistics and problems of second language acquisition. (W, \text{Sp})</td>
</tr>
<tr>
<td>202</td>
<td>Poetry</td>
<td>5</td>
<td>Formerly 202A-202B. One 2-hour meeting per week. Course may be repeated for credit when topic changes. (W, \text{Sp})</td>
</tr>
<tr>
<td>203</td>
<td>Grammar</td>
<td>4</td>
<td>Formerly course 123. Three class hours per week. (W, \text{Sp})</td>
</tr>
<tr>
<td>204</td>
<td>Portuguese for English Speakers</td>
<td>4-5</td>
<td>Formerly course 124. Three class hours per week. (W, \text{Sp})</td>
</tr>
<tr>
<td>205</td>
<td>Spanish for English Speakers</td>
<td>4-5</td>
<td>Formerly course 123. Three class hours per week. (W, \text{Sp})</td>
</tr>
</tbody>
</table>

**Graduate Courses**

Concerning conditions for admission to graduate courses, see Graduate Division in Index.

**Linguistics**

**201. Applied Linguistics and Foreign Language Acquisition.** (3) Two class hours per week. Applied linguistics as a field of research and its relationship to theoretical linguistics and problems of second language acquisition. Emphasis on contrastive analysis of selected aspects of English, Spanish, and Portuguese. Students may not receive credit for both Portuguese 201 and Spanish 201.

**Literature: Comprehensive Courses**

**220. Early Portuguese Literature.** (3) Formerly 200. One 2-hour meeting per week. Mr. Askins

**Literature: Studies**

**226. A Single Author or Special Topic In Portuguese Literature.** (3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Askins, Mr. Moises

**276. The Brazilian Novel.** (3) Formerly 201. One 2-hour meeting per week. Mr. Woodbridge

**279. Author or Special Topic in Brazilian Literature.** (3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Woodbridge

**Special Study for Graduate Students.** (2-6) Hours of meeting are variable. Prerequisite: graduate standing. Individual conferences on special programs of study or research in a restricted field not covered by available courses or seminars. Mr. Askins, Mr. Azevedo, Mr. Moises, Mr. Woodbridge (F, W, Sp)

**Special Advanced Study.** (2-6) Restricted to candidates for higher degrees with an adequate preparation for the subject proposed for special study, by previous arrangement with members of the Departmental Staff. Sections 1 through 20; letter-graded; Sections 21 through 40: satisfactory/unsatisfactory grading. Mr. Askins, Mr. Azevedo, Mr. Moises, Mr. Woodbridge (F, W, Sp)

**Catalan**

**Lower-Division Courses (Mr. Azevedo in charge)**

Evaluation of Credit Previously Received. The first year of secondary-school credit in Catalan is considered to be equivalent to the first-quarter course; each successive year of credit is equal to one additional course (5 units) in a sequence of four quarter courses in college.

**1. Elementary Catalan (Beginner's Course).** (5) Five 1-hour class meetings per week. Mr. Azevedo (F, W, Sp)

**2. Elementary Catalan (Continuation of 1).** (5) Five 1-hour class meetings per week. Prerequisite: course 1 or equivalent. Mr. Azevedo (F, W, Sp)

**3. Elementary Catalan (Continuation of 2).** (5) Five 1-hour class meetings per week. Prerequisite: course 2 or equivalent. Mr. Azevedo (F, W, Sp)

**4. Intermediate Catalan (Continuation of 3).** (5) Five 1-hour class meetings per week. Prerequisite: course 3 or equivalent. Mr. Azevedo (F, W, Sp)

**5. Advanced Catalan.** (5) Five 1-hour class meetings per week. Prerequisite: course 4 or equivalent. Mr. Azevedo (F, W, Sp)

**6. Spoken Catalan.** (4) Five 1-hour class meetings per week. Prerequisite: course 3 or equivalent. Mr. Azevedo (W, Sp)

**Special Programs**

**Division Office: 301 Campbell Hall**

**Professors:**
Gone A. Brucker, Ph.D. (history)
Stephen J. Greenblatt, Ph.D. (English)
Erich B. Gruen, Ph.D. (History)
The Division of Special Programs is designed to develop and administer innovative and interdisciplinary courses and programs in the College of Letters and Science that do not belong to a single department. At present it administers the field majors in the humanities and the social sciences and the group majors in environmental studies, film, genetics, mass communications, neurobiology, religious studies, and women’s studies. In addition to these majors, it offers special interdisciplinary courses such as Introduction to Western Civilization and administers the Summer Threshold Program. For complete descriptions of the Special Programs majors and major courses, please see the entries listed alphabetically by major.

Lower Division Course

44A-44B-44C. Topics in Western Civilization. (5–8–6) One hour of lecture and four hours of discussion per week. Prerequisites: course 40A or consent of instructor. Introduction to the history, literature, and other cultural aspects of selected periods of western civilization from its beginnings to the present time. The course will meet in small groups for discussion; lectures, discussions, and reading assignments will involve interdisciplinary approaches; the development of skill in writing will be a goal. Mr. Strotman in charge. (F, W, S)

Summer Threshold Program

The mission of the Division of Special Programs is to develop and administer innovative and interdisciplinary courses and programs on a large campus. Each of the approximately 500 students who have similar academic interests. Each group takes introductory core courses together for registration. A student may not receive full credit for partially parallel courses. The interests of the members of the staff are too varied to be reflected completely in the courses given each year. The courses numbered from 160 to 181A cover a wide range; attention is also drawn to 191, given to recent developments.

The Major

Lower Division Courses. Required: Mathematics 1A–1B–1C and 5A–5B–5C, or preferably the corresponding honors courses. Recommended: Statistics 1A–1B or 20 is helpful preparation for the upper division courses. Familiarity with computer programming (e.g., Computer Science 1) is very useful in applied statistical work.

Upper Division Courses. Statistics 100A–100B–100C; Mathematics 112 or 113C. At least four courses from Statistics 134B, 142, 160, 161, 162, 166 (with 165L), 168, 189, 181A, *181C. In addition, either two courses from Mathematics 104A, 104B, 105, 113A, 125A, 125B, 135 and 185; or at least three advanced nonoverlapping courses from a substantive field. The courses selected for the 40 or more upper division units required for the major must be approved in advance by the major adviser. Reasonable exceptions and substitutions in the above list may be authorized by the major adviser.

Honors Program. Students with an overall 3.3 grade-point average or higher in the undergraduate courses in the major may apply for admission to the honors program with the approval of the major adviser. The program will include course H196, reading in a special topic and writing a thesis.

Double Major. Superior students are encouraged to consider a double major, combining statistics with mathematics or with a field of application.

Engineering Mathematical Statistics. The College of Engineering with the cooperation of the Department of Statistics offers a curriculum in engineering mathematical statistics leading to the degree of Bachelor of Science. Major Adviser: Mr. Thomas (see section on Engineering Statistics). Preparation for Graduate Study. Those interested in the graduate statistics major should include in the undergraduate courses a strong foundation in mathematics as well as probability and statistics. For advanced degrees of the theoretical type, Mathematics 104B, 105, 113B and 165 are needed. For advanced degrees of the applied type, at least a year of upper division probability and statistics (or course 200A–200B–200C) is also recommended; that all students acquire some familiarity with French, German, or Russian.

Letters and Science List of Courses: 162 units from the List must be included in the 160 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

The Graduate Major

Higher degrees may be of the theoretical or of the applied type. The program for the theoretical type of M.A. will usually include 205A–205B and 210A–210B–210C; the program for the applied type of M.A. will usually include 230A–230B, 230A–230B–240 and at least one of 235A, 235B, 235C. The master’s degree may be taken either under Plan I or Plan II. For details consult the M.A. adviser. The Ph.D. program may emphasize theoretical probability, theoretical statistics, or applied probability and statistics. For details consult the Ph.D. adviser.

Biostatistics. A program in biostatistics, leading to the M.A. or Ph.D. degree, is offered jointly with the School of Public Health. The emphasis may be toward theory or toward the substantive field. For information, consult Ms. Scott.

Lower Division Courses *

*. Since various statistics courses overlap, some combinations of courses will not be allowed and only partial credit will be allowed for others. Specific courses are available from the Department. Exceptions may be granted by the undergraduate major adviser.

1A. Introduction to Probability. (3) Three 1-hour lectures per week. Prerequisite: Students who have completed a course in probability will receive only partial credit.) Elementary concepts of probability; random events; variance; binomial and hypergeometric distribution; normal and Poisson approximations. (F, W, S)

1B. Introduction to Statistical Inference. (3) Three 1-hour lectures per week. Prerequisite: Students who have completed a course in statistics will receive only partial credit. Elementary concepts of statistics. Estimation of the parameters of a population. Testing hypotheses; simple examples; tests; the concept of power. (F, W, S)

2A. Probability and Statistics for Engineers. (3) Three 1-hour lectures and three hours of laboratory per week. Prerequisite: Calculus (Students who have completed a course in probability or statistics will receive only partial credit.) Elementary treatment of basic ideas in probability and statistics; emphasis on estimation of means, differences, variance. Determination of sample size, choice of estimate and problems of testing hypotheses; simple examples of significance tests; power of test. (F, W, S)

2B. Introduction to Probability and Statistics. (3) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: Calculus (Students who have completed a course in probability or statistics will receive only partial credit.) Descriptive statistics, concepts of probability, random variables, expectation, testing hypotheses. Estimation. Illustrations from various fields. (F, W, S)

21. Introduction to Probability and Statistics for Business. (3) Three hours of lecture and one 2-hour laboratory per week. Prerequisite: Calculus (Students who have completed a course in probability or statistics will receive only partial credit.) Descriptive statistics, concepts of probability, discrete and continuous random variables, expectation, variance, binomial, normal, Poisson, negative binomial distributions. Estimation. Testing hypotheses. Estimation. Illustrations from various fields. (F, W, S)

25. Introduction to Probability and Statistics for Engineers. (3) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: One year of calculus. (Students who have completed a course in probability or statistics will receive only partial credit.1) Introduction to probability emphasizing concepts and applications; conditional probability, independence; random events; discrete and continuous random variables; expectation. Discrete and continuous random variables. Testing hypotheses. Estimation. Illustrations from engineering. (F, W, S)

Upper Division Courses *

*Some statistics courses overlap, some combinations of courses will not be allowed and only partial credit will be allowed for others. Specific courses are available from the Department. Exceptions may be granted by the undergraduate major adviser.

100A. Introduction to the Theory of Probability and Statistics. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: second year
100B–100C. Introduction to the Theory of Probability and Statistics. (5–5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: 100B. Statistics 100B is prerequisite to 100C. Analysis of data and methods of estimation and testing of hypotheses. Probability densities including the normal, $e^x$, and $1/x$. Efficiency properties. Estimations based on these statistics. (F, W, Sp)

101A. Probability and Statistics A. (4–4) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: 101A or consent of instructor. Topics from: probability, statistics, random processes, renewal theory, discrete parameter Gauss-Markov processes. (W)

101B. Probability and Statistics B. (4) Three 1-hour lectures per week. Prerequisite: course 100A or 134A or 135A or 135B or consent of instructor. Theory of sampling and analysis of sampling methods. Unidimensional random variables and of representative designs. (Sp)

106L. Laboratory Course in Sampling Surveys. (1) One 2-hour laboratory per week. May be taken only concurrently with course 106. (W)

160. Elements of Nonparametric Inference. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: course 130C, 130E, 132, 135B or consent of instructor. Common nonparametric tests such as the sign test, Wilcoxon test and rank correlation tests. Null distributions and their approximations. (F, Sp)

200A. Introduction to Probability and Statistics at an Advanced Level. (4–4) Three 1-hour lectures per week. Prerequisite: a year of upper division mathematics. Course covers material of 200A–200B–200C in two quarters. Students who have completed a course in probability or statistics will receive only partial credit. (F, W)


210M. Laboratory for Statistics 210B. (1) One 2-hour laboratory per week. (F, W, Sp)

210N. Laboratory for Statistics 210C. (1) One 2-hour laboratory per week. (Sp)

216A–216B. Theory of Nonparametric Inference. (4–4) Three 1-hour lectures per week. Prerequisite: course 210A (may be corequisite) or consent of the instructor. Expectations, conditioning. Distributions and characteristic functions. Incomplete data and nonparametric procedures with applications in areas such as normal theory, analysis of variance, multivariate analysis, nonparametric inference and sequential analysis. Sequence beginning (F). (F, W, Sp)


230A–230B. Analysis of Variance. (5–5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: 230A: Matrix algebra, a year of calculus, two quarters of probability or statistics. 230B: theory of least squares estimation, interval estimation, and tests under the general linear model. One-week special project. (F, W)

230A. Analysis of Variance. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: 205A, and 210B or 200C. Convergence of probability measures. Large sample properties of maximum likelihood estimates and Bayes estimates. Asymptotic distribution of normal families. Asymptotic sufficiency. Von Mises differential statistical functions. Best asymptotically normal estimates and asymptotically normal tests including likelihood ratio tests and asymptotically similar tests. Sequence beginning (F). (F, W, Sp)

230B. Analysis of Variance. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: 205A, and 210B or 200C. Convergence of probability measures. Large sample properties of maximum likelihood estimates and Bayes estimates. Asymptotic distribution of normal families. Asymptotic sufficiency. Von Mises differential statistical functions. Best asymptotically normal estimates and asymptotically normal tests including likelihood ratio tests and asymptotically similar tests. Sequence beginning (F). (F, W, Sp)
232. Experimental Design. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: course 230A. Randomization models. Blocking, confounding, and fractional replication in 2^k experiments. Response surface exploration. (Sp)

236A–236B. Analysis of Discrete Observations. (4–4) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisite: one of course 100C, 130C, 132, 135A, 200C. Wald probability-ratio tests. Truncated sequential tests. Sequential design. Industrial inspection. Sequential estimation. Two-stage procedures. (Sp)


242. Multivariate Analysis. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: course 230A. Topics selected from the following, with testing and estimation in each case: Sampling theory for multivariate normal distribution. Multivariate analysis of variance and covariance. Classification and discriminant analysis. Component and factor analysis. Canonical correlations. Stochastic difference equations. (Sp)


252. Special Stochastic Processes. (4) Three hours of lecture per week. Prerequisite: one of the courses 100A, 130B, 200A, 200F, or consent of instructor. Concepts and applications of the Poisson process, the Wiener process, Markov processes, diffusion processes, general point processes. (Sp)

255A. Applied Probability. (4) Three hours of lecture per week. Prerequisite: one of the courses 100A, 130A, 200A, 200F, or consent of instructor. Renewal processes, branching processes, birth and death processes, queuing processes, storage, ruin and traffic problems. (W)


259. Statistics in Scientific Research. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: familiarity with concepts of probability and statistics. Recommended: course 210C or 230A and 236A. Introduction to studies conducted at the Statistical Laboratory, predominantly in biology, health, and astronomy. Material will include novel problems of design, testing, and estimation, frequently unpublished and occasionally unsolved. As need arises, particular sections of statistical theory will be reviewed. (Sp)

261. Foundations of Random Analysis. (4) Three 1-hour lectures per week. Prerequisite: course 205B or consent of instructor. Separability, sample continuity, Martingale processes, and further topics. (F)

262. Information Theory. (4) Three 1-hour lectures per week. Prerequisite: course 203A or 205A. Topics in the Shannon theory of information such as: entropy rate, channel capacity, coding theorems, error bounds, algebraic coding, sequential decoding. (W)

263. Decomposable Processes. (4) Three 1-hour lectures per week. Prerequisite: course 261 or consent of instructor. Three part decomposition. Continuity, Levy-Itô theorem. Poisson processes and Brownian processes. (W)

265. Markov Processes. (4) Three 1-hour lectures per week. Prerequisite: course 261 or consent of instructor. Markov independence. Time continuous transition probabilities. Strong Markov property. Semi-group methods, relation to potential theory. (Sp)


278. Seminars. (2) Current literature. (3) Supervised presentations by students of current literature. (F, W, Sp)

278B. Special Seminars. (2–6) Special topics, by permission of the graduate adviser. Intended to provide an opportunity for qualified students to prepare themselves for certain examinations required of candidates for the Ph.D. degree. May not be used for unit or residence requirements. Course to be taken on the satisfactory or unsatisfactory basis. (F, W, Sp)

The Statistical Laboratory

When founded in 1939, the Statistical Laboratory was a unit of the Department of Mathematics and combined research with an extensive instruction program in mathematical statistics. This instruction program led to A.B., M.A., and Ph.D. degrees in statistics. In 1955, the instruction activities in statistics were taken over by the newly established Department of Statistics. Since that time the Laboratory has been functioning as a research unit.

Research activity of the Statistical Laboratory includes work on the theory of statistics and its various applications: to astronomy (cosmology), to biology (population dynamics, competition of species), to communication theory, to problems of health (theory of diagnostic tests, bio-assay, apparent associations between disease, carcinogenesis), to experimentation, to meteorology (experiments on weather control), etc.

NOTE: For key to symbols, see page 36.
Students to examine in depth traditional and changing ods commonly used at the University of California, the group major in women's studies groups together to be offered 1979/80 only.

Women's Studies

Must be taken on a Satisfactory/Unsatisfactory basis per week. Designed for foreign-born teaching as 350. Teaching Workshop. (2) Three hours discussion. (2-2-2) Two 1 1/2-hour classes and two conversations. (2) Two 1 1/2-hour classes and two tutorials per week. An introductory language. A grade of C- or higher fulfills the Subject A requirement. Ms. Brooks, Mr. Davis, Ms. Johnson, Mr. Tollefson and Staff (F, W, Sp)

English as a Second Language

Performance on the Subject A Placement Examination in English as a Second Language given at the beginning of each quarter (see Calendar for exact dates) determines the composition course—ESL 23, 25, or 28—in which an entering undergraduate who does not pass the examination must enroll. All composition courses must be taken in sequence in successive quar ters and must be passed with a grade of C- or higher. Auditors are not permitted.

23. English Composition. (5) Three 2-hour classes per week. Focuses on complex sentence patterns and basic paragraph organization.

25. English Composition. (5) Three 2-hour classes per week. Focuses on complex sentence patterns and basic paragraph organization.

27A-27B-27C. English Pronunciation and Con versation. (2-2-2). Two 1 1/2-hour classes and two hours of laboratory per week. Aims to improve pronunciation, oral comprehension and fluency. Students will be placed in either 27A, 27B, or 27C according to their performance on the Subject A Placement Examination.

28. English Composition. (4) Three 1 1/2-hour classes per week. Focuses on grammatical variation and on the development of the paragraph and short essay.

350. Teaching Workshop. (2) Three hours discussions. (2-2-2). Two 1 1/2-hour classes and two hours of practice teaching using these methods, classroom visi tion, and practice of those aspects of pronunciation, vocabulary, etc., which are important in the classroom. Must be taken on a Satisfactory/Unsatisfactory basis. To be offered 1979/80 only. Ms. McKay and Staff (F, W, Sp)

Women's Studies

Group Major Office, Division of Special Programs, 301 Campbell Hall

Major Advisers: Gloria Bowles (Women's Studies), Carol Christ (English), Artie R. Hochschild (Sociology)

Group Major in Women's Studies

The group major in women's studies groups together courses from various departments to create an under graduate interdisciplinary major. It is designed to allow students to examine in depth traditional and changing roes in various cultures, to study the role of women from the perspective of different disciplines, and to explore new alternatives for women and men in our society.

Major Program

I. One course from each of the following six groups:

a. Lower Division Literature. Comparative Literature 40A, 40B, 40C, 40D, Women and Literature (4-4-4-4); French 41, Women in French Literature (4) in translation; German 40, Women in German Literature (4) in translation.

b. Upper Division Literature. Comparative Literature 185, Women's Perspective in Literature (4); English 171, and Gender Identity (5) and English 175, Women Writers (5); Afro-American Studies 155A–155B, Images of Black Women (5). Ethnic Studies. Afro-American Studies 152H, Black Women Writers (5) (prerequisite: Afro-American Studies 3 and 150A, 150B or 150C); Afro-American Studies 155, Images of Black Women in Literature (5); Asian American Studies 151, Asian Women (5); Chicano Studies 139, La Chica (5); Ethnic Studies 147, Third World Women (5); Native American Studies 159, Native American Women (5) (prerequisite: Native American Studies 5 or consent of instructor); Psychology 156, Topical Issues in Personality (5) when the subject is Psychology of Women (prerequisite: consent of instructor); Sociology 130, Sociology of the Family (5) (prerequisite: one lower division sociology course or consent of instructor); Sociology 152, Sociology of Gender Roles (4); Sociology 153, Sociology of Men (5); Women's Studies 100, Special Topics (5) when relevant; Women's Studies 110, Theories of Women's Studies (4); Women's Studies 198, Directed Group Study (1-5)*; Women's Studies 199, Supervised Independent Study and Research (1-5)*.


Honors Program. To be admitted to the honors program, a student must have attained at least a 3.3 grade-point average in the major in the semester to be granted honors, a student must write a thesis which in the judgment of the thesis director and the adviser of the program is characterized by superior distinction.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for the degree. See the Announcement of the College of Letters and Science for courses on the List.

Lower Division Course

10. Introduction to Women's Studies. (5) Four to five hours of lecture per week. An introduction to women's studies, integrating literary, psychological, historical, sociological and biological approaches to the study of sex roles. Ms. Bowles (Sp)

Upper Division Courses

100. Special Topics: Psychoanalysis and Feminists. (4–5) Three hours of lecture per week. Theories of feminism within a psychoanalytic framework will be examined. Freud's theories of female psychology compared with those of later writers. The effect of feminism on psychoanalytic theory. The relevance of the psychoanalytic position to the current theories of female psychology and social development. To be offered 1979/80 only. Ms. Lakoff (Sp)

101. Humanities Methodology. (4) Three 1-hour lectures. A seminar designed to cover various approaches to literary texts: formalist, affective, generic, psychoanalytic, structuralist, and to investigate the implications and aspects of feminist criticism in relation to these approaches.

Ms. Bader (W)

110. Theories of Women's Studies. (4) Three 1-hour lectures and one hour of discussion per week. An overview of current research on women in selected disciplines and how the knowledge and methods of more than one discipline can be brought to bear upon a problem.

Ms. Bowles (W)

158A–158B. Thesis. (4–4) In this course, the Women's Studies major will write a thesis which uses the analysis of a particular problem to integrate and synthesize knowledge gained in the major. Credit and grade to be awarded upon completion of the sequence.

Ms. Brown (F, W)

198. Directed Group Study for Advanced Undergraduates. (1–6) Prerequisite: Approval of Women's Studies majors with the consent of the instructor. Seminars for the group study of selected topics not covered by the regularly scheduled courses. Topics will vary from year to year.

199. Supervised Independent Study for Advanced Undergraduates. (1–6) Prerequisite: Approval of Women's Studies majors with the consent of the instructor. Restricted by regulations listed on page 36. Reading and conference with the instructor in a field that shall be specific enough to enable the student to write an essay based upon the student's study. Must be taken on a pass/no pass basis.

*Each student may elect only one 198 or 199 course for the entire major.
Zoology

Departmental Office, 4079 Life Science Building

Professors:
- Max Allert, Ph.D.
- William A. Bechtel, Ph.D.
- George W. Beverly, Ph.D.
- David F. Bogen, Ph.D.
- William E. Berg, Ph.D.
- Howard A. Blakesley, Ph.D.
- Cedel H. Hend, Jr., Ph.D.
- Morgan Harris, Ph.D.
- Neal R. Johnson, Ph.D.
- Paul Licht, Ph.D. (Chairman)

Associate Professors:
- David R. Befltley,* Ph.D.
- Robert K. Collwell, Ph.D.
- G. Steven Martin, Ph.D.
- Thelma E. Rowell,' Ph.D.
- John E. Simmons,' Ph.D.
- Paul Licht, Ph.D. (Chairman)

Assistant Professors:
- Harry W. Greene, Ph.D.
- Mimi A. R. Koehl, Ph.D.

Acting Assistant Professor:
- A. Joyce Brothers

Professional Staff:
- Werner Loher, Ph.D. (Entomology)
- George Deten, Ph.D. (Entomology)

Lecturer:
- Mercedes S. Foster, Ph.D.

The Department of Zoology presents a broad coverage of areas ranging from cell and molecular biology to ecology and ethology, and including intensive offerings in vertebrate and invertebrate zoology. The zoology major may be entered after a basic year-to-ecology and ethology, and includes intensive courses including marine and terrestrial vertebrate and invertebrate types with emphasis on anatomy and ecology. Strongly recommended for Zoology majors.

John E. Simmons,* Ph.D.

1. Animal Diversity. (4) Three hours of lecture and two hours of laboratory per week. A survey of animal diversity including marine and terrestrial vertebrate and invertebrate types with emphasis on anatomy and ecology. Strongly recommended for Zoology majors.

2. Animal Zoology. (4) Three hours of lecture and two hours of laboratory per week. An introduction to the biological sciences. Most are offered primarily for the student not majoring in biological sciences but may be useful as well to lower division students who desire to explore areas of elementary biology before embarking on a major. Students should note carefully the credit restrictions indicated.

1. Animal Diversity. (4) Three hours of lecture and two hours of laboratory per week. A survey of animal diversity including marine and terrestrial vertebrate and invertebrate types with emphasis on anatomy and ecology. Strongly recommended for Zoology majors.

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feeding, respiration, excretion, and water balance, or
3-hour laboratory periods plus about 6-hours addition
lecture and one hour of discussion per week and a term
Zoology 108A-108B or Zoology 157, or a course in
brates. Mr. Smith (F)
para-hormonal mechanisms with emphasis on neuro-
on isolation and characterization of organelles and
lecture and six hours of laboratory per week. Prere
growth as seen in cell cultures and in the development
in the cellular genome; animal viruses as tools for study
quences beginning (F). The structure and function of
basic processes, selection theory, adaptive re-
opment, and patterns of specialization and phylogensis.
110A-110B. Cytology. (3-3) Two 1-hour lectures per
Sequence beginning (F). The structure and function of
107L. Laboratory In Ichthyology. (2) Two 3-hour
Lab, and field work, and individual study of problems in marine ecology. Class limited to sixteen students.
Mr. Barlow (F)
144. Laboratory In Population and Community
Ecology. (6) Two regular 4-hour laboratories or field
Trips. Prerequisite: course 155, or equivalent, and
consent of instructor. Introduction to field and laboratory
and evolutionary processes and patterns in nature. Enrollm
Mr. Colwell (Sp)
155. General Protozoology. (5) Two 1 1/2-hour lec-
tures and two 3-hour laboratories per week. Pre-
requisite: course in general biology recommended. Comprehensiv
survey of the protozoa, including some groups often classified with algae and fungi (i.e., plant flagellates and slime molds). Lecture coverage inc
cludes comparative morphology, life cycles, and ecol
adaptations. Laboratory emphasizes living ma-
terials, experimental handling, and microscopic tech-
hiques. Mr. Balamuth (F)
156. General Animal Parasitology. (4) Three 1-
hour lectures per week, plus one discussion per week.
Prerequisite: Biology 1A-1B or 115, and one course in the biology of invertebrates, helminth, and other invertebrate para-
sites with selected experiments. Mr. Simmons (Sp)
157. Biology of Marine Invertebrates. (10) Full-
time study in Marine Laboratory. Prerequisite: Biology 1A-1B. Credit and grade will be awarded upon completion of
Mr. Barlow (F)
158. General Animal Parasitology. (4) Three 1-
hour lectures per week, plus one discussion per week.
Prerequisite: Biology 1A-1B or 115, and one course in the biology of invertebrates, helminth, and other invertebrate para-
sites with selected experiments. Mr. Simmons (Sp)
159. Experimental Protozoology. (5) One hour of
lecture and six hours of laboratory per week plus spe-
cial problem work. Laboratory 148 and 149, or equivalen
Zoology 155 and a course in cell or developmental biology. Experimental analyses of protozoan organization. Protozoa as cells and organisms: aspect
of growth and nutrition, cyclical differentiation and regen
ation, sexuality and genetics. Mr. Balamuth (W)
160. Regulation In Cells and Cell Culture. (3) Two
1-hour lectures and one 1-hour discussion per week.
Prerequisite: Zoology 140 or equivalent and consent of instructor. Lectures, laboratory, field trips, and individual study of marine invertebrates. Class limited to twenty-five students.
Mr. Smith (Summer)
161. Evolutionary Cyto genetics of Vertebrates.
(4) Two 1-hour laboratories, one 3-hour laboratory and one
1-hour discussion per week, to include student proj
ects. Prerequisite: a basic course in genetics; cytology recom
mended; and consent of instructor. The theoreti
cal and practical applications of cytogenetics to verte
brate population structures, systems, and phylo
geny. Mr. Paton (Sp)
163. Mammalogy. (6) Two 1-hour lectures and two
3-hour laboratories per week, plus two weekend field
trips. Prerequisite: course 160, or equivalent, and consent
in the course of the biology of mamals. Mr. Paton (F)
164. Ornithology. (4) Two 1-hour lectures and one
4-hour laboratory or field trip per week, plus two week
end field trips. Prerequisite: course 107A. An advanced
in the course of the biology of birds. (Sp)
165. Harp ethology. (6) Two 1-hour lectures, two 3-
hour laboratories per week, and 2 weekend field trips. App
Local study of amphibians and reptiles. Mr. D. Wake, Mr. Greene (Sp)
166. Ichthyology. (3) Three 1-hour lectures per week.
Prerequisite: Biology 1 and Zoology 1 recommended. Course begins with a field survey of local
in the natural history and phylogeny of fishes. Mr. Barlow (F)
167. Laboratory In Ichthyology. (2) Two 3-
hour laboratory sessions per week; some required weekend
Trips. Prerequisite: concurrent course 166, and consent of the instructor. An introduction to the diversi
of fishes with emphasis on local sites. Mr. Barlow (F)
**191A. Topics in Population Biology. (3) Two 1-hour lectures per week. Prerequisites: Zoology 143 and 144 (or equivalents) and permission of instructor. Comparative survey of functional organization and adaptive significance of life-cycles in vertebrates; population consequences of varying strategies.**

Mr. Pitelka (F)

**190A—190B. Thesis Course. (3-3) Prerequisites: overall grade-point average of 3.00 and a grade-point average of 3.30 in the major. Individual study and research to be chosen in consultation with a member of the staff; preparation of a thesis on broader aspects of this work. H190A may be taken alone; if both H190A and 190B are taken, grade is given on completion of both courses.**

Mr. Licht (F, W, Sp)

**219A. Seminar in Developmental Biology. (2) One 2-hour meeting per week. Prerequisites: course 105 or equivalent.**

Mr. Berg (Sp)

**202. Cell Biology Research Reviews. (1) One and one-half hours of lecture per week. Prerequisites: course 104, and consent of instructor.**

Mr. Smith (F)

**201. Molecular and Cellular Aspects of Development. (3) Two 1 1/2-hour lectures per week. Prerequisites: courses 104, 105, and 154 of the major. Advanced treatment of cellular developmental biology. Regulation of cell biosynthesis and differentiation.**

Mr. Martin (Sp)

**206. Seminar in Cytology. (2) One 2-hour meeting per week. Prerequisite: course 106A-106B. Critical discussion of basic problems and recent literature in descriptive cytolgy and cytochemistry.**

Mr. Altett (Sp)

**215. Seminar in Physiological Biology. (2) One 2-hour meeting per week. Prerequisite: course 104 or consent of the instructor. Seminar discussion of recent literature.**

Mr. Stromhan (Sp)

**216. Somatic Cell Heredity. (2) One 2-hour meeting per week. Prerequisite: consent of the instructor. Developmental, genetic, and neoplastic changes in isolated cell systems.**

Mr. Harris (Sp)

**217. Research Reviews in Somatic Cell Genetics. (1) One and one-half hours of lecture per week. Prerequisite: consent of instructor. Reports and discussion of original research by staff and outside visitors.**

Mr. Harris (F, W, Sp)

**259. Seminar on Parasitism. (2) One 2-hour meeting per week. Prerequisite: Consent of Instructor. Review and discussion of topics of current interest and importance to the phenomenon of parasitism.**

Mr. Martin (Sp)

**261. Seminar in Protozoology. (2) One 2-hour meeting per week, plus outside preparation of papers. Prerequisite: consent of instructor.**

Mr. Balamuth (Sp)

**257. Advanced Biology of Marine Invertebrates. (6) Full-time study at Bodega Marine Laboratory during the first summer session. Lectures, seminar discussions, and individual study of selected problems. Class limited to 18 students. Prerequisites: 108 or 157 and consent of instructor.**

**256. Seminar on Parasitism. (2) One 2-hour meeting per week. Prerequisite: four years of English and consent of instructor.**

Mr. Smith (W)

**260. Seminar in Evolutionary Biology of the Vertebrates. (4) One 1-hour seminar per week. Prerequisites: graduate standing and consent of instructors. Discussion of major evolutionary trends leading to the development of the major classes of vertebrates.**

Mr. Wake, Mr. Greene, Mr. Johnson, Mr. Simmons (F)

**268. Seminar on Speciation in Vertebrates. (2) One 1 1/2-hour meeting per week. Prerequisite: 104A or equivalent.**

Mr. Barlow (F, Sp)

**269. Seminar on Vertebrates. (2) One 1 1/2-hour meeting per week. Prerequisite: course 104 or equivalent.**

Mr. Barlow (W)

**267. Seminar on Vertebrates. (2) One 1 1/2-hour meeting per week. Prerequisite: consent of instructor.**

Mr. Barlow (W)

**264. Seminar in Animal Behavior. (2) One 1/2-hour seminar per week. Prerequisite: course 105 or equivalent, and consent of instructor.**

Mr. Colwell, Mr. Lidicker, Mr. Pitelka, Mr. Oster (W, Sp)

**254. Comparative Population Ecology. (4) Two 2-hour lectures per week. Prerequisites: course 104 or equivalent. Comparative analysis of vertebrate populations, stressing ecological and evolutionary aspects.**

Mr. Pitelka (Sp)

**244. Seminar in Animal Ecology. (2) Two 1-hour lectures per week. Prerequisite: course 104 or equivalent, and consent of instructor.**

Mr. Colwell, Mr. Lidicker, Mr. Pitelka, Mr. Oster (W, Sp)

**245. Ecological Research Reviews. (1) One 1 1/2-hour meeting per week. Prerequisite: graduate standing. Basic concepts in ecology and consent of instructor; enrollment limited. Reports and discussions of original research.**

Mr. Lidicker, Mr. Colwell, Mr. Souza (Su, F, W, Sp), Mr. Wake, Mr. Caldwell (F, W, Sp)

**246. Seminar in Marine Ecology. (1) One 1-hour lecture per week. Prerequisite: consent of instructor. Participation will include the preparation and presentation of a seminar. The topic for each quarter will be determined prior to the first meeting and announcements will be made in advance. Must be taken on a satisfactory/unsatisfactory basis.**

Mr. Souza (F)

**243. Genetics and Evolution. (3) Two 1 1/2-hour lectures per week. Prerequisite: an upper division, course in genetics and evolution (course 140 or equivalent). Lectures and discussion concerning the relationships between the genetic composition of populations and the evolutionary processes. Specific topics will vary from year to year.**

Mr. Lidicker (F)

**251. Invertebrate Review. (1) One 1-hour meeting per week. Prerequisite: senior or graduate standing, Zoology 108A-108B or equivalent, and consent of instructor. Reports and discussion of original research in invertebrate zoology.**

Mr. Smith (F, W, Sp)

**252. Seminar on Parasitism. (2) One 2-hour meeting per week. Prerequisite: Consent of Instructor. Review and discussion of topics of current interest and importance to the phenomenon of parasitism.**

Mr. Martin (Sp)

**255. Seminar in Protozoology. (2) One 2-hour meeting per week, plus outside preparation of papers. Prerequisite: consent of instructor.**

Mr. Balamuth (Sp)

**256. Seminar on Parasitism. (2) One 2-hour meeting per week. Prerequisite: four years of English and consent of instructor.**

Mr. Smith (W)

**260. Seminar in Evolutionary Biology of the Vertebrates. (4) One 1-hour seminar per week. Prerequisite: consent of instructor. Discussion of major evolutionary trends leading to the development of the major classes of vertebrates.**

Mr. Wake, Mr. Greene, Mr. Johnson, Mr. Simmons (F)

**268. Seminar on Speciation in Vertebrates. (2) One 1 1/2-hour meeting per week. Prerequisite: 104A or equivalent.**

Mr. Barlow (F, Sp)

**269. Seminar on Vertebrates. (2) One 1 1/2-hour meeting per week. Prerequisite: consent of instructor.**

Mr. Barlow (W)

**267. Seminar on Vertebrates. (2) One 1 1/2-hour meeting per week. Prerequisite: consent of instructor.**

Mr. Barlow (W)

**264. Seminar in Animal Behavior. (2) One 1/2-hour seminar per week. Prerequisite: course 105 or equivalent, and consent of instructor.**

Mr. Colwell, Mr. Lidicker, Mr. Pitelka, Mr. Oster (W, Sp)

**245. Ecological Research Reviews. (1) One 1 1/2-hour meeting per week. Prerequisite: graduate standing. Basic concepts in ecology and consent of instructor; enrollment limited. Reports and discussions of original research.**

Mr. Lidicker, Mr. Colwell, Mr. Souza (Su, F, W, Sp), Mr. Wake, Mr. Caldwell (F, W, Sp)

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Mr. Souza (F)

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Mr. Smith (F, W, Sp)

**252. Seminar on Parasitism. (2) One 2-hour meeting per week. Prerequisite: Consent of Instructor. Review and discussion of topics of current interest and importance to the phenomenon of parasitism.**

Mr. Martin (Sp)
202. Development of the Book. (3) Three hours of lecture per week. The book as a historical and social artifact; the beginning of writing to microphotography; emphasis placed on all aspects of the history of the printed book. Course 202L highly recommended, concurrently or in the succeeding quarter.

202L. Typographical Laboratory. (1) One hour of laboratory per week. Prerequisite: course 202 or may be taken concurrently. Examination of basic book construction; includes typesetting, papermaking, hand printing.

203A. Origins and Spread of Printing and Publishing in Europe. (2) Two hours of lecture and two hours of laboratory per week.


2041. General Biological Microtechniques. (3) Two hours of lecture and four hours of laboratory per week. Prerequisite: a course in general biology with laboratory. Preparation of invertebrate and vertebrate tissues for light microscopy. Basic histological and histotechnical techniques, including whole mounts, use of anesthetics, fixation, embedding, sectioning and staining of tissues. The paraffin method is emphasized.

601. Individual Study for Master's Students. (1-5) Individual study for the comprehensive examinations or individual study for the master's degree. May not be used for either unit or residence requirements for the master's degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Su, F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the graduate adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examination requirements for the Ph.D. May not be used for either unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Su, F, W, Sp)

Zoology Seminar. (No credit) Meetings for the presentation of original work by the faculty, visiting lecturers, and graduate students. Attendance by all graduate students is recommended.

Ms. Brothers (W); Mr. Alford (Sp)

Related Courses in Other Departments

Biology 221. Comparative Physiology and Endocrine and Reproductive Systems. (3) See Biology for the complete description of this course.

Biology 250. Tropical Biology—An Ecological Approach. (12) See Biology for the complete description of this course.

IDS 200. Integrative Neurobiology. (3) See Interdepartmental Studies for the complete description of this course.

IDS 200L. Advanced Laboratory in Neurophysiology. (6) Formerly Zoology 222L. See Interdisciplinary Studies for the complete description of this course.

IDS 201. Cellular Mechanisms Underlying Nervous Activity. (4) See Interdepartmental Studies for the complete description of this course.

IDS 201L. Laboratory Cellular Mechanics Underlying Nervous Activity. (3) See Interdepartmental Studies for the complete description of this course.

IDS 204. Animal Behavior Research Reviews. (1) See the expectations for studies for the complete description of this course.

Bibliography

1. Methods of Library Use. (3) Three hours of lecture per week. Students will learn how to approach the U.C. Library's resources, to formulate questions to meet their needs, via lecture, section, problem sets, examinations and a term paper. They will learn to extend these techniques to future independent research.

104. The Book as an Artifact. (3) Three hours of lecture per week. A survey of the evolution of writing and the manuscript and printed book, with emphasis on letterforms, typesetting, papermaking, printing processes, bookbinding and book design.

128. Survey of Children's Literature. (3) Three hours of lecture per week. Children's literature as a genre of literature; its role in the lives of children. Historical perspective; milestones and the current scene in publication. All types of books read by children will be included. Not open to graduate students in English.

141. Information Access and Retrieval: Problems and Prospects. (2) Two hours of lecture per week. Prerequisite: 210. Instructor: 2211. Key problems of information retrieval. Introduced as an introduction for students in engineering, science, or professional school backgrounds. Emphasis on design principles for documentation and data retrieval, binary, weighted, and statistical indexing techniques; retrieval evaluation; relevance, shrewdness, utility, indexing vocabulary control.

190. Individual Study. (1-5) Enrollment is restricted by regulations on page 36. Must be taken on a passed/not passed basis.

Librarianship


202L. Typographical Laboratory. (1) One hour of laboratory per week. Prerequisite: course 202 or may be taken concurrently. Examination of basic book construction; includes typesetting, papermaking, hand printing.

203A. Origins and Spread of Printing and Publishing in Europe. (2) Two hours of lecture and two hours of laboratory per week.

203B. History of Printing and Publishing: 1500–1800. (4) Three hours of lecture and one hour of laboratory per week. Prerequisite: course 202.


204. Information in Society. (3) Three hours of lecture per week. Information in its social context. The role of the library and information center in providing primary services, information-gathering behavior and use. Societal and clientele needs and demands. Application of behavioral and social sciences to study and evaluation of information services.

Mr. Shaw

210. Colleges and Clients: Behavior in Information Settings. (4) Three hours of lecture per week. Study of the behavior of interpersonal behavior and information work. Influence of social and physical environment and of personality factors on interaction between staff and clientele. Mr. Shaw

215. Popular Culture in the Public Library. (2) Two to three hours of lecture per week. Analysis of the content of popular books, films, song lyrics, etc., and implications for library programs. Mrs. Blake


221. Special Topics in Reference and Bibliography. (1–6) One to eight hours of lecture per week. Prerequisite: consent of instructor. Specific topics, hours, and credit vary from semester to semester. May be repeated for credit, with change of content.

222. Computer-Based Reference Services. (4) Three hours of lecture and one hour of laboratory per week. Application of computer techniques to library reference work. Bibliographic data bases in machine-readable form, current awareness services, batch and on-line retrospective searching, query formulation and search strategy, management considerations. Student will take a computer course in librarianship.

224. Government Documents. (4) Three hours of lecture per week. Identification, selection, acquisition, organization, and use of publications of federal, state and local governments, regulatory agencies, international organizations, and foreign governments.

225. Law Librarianship: Legal Research, Reference, and Bibliography. (3) Two hours of lecture per week. Prerequisite: open to graduate students in Law and Information and Information Studies and to third year students in the School of Law. Introduction to legal bibliographic procedures and search, legal research tools and disposition and decisions, legislative history, legal citators and digests, legal periodicals and indices, secondary material, and legal bibliographies.

227. Design and Evaluation of Reference Service. (2) Ten hours of class meeting per quarter and sixty hours per quarter of approved on-site activity in an area of providing reference service. Examination of the design, organization, operation and evaluation of reference service: economic, ethical, political, technical and interpersonal considerations. Extensive, analytical paper required. Mrs. Blake

228A. Children's Literature. (4) Three hours of lecture per week. Historical backgrounds and development; children's literature trends and interpretations; trends in use of illustration. Ms. Roger

228B. Library Work with Children and Young Adults. (3) Three hours of lecture per week. Prerequisite: course 228A. Reading interests; types of library materials; levels of reading ability; book selection; library programs.

229. Children's Literature. Oral Interpretation. (3) One 2 1/2-hour lecture per week. Prerequisite: course 228A or consent of the instructor. Historical development and critical approaches to folklore, myths, and modern imaginative literature: their role in the library program for children and young adults.

Mrs. Blake

236. Library and Information Service Policy. (3–4) Two or three hours of class meetings per week. Prerequisite: consent of instructor. Problems in analysis and implementation of alternatives at the graduate level in bibliographical, library, and information service. Topics vary from offering to offering. May be repeated for credit with change of content. Mr. Swank, Mr. Buckland, Mr. Wilson, Mrs. Blake

240. Introduction to the Information Sciences. (3) Two to three hours of lecture per week. Need for
Two or three hours of lecture per week. Pre-require: consent of instructor. Analysis of problems of information retrieval, merging of document and reference retrieval that can in principle be programmed for a digital computer. Topics to be covered may include: retrieval by keyword, automatic indexing and classification, weighted indexes, associative searching. Mr. W. Cooper

243. Automatic Data Retrieval and Question-Answering. (3) Two hours of lecture per week. Pre-requisite: consent of instructor. A survey of the current status of current data retrieval and question-answering systems. An examination of some of the major logical, linguistic, programming and file organization problems relating to automatic question-answering.

244. Principles of Information Retrieval: Foundational Concepts. (3) Two hours of lecture per week. Pre-requisite: course 242 or consent of instructor. Analysis of fundamental theoretical concepts of information retrieval including relevance, authority, topicality, utility. Mr. Maron

246. Evaluation of Information Systems and Services. (3) Three hours of lecture per week. A general survey of principles and methodologies for evaluating information systems. The meaning and logical role of measures of retrieval effectiveness. The concept of utility and techniques of cost-effective evaluation. Mr. Cooper

248. Design of Mechanized Information Retrieval Systems. (4) Three hours of lecture per week. Pre-requisite: course 275A or equivalent, or consent of instructor. Design and development of mechanisms for mechanized information storage and retrieval systems. Topics include: query languages, telecommunications concepts, applications of programs to information retrieval, file organization, evaluation of systems. Mr. M. Cooper

250. Introduction to Bibliography. (8) One hour of lecture per week and two hours of laboratory. A general survey of the development and institutions of libraries and information services. Survey of bibliographical systems: bibliographical description, indexing and classification, literature search, selection of materials. Mr. Wilson, Ms. Shosid

251. Cataloging and Classification. (4) One hour of lecture and three hours of discussion per week. Pre-requisite: Librarianship 250. Standard techniques of identification, indexing, and subject access in library cataloging and library automation. Preparation of monograph and serial catalog records for machine and manual retrieval; use of DDC, LCS, and classification schemes; practice in use of a computerized catalog data base.) Mr. Wilson, Mrs. Cooke

252. Special Topics In Cataloging and Classification. (1-8) One to eight hours of lecture per week. Pre-requisite: consent of instructor. Specific topics, hours, and credit vary from section to section and from year to year. May be repeated for credit, with change in content.

253. Library Technical Services. (3) Three hours of lecture per week. Pre-requisite: course 251. Survey of developments and problems, with emphasis on management aspects of acquisitions, cataloging, classification, storage, and preservation of library materials; professional distribution of technical reports, application of mechanized systems.

254. Descriptive Bibliography. (3) Three hours of lecture per week. Historical and analytical bibliography as methods of investigation, based on McKerrow and Bowes; methods of bibliographical description based on Bowes and Greg; literature of analytical bibliography.

260. Librarians and Information Agencies. (3) Three hours of lecture per week. The history, functions, and characteristics of libraries and information agencies; use of libraries for the socioeconomic factors in reconciling the design of such agencies; existing and proposed types of agencies; concepts of administration and systems of library work.

282. History of Libraries. (4) Three hours of lecture per week. A historical introduction to the libraries of the Western world, from antiquity to the present.


300. Practicum in Libraries or Information Centers. (4) Three hours of lecture per week. Need for, development, organization, and services of co-operative library and information systems and networks. Potentialities and problems of computers and other technologies in network development. Mr. Swank

301. Field Study in Librarianship. (1-5) Individual or group study of specific problems in library and information service in the field. Individual and group meetings with faculty sponsor and reports required.

298. Directed Group Study. (1-4) The Staff

299. Individual Study. (1-8) The Staff

300. Practicum in Libraries or Information Centers. (1-4) Prerequisite: consent of instructor and agency supervisor required. Supervised participation in the operations of a campus or off-campus library or information center, in tasks at or near the professional level. On-the-job activities, conferences with agency supervisor and course instructor. Supplementary meetings may be required. Mr. Swank

384. Special Practicum in School Libraries. (3) Nine hours of practicum per week. Prerequisite: Libraryship 220A, 220B, 250, 251, 264, of which 264 must be taken prior to this course. Participation in school libraries, elementary through secondary. Open to those who hold a standard teaching credential. Required for initial School Library Service credential.

602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field advisor. Intended to provide an opportunity for qualified students to prepare themselves for the S.M., Ph.D., and D.L.S. degrees. May not be used for unit or residence requirements for the Ph.D. and D.L.S. degrees. May not be taken for credit. The Staff

College of Natural Resources

Office of the Dean, 101 Giannini Hall
Dean: David E. Schlegel, Ph.D., Acting
Associate Deans: Academic Affairs—George M. Briggs, Ph.D.; Research—David E. Schlegel, Ph.D.; Student Affairs—Paul R. Day, Ph.D.

The College of Natural Resources, formed on July 1, 1953, is a new college in the University of California. It is an outgrowth of the College of Forestry and Conservation. In its philosophical direction, the new college responds to many concerns among students and faculty and in the society generally. Prominent among these concerns is the belief that, in meeting the accelerating rise in demand for essential foods, fibers, timber, and wood products and for recreational use of open space, our renewable natural resources must be used in ways that are at once productive, conservative of those resources, and protective of environmental quality.

The College of Natural Resources offers a variety of academic programs which focus on renewable natural resources. These embrace most of the physical, biological, technical, and social processes that people use to produce and utilize the food, fiber, and other materials that they require. The undergraduate programs of the College place particular emphasis on two aspects of natural resources: they seek out and develop the complex interactions involved in resource systems that have major environmental, material, and amenity values; and they stress the relationships between the natural environment and people, whether through their needs, their desires, or their actions.

The College offers undergraduate programs which provide different approaches to the study of natural resources. Some of these programs serve the needs of students who will work on an agricultural or forestry basis and of students in the premedical and other health-oriented fields. Majors in these categories include Biogeography, Bioresource Sciences, Entomology, Genet-ics, Plant Pathology, Soil and Water Resources, and Food Nutrition and Dietetics. An option in the Bioresource Sciences major will accommodate the needs of students interested in Animal Sciences.

Other majors, Conservation of Natural Resources, and Political Economy of Natural Resources, offer broadly based and flexible programs for students who are moti-
vated and concerned by public issues in the fields of population, renewable natural resources, resource economics, and environment and who prefer an approach less specialized than the specific majors listed above.

Still other majors offer undergraduate preparation for professional careers that require extensive and specific academic qualifications as conditions for entry into the professions of renewable natural resource management. They include Forestry, Pest Management, Soil Resource Management, Wood Science and Technology, and a professional program in Dietetics. A Pre-veterinary program offers basic training in preparation for subsequent work in a School of Veterinary Medicine.

Graduate programs with academic or professional emphasis are available in agricultural chemistry, agricultural and resource economics, biophysics, comparative biochemistry, entomology, food science, forestry, genetics, nutrition, parasitology, plant pathology, plant physiology, range management, soil science, wildland resource science, and wood science and technology. In addition, an ad hoc interdisciplinary doctoral program is offered.

For further information concerning course requirements and areas of specialization, consult the Announcement of the College of Natural Resources, available free of charge from the Dean’s Office, Student Affairs, 105 Giannini Hall.

Agricultural and Resource Economics

Department Office, 207 Giannini Hall


Assistant Professors: John T. Doyen, Ph.D. Gordon W. Franklin, Ph.D. Andrew Schmitz, Ph.D.

Associate Professors: John T. Doyen, Ph.D. David Weeks, Ph.D. Richard Just, Ph.D.


Forestry and Resource Management

Department Office, 145 Mulford Hall

Chairman: Dennis E. Teague

Professors: Donald G. Arganbright, Ph.D. 
David L. Brink, Ph.D. 
Robert P. Coflin, Ph.D. 
Fred E. Dickinson, Ph.D. 
Harold F. Foy, Ph.D. 
A. Starkey Leopold, Ph.D. (Emeritus) 
William J. Libby, Ph.D. 
William M. McElhiney, Ph.D.

Associate Professors: Don C. Erman, Ph.D. 
John A. Helms, Ph.D. 
Joe R. McBride, Ph.D.

Assistant Professors: Douglas Alt, Ph.D. 
Reginald H. Barrett, Ph.D. 
Gregory D. Biggs, Ph.D. 
Natalie R. Butts, Ph.D. 
Joseph A. Davis, Ph.D. 
Ann O. Schnieder, Ph.D. 
Barney E. Klinecki, Ph.D. 
Randall E. Mihlbichler, Ph.D. 
Ronald H. Weinhold, Ph.D.

Lecturers: 
Paul Kasama, M.F. 
John Tippelhorn, Ph.D. 
Marshall White, Ph.D.

Genetics

Department Office, 345 Mulford Hall

Chairman: Paul L. Gesper

Associate Professor: Claudine J. Carr, Ph.D.

Assistant Professor: Sally Kirk Fairall, Ph.D.

Professors: Donald L. Dahlsten, Ph.D. Joseph G. Hancock, Jr., Ph.D. John G. Hurst, Ph.D.

Associate Professor: Philip E. LeVan, Ph.D.

Lecturers: 
Michael Freeberg, Ph.D. 
Patricia St. Lawrence, Ph.D.

Associate Professors: 
Leonard E. Kelly, Ph.D. 
Donald R. Cameron, Ph.D. (Emeritus)

Lecturers: 
Eugene Zavarin, Ph.D.

Nutritional Sciences

Department Office, 119 Morgan Hall

Chairman: Paul L. Gesper

Associate Professor: 
George M. Biggs, Ph.D. 
Don Davis, Ph.D. 
James J. Skidmore, Ph.D. 
Doris H. Calloway, Ph.D.

Entomological Sciences

Department Office, 137 Giannini Hall

Chairman: Paul L. Gesper

Professors: 
John R. Anderson, Ph.D. 
Leopoldo E. Catugaling, Ph.D. 
John E. Casida, Ph.D. 
Donald D. Lathien, Ph.D. 
Hovell V. Dally, Ph.D. 
Louis A. Falcon, Ph.D. 
Deane P. Furman, Ph.D. 
Kenneth S. Hagen, Ph.D. 
Ernst Heinrich, Ph.D. 
Carl B. Hufnagel, Ph.D. 
Werner J. Loher, Ph.D. 
George Osier, Ph.D.

Associate Professors: 
John T. Doyen, Ph.D. 
David Weeks, Ph.D.

Lecturers: 
William W. Allen, Ph.D. 
Richard E. Goddard, Ph.D. 
Bruce M. Feldman, D.V.M. 
Richard Garcia, Ph.D. 
Harold T. Gordon, Ph.D.

Plant Pathology

Department Office, 147 Hilgard Hall

Chairman: Paul L. Gesper

Professors: 
Max W. Gardner, Ph.D., D.Sc. (Hon.) (Emeritus) 
A. Herbert Gold, Ph.D. (Emeritus) 
William C. Snyder, Ph.D. (Emeritus) 
William N. Tashkash, Ph.D. (Emeritus) 
Cecil E. Yanow, Ph.D. (Emeritus)

Associate Professors: 
Fields W. Cobb, Jr., Ph.D.

Assistant Professors: 
Raymond Schneider, Ph.D. 
Zimmy Renee Sun, Ph.D.

Sols and Plant Nutrition

Department Office, 108 Hilgard Hall

Chairman: Paul L. Gesper

Professors: 
Harry E. Doner, Ph.D. 
John G. McColl, Ph.D. 
Paul L. Gesper, Ph.D. 

Assistant Professor: 
Raymond W. Schneider, Ph.D.

Lecturers: 
Rodney J. Attelev, Ph.D. 
Isaid Berah, Ph.D.

Graduate Programs

Agricultural Chemistry

Administered by an Interdepartmental Group

Office, 145 Mulford Hall
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Wood Science and Technology

Administered by an Interdepartmental Group
Office, 478 Richmond Field Station

Professors:
Donald G. Arbogast, Ph.D.
David L. Blank, Ph.D.
Robert A. Cockrell, Ph.D.

Lecturers:
Fred E. Dickinson, Ph.D.

Assistant Professors:
Douglas L. Allard, Ph.D.
Barney E. Klamecki, Ph.D.

Undergraduate Programs

The College of Natural Resources offers a variety of academic programs which focus on renewable natural resources. For further information on the following programs write for the Announcement of the College of Natural Resources, obtainable free of charge from the Dean's Office, 108 Giannini Hall, University of California, Berkeley, CA 94720.

Undergraduate advisers serve as the principal liaison officers between students and the College. They are available for consultation throughout the year. All students are encouraged to see these representatives as early as possible for advice in the planning of their academic programs. The adviser will be fully prepared to discuss details of the requirements, planning of a program best suited to a student's individual needs and interests, and the careers available after graduation. The adviser should also be consulted concerning any special academic problems that may arise. In addition, the Office of the Dean may be consulted on any such difficulties or on questions relating to records and regulations. It is open year-round, 8:15 am to 4:45 pm, weekdays, except during the noon hour and administrative holidays.

To expedite program planning, the adviser's approval is required prior to the Dean's final endorsement of the student's study list. Any changes in the program must be similarly approved.

Animal Resource Sciences

(See Major in Bioresource Sciences)

Bioenergetics. The Bioenergetics major is designed to introduce you to fundamental aspects of biology centering on the energy relations of living cells. The curriculum provides a strong preparation for students interested in careers in the biological and health-related sciences and for students in programs oriented toward the environment and renewable plant resources.

Lower division requirements are the same as those listed in Bioresource Sciences. For upper division requirements, see the Announcement of the College of Natural Resources.

Bioresource Sciences. The major provides an interdisciplinary approach to the biology of renewable natural resources. Selection of at least one course from each of nine subject areas, and also a wide choice of electives from courses in general biology or in renewable natural resources are advantages of this major. The inclusion in the major of specified subject areas and the wide choice of electives give you a broad background in biology and an excellent preparation for graduate studies in many allied biological sciences.

Lower division requirements include Biology 1A–1B; Chemistry 1A–1B, 8A–8B, Computer Science 1 or Statistics 2; English 1A–1B or Rhetoric 1A–1B or Comparative Literature 1A–1B; Mathematics 16A–16B, Physics 6A–6B–6C; and Resource Science 50 or CR5 23.

Students wishing to elect an area of emphasis in Animal Resource Sciences may do so by selecting appropriate courses within the 32 units of free electives and the 28 units of courses "in or relevant to biological and natural resources." Consult with your adviser for specific

NOTE: For key to symbols, see page 36.

Biophysics

Administered by an Interdepartmental Group
Office, 101 Donner Lab

Professors:
Daniel I. Arnon, Ph.D., Docteur (Hon.)
E. L. Robert Stoksad, Ph.D.

Lecturers:
Ann H. Good, M.D., Ph.D.
George P. Reiner, Ph.D.

Comparative Biochemistry

Administered by an Interdepartmental Group
Office, 2553 Life Sciences Building

Professors:
Daniel I. Arnon, Ph.D., Docteur (Hon.)
E. L. Robert Stoksad, Ph.D.

Lecturers:
Janet C. King, Ph.D.

Comparative Biochemistry

Administered by an Interdepartmental Group
Office, 119 Morgan Hall

Professors:
Daniel I. Arnon, Ph.D., Docteur (Hon.)
E. L. Robert Stoksad, Ph.D.

Lecturers:
Janet C. King, Ph.D.

Computers

Administered by an Interdepartmental Group
Office, 487 Storke Hall

Professors:
Donald G. Arbogast, Ph.D.
David L. Blank, Ph.D.
Robert A. Cockrell, Ph.D.

Lecturers:
Fred E. Dickinson, Ph.D.

Assistant Professors:
Douglas L. Allard, Ph.D.
Barney E. Klamecki, Ph.D.

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Biophysics

Administered by an Interdepartmental Group
Office, 101 Donner Lab

Professors:
Daniel I. Arnon, Ph.D., Docteur (Hon.)
E. L. Robert Stoksad, Ph.D.

Lecturers:
Janet C. King, Ph.D.

Comparative Biochemistry

Administered by an Interdepartmental Group
Office, 2553 Life Sciences Building

Professors:
Daniel I. Arnon, Ph.D., Docteur (Hon.)
E. L. Robert Stoksad, Ph.D.

Lecturers:
Janet C. King, Ph.D.

Computers

Administered by an Interdepartmental Group
Office, 487 Storke Hall

Professors:
Donald G. Arbogast, Ph.D.
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Robert A. Cockrell, Ph.D.

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(See Major in Bioresource Sciences)

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Lower division requirements include Biology 1A–1B; Chemistry 1A–1B, 8A–8B, Computer Science 1 or Statistics 2; English 1A–1B or Rhetoric 1A–1B or Comparative Literature 1A–1B; Mathematics 16A–16B, Physics 6A–6B–6C; and Resource Science 50 or CR5 23.

Students wishing to elect an area of emphasis in Animal Resource Sciences may do so by selecting appropriate courses within the 32 units of free electives and the 28 units of courses "in or relevant to biological and natural resources." Consult with your adviser for specific

NOTE: For key to symbols, see page 36.
course numbers and titles that satisfy the require-
ments.

Conservation of Natural Resources
This major is an interdisciplinary program designed for
students interested in environmental issues and areas
of interaction among natural resources, population,
technology, societal institutions, and cultural values.
The major's orientation is toward flexibility and an indi-
vidualized educational approach to understanding the
structure and dynamic functions of complex envi-
ronmental systems within our society and biosphere.
The program encourages students to use the course
offerings of the entire Berkeley campus and appropri-
ate courses in the development of individual
programs of study. A growing number of courses and
continuous innovation within the major provide the
necessary flexibility to attempt to understand and re-
solve basic environmental issues. The major facilitates
and encourages interaction among students, faculty,
and community.

Breadth requirements include three quarter courses in
each of four of the following five areas: physical
sciences, biological sciences, social sciences, humani-
ties, and mathematics and/or statistics. Three addi-
tional quarter courses are required in one of the four
areas chosen, as well as two quarter courses in read-
ing and composition. Other requirements include Inter-
departmental Studies 104A, 104B, 105, 106, 107, 108A,
109A, 109B, 119, 120A, 120B, 123A, 141, 142, 143,
Natural Resources 49 and 149, and a 10-quarter pro-
gram in the area of interest that is selected by the student.

Entomology
The Department of Entomology administers the major
in entomology, which provides a background for re-
search, teaching, public service, and the many com-
mercial fields where knowledge of entomology and
parastatistics is applied.
Lower Division requirements are the same as those
listed in Bioresource Sciences. For upper division re-
quirements, see the Announcement of the College of
Natural Resources.

Food, Nutrition, and Dietetics
The Food, Nutrition, and Dietetics major gives students an
understanding of the relationships among the biological and
chemical sciences. In their program, students may choose to
emphasize food science—the study of the properties
and processing of food materials; nutrition—the study of
the biochemistry and physiology of food utilization;
or agriculture—a professional program in nutrition man-
agement.
A student with a Bachelor of Science degree in the food
science or nutrition emphasis is well prepared to seek
advanced professional study in the health sciences
(medicine, dentistry, and public health), advanced
graduate study in the life sciences, or technical em-
ployment in research and in the food industry. The
dietetics emphasis is for students planning to enter the
dietetics profession as therapeutic and clinical dieti-

tes. The major in genetics is designed to provide a broad
foundation in biology, centered around a core of em-
phasis on genetics. The field of genetics encompasses
most areas of biological research. Major requirements
range from molecular to populational levels, and are
designed to take advantage of the diversity of course
offerings at Berkeley, allowing students with interests
as varied as bacterial genetics, human genetics, or
population biology to fulfill the requirements in a man-
er suited to their personal interests. The intent of the
program is to be rigorous in the breadth of its require-
ments and flexible in the means of fulfilling them.

Lower division requirements are the same as those
listed in Bioresource Sciences. For upper division re-
quirements, see the Announcement of the College of
Natural Resources.

Genetics
The major in genetics is designed to provide a broad
foundation in biology, centered around a core of em-
phasis on genetics. The field of genetics encompasses
most areas of biological research. Major requirements
range from molecular to populational levels, and are
designed to take advantage of the diversity of course
offerings at Berkeley, allowing students with interests
as varied as bacterial genetics, human genetics, or
population biology to fulfill the requirements in a man-
er suited to their personal interests. The intent of the
program is to be rigorous in the breadth of its require-
ments and flexible in the means of fulfilling them.

Lower division requirements are the same as those
listed in Bioresource Sciences. For upper division re-
quirements, see the Announcement of the College of
Natural Resources.

Pest Management
The primary objective of the major is to provide the
interdisciplinary training which will permit the student to
appraise and diagnose field pest and disease prob-
lems and to recommend courses of corrective or other
action that are economically and ecologically sound.
Attention has shifted from traditional dependence on
chemical suppression of pests to pest population man-
agement through integrated control systems. Pest
management specialists must have an understanding
of natural control agents operating in the ecosystem as
well as knowledge of the economics of the crop or
other commodity system, pest phenology and ecology,
and the spectrum of available control meth-
ods. Plant disease, weed, and nematode situations
and many other factors must be considered before the
pest management specialist can make the important
action decisions required. Properly trained pest man-
agement specialists are in short supply today, and the
outlook for employment in this important field is bright,
both in public agencies such as the U.S. Department of
Agriculture, U.S. Forest Service, National Park Service,
and state departments of agriculture and forestry,
and with private firms such as agricultural chemical com-
panies, consulting firms, food processing firms, corporate
farms and ranches, and large forest product firms.
Curriculum requirements in the first two years include:
biology, 5 units; English, 8 units; other humanities and
social sciences, 17 units; Chemistry 1A–1B, 8A–
8B, biochemistry, 4 units; calculus, 4 units; and phys-
ics, 4 units. Additionally, 86 units of biological and
resource sciences are needed, as well as 81 units of
courses that focus on pest management.

Plant Pathology
Plant Pathology involves the study of interactions
among plants, pathogens, and their environment, with
the objective of developing effective procedures for the
protection of plants from disease. The subject area is
exceptionally broad embracing the response of the
plant to the environment and to disease agents such as
bacteria, fungi, seed plants, and viruses. Plant path-
ologists are involved in the study of such diverse
along with the development of an understanding of the
whole series of related elements which constitutes a
wildland environment.

The Junior and Senior Years. The program for the
junior and senior years involves 90 quarter units of
work, consisting of a core of 41 units of courses re-
quired of all students in the major and 49 quarter units
of electives totaling 20 to 25 units, and 24 to 29 units of
free electives.
Each student in the major must select an option (Forest
Management, Wildlife Management, Range Manage-
ment) by the first quarter of residence following the
Summer Field Program and satisfy the Restricted Elec-
tives Requirements established for that option.
After completion of the required Summer Field Program
(Forestry 100A–110B–100C), at least 60 units of the
requirements for the major in Forestry must be com-
pleted in residence in not less than five quarters in this
major in the College of Natural Resources.
problems as host-parasite physiology, microbial ecology, and integrated pest management, utilizing cultural, chemical, genetic, and biological control approaches. Because of the fundamental importance of plants as food, fiber and recreational resources, the discipline must be planned to benefit human welfare. To function as a professional plant pathologist, graduate training to the M.S. is required, and the Ph.D. is desirable. A primary purpose of the undergraduate major in plant pathology is to prepare students for graduate work in the discipline. Because of the broad requirements, the major is also well suited for students who wish to obtain a strong background in plant biology or general microbiology. Lower division requirements are the same as those listed in Bioresource Sciences. For upper division requirements, see the Announcement of the College of Natural Resources.

Political Economy of Natural Resources

Students in the Political Economy of Natural Resources major explore those aspects of human behavior, economic systems, and social institutions which affect and are affected by the management of natural resources and the environment. The framework of study combines economics, political science, and law. The curriculum includes disciplinary approaches to natural resources and courses specifically designed to integrate the different social science approaches to the dilemmas associated with resource-based social needs. The major requirements are structured to provide opportunity for specialization in one discipline or one area of resource management. Students who complete this major have the options of professional employment in the fields of resource policy or continuing on to graduate work in professional schools, disciplinary majors, or interdisciplinary programs.

Lower division breadth requirements stipulate five quarter courses in the social sciences, of which one is principles of economics; three quarter courses in calculus, statistics; and two quarter courses in each of reading and composition, humanities, biological sciences, and physical sciences.

Upper division work must include a total of about 60 units in the fields of natural resource economics, history of resource use, resource and environmental law, economic theory, political economy, and systems and policy theory, and a senior research project.

Preventeriology

The preventeriology program, administered by the College of Natural Resources, offers basic training in the natural sciences and humanities in preparation for subsequent work in the School of Veterinary Medicine on the Davis campus. The two-year preventeriology program is followed by two more years of undergraduate work, completing a suitable major for the Bachelor's degree. No particular major offers special advantages for admission to the School of Veterinary Medicine. On admission to the School of Veterinary Medicine, four years of professional study leads to the degree of Doctor of Veterinary Medicine. Enrollment in the School of Veterinary Medicine is limited, and candidates are selected upon the basis of scholarship and other criteria. Preventeriology work should be planned in such a way that, if the student fails to enter the professional school, alternate career goals are possible.

Requests for information regarding the preventive profession, requirements for entry in the School of Preventeriology, and application forms for admission may be directed to the Office of the Dean, School of Veterinary Medicine, University of California, Davis, CA 95616.

The preventeriology program requires: 25 units of chemistry, 8 units of English, 9 units of biology (including vertebrate embryology), 3 units of genetics, and 28 units of electives in the social sciences and humanities.

Soil and Plant Resources

The major provides academic training in basic concepts of soil-plant interactions. The curriculum is broadly based for dealing with principles of soil-plant interactions and covers such areas as soil, chemical, physical, and biological processes; soil-plant relationships; plant nutrition, physiology and plant biochemistry. The curriculum in Soil and Plant Resources is designed for students preparing to continue graduate studies in or wishing to seek employment in technical areas, such as soil and plant testing laboratories, consulting firms, fertilizer sales, and as soil scientists for federal agencies.

Lower division requirements are the same as those listed in Bioresource Sciences. For upper division requirements, see the Announcement of the College of Natural Resources.

Soil Resource Management

The primary objective of the major in soil resource management is to prepare students for professional and applied scientific work on conserving and improving the soil resources used by man. Students in the major are required to achieve an understanding of scientific principles underlying professional techniques, in such areas as soil resource classification and inventory, soil property evaluation, and management of soils used in a variety of ways.

Students graduating from this major may expect to follow professional careers in both private firms and government agencies, including farm management firms, environmental consulting firms, tree farming firms, the Soil Conservation Service, Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Forest Service, Bureau of Land Management, California Resources Agency, and state and county planning agencies. The outlook for employment in soil resource management is growing owing to the growing use of specialists in this field.

The preparatory program requires: 10 units of economics; 10 units of English; Chemistry 1A-1B; work in surveying, geology, and statistics; Mathematics 16A-16B; Biology 1A-1B, ecology, and political economy. Major work in the upper division stipulates 61 units in the fields of soil science and soil resource management.

Wood Science and Technology

The major in Wood Science and Technology is designed for students interested in the wise utilization of the many products obtained from trees and in obtaining an education embracing the broad field of renewable natural resources. Emphasis is placed on the management aspects of an integrated program of utilization to maximize benefits from the harvested tree. Courses provide a basic understanding of the interactions with forest management and the importance of effective utilization in the management and conservation of forests. Students may select technical elective courses that are relevant to their individual interests and career objectives.

The Wood Science and Technology major provides the academic background for careers in wood industries and in other fields where knowledge of the forest products and their use is important. Students who desire careers in research or teaching may also prepare themselves for graduate studies leading to the M.S. and Ph.D. degrees. An applicant should hold a degree in another field (for example, agricultural economics) comparable to a bachelor's degree at the University of California and must have demonstrated strong scholarship potential.

The agricultural economics program is relatively flexible, however, each program stresses economic theory, quantitative methods, and two elective fields defined in consultation with the graduate advisor. Some common elective fields include marketing and trade, agriculture in economic development, domestic rural policy, and natural resource economics.

The first year of course work in the Ph.D. program is normally devoted to economic theory and quantitative methods, after which the student writes departmental preliminary examinations in each of these areas. Although there are no specific course "requirements," the level of sophistication expected in these preliminary examinations is defined with respect to a specific set of courses, and most students are advised to take these courses.

Outstanding facilities are available within the Department, including the Glidden Foxton Agricultural Economics Library, one of the world's foremost research libraries of its type.

Biophysics

This program is administered by a campus-wide interdepartmental group which was organized to permit students interested in biophysics to obtain graduate training leading to an M.A. or a Ph.D. degree. Students

NOTE: For key to symbols, see page 30.
interested in study and research in biophysics may work toward a Ph.D. degree in any of the fields belong-
ing to the group without having to pursue other
graduate programs offered by the department with
which the faculty member is affiliated. In this College,
members of the group in biophysics include individual
faculty members of the departments of Cell Physiology,
Entomological Sciences, Genetics, Nutritional
Sciences, and Soils and Plant Nutrition.
Undergraduate students interested in pursuing gradu-
ate work in biophysics should as undergraduates ac-
cquire training in such physical and biological
sciences, but individual deficiencies may be removed
during the early stages of graduate study.

Comparative Biochemistry
This program is administered by an interdepartmental
group which was organized to permit students interest-
ed in a biochemical approach to biological problems
to obtain graduate training and advanced degrees.
This interdisciplinary program allows the student to do
research on a biochemical problem and to fulfill M.A.
or Ph.D. thesis requirements under the supervision of
a faculty member in one of several departments, such as
Microbiology, Cell Physiology, Entomological
Sciences, Nutritional Sciences, Physiology-Anatomy,
and organized research units such as Chemical Bi-
yodynamics. Students are expected to obtain a back-
ground in general biology and to specialize in some area of
biochemistry.

Entomology
This program is administered by the Department of
Entomological Sciences. Both M.S. and Ph.D. degree
programs are offered. A basic educational background
in the physical and biological sciences is prerequisite to
the study of entomology at the graduate level. The
minimum requirements are usually fulfilled by a bache-
lor's degree from an institution of acceptable standing.
The preparatory undergraduate program should in-
clude the following subjects: general entomology, in-
spect classification, insect anatomy and physiology,
 systematic entomology, insect ecology, and a year of
general biology, including zoology and botany as well as
animal and plant physiology. Courses in genet-
ics, physiology and invertebrate zoology, and statistics
are strongly recommended. Chemistry, including or-
ganic chemistry, and physics are required. Any defi-
cencies in these areas must be removed at the outset of
graduate study.
Fields of emphasis include acarology, agricultural en-
tomology, biological control, forest entomology, pest
management, insect behavior, insect ecology, toxicol-
ogy, insect morphology, insect nematology, insect pa-
thology, insect vectors in medical entomology, parasit-
ology, and insect physiology and biochemistry.
Excellent available research facilities include an out-
standing entomological museum, specialized labora-
tories, and an extensive library. Students also use
insectary buildings, growth chambers, and green-
houses at the Oxford Tract and growth chambers, bi-
odicam chambers, and greenhouses at the Gill Tract.

Food Science
This program, leading to the M.S. degree, is adminis-
tered by an interdisciplinary group composed of repre-
sentatives from the Departments of Nutritional
Sciences, Chemical Engineering, and Public Health. A student must have the direction of a fac-
ulty member in any department represented in the
group. Provision is available to include selected per-
sonnel from the Western Regional Research Laborato-
ry of the U.S. Department of Agriculture as adjunct
professors and to extend research to their laboratories.
Applicants must have completed the requirements for a
B.A. or B.S. in the sciences or fields on which food
science is based. Undergraduate preparation should in-
clude general, qualitative, analytical, organic, and
preferably also physical chemistry; physics with lab-
oratory; bacteriology with laboratory; and courses in
nutrition and/or food science or technology. Ideally the
undergraduate program will be comparable to the ma-

or in food, nutrition, and dietetics as offered on this
campus.
Programs are designed to prepare students for indus-
trial or teaching application of their education in such
areas as emphasis on food chemistry, food production,
food analysis, and quality control. The San Francisco
Bay area is a major food processing and research
center, and students able to establish close con-
tact with these industries and product development
groups.

Forestry
The Master of Forestry degree is a graduate profes-
sional degree, granted through the Department of For-
estry and Conservation, and represents completion of
academic preparation for a professional career in for-
estry. The M.F. is the only master's degree counting
as to achieve technical specialization at an advanced
level and to acquire an understanding of how to ma-

age resources to meet specific economic and social
goals. Excellent field study opportunities are available,
and students are encouraged to work closely with pro-
fessional forestland managers in public and private
agencies and to become involved in analyzing land
management problems currently faced by these agen-
cies.

Genetics
Administered by an interdepartmental group, this pro-
gram offers graduate studies at both the M.S. and Ph.D.
developmental levels. Genetics cuts across the conventional subdi-

cisions of the biological sciences, requiring some famil-

iarity with botany, zoology, bacteriology, biochemistry,
and physiology. In addition, genetics has important
applications in the fields of clinical microbiology,
medicine, forestry, nutrition, and molecular biology.
Therefore, graduate work leading to the Ph.D. degree
may be supervised by faculty members from the vari-
ous departments where work related to genetics is
being done.
The interdepartmental group arrangement allows stu-
dents of genetics to approach their field from several
points of view: some may study the more purely theo-
retical aspects of the subject; others may focus on its
application in particular disciplines (in forestry or physi-
ology, for example). Genetics is also viewed as a uni-

fying discipline; and each student, regardless of the
area of specialization, must obtain a fundamental
knowledge of genetics.

An undergraduate major in genetics or its equivalent in
the biological sciences is the standard preparation.
However, students with undergraduate degrees in such
fields as mathematics, psychology, and chemistry are
welcome, with the understanding that subject matter
deficiencies must be removed early in the graduate
work.

In addition to laboratory and other facilities for re-
search, many field stations of the University are avail-
able for students interested in natural populations; and
working relationships have been established with the
San Francisco Zoo, San Francisco Museum of Natural
Sciences, and the Institute of Forest Genetics at Placerville.
The State Department of Public Health laboratories, the Bi-
ological group at San Diego State College, and the Or-

Nutation
Graduate study is supervised by an interdisciplinary
group representing the various departments at Berke-
ley interested in nutrition: Nutritional Sciences, Bio-
chemistry, Anatomy and Physiology, Public Health, and
Medical Physics. Programs are available at both the
M.S. and Ph.D. levels. For admission the student
should have a bachelor's degree in one of the sciences
on which nutrition is based. An undergraduate major or
its equivalent in any of the the nutritional sciences cur-
ricula or related fields, such as biochemistry, chem-
istry, biological sciences, and physiology, will provide
a strong background.

Graduate study in nutrition is intellectually challenging
and offers opportunities to study a range of problems
on a biochemical, comparative, and cellular nutri-
tion. Fields of emphasis include biochemical, biophysi-
al, and genetic aspects of nutrition; experimental nu-

trition; human nutrition; international nutrition; physio-

logic phenomena; and therapeutic nutrition.
Special facilities include a six-bed metabolic unit for the

conduct of human investigations and an animal colony
maintained for teaching and research purposes.

Parasitology
This program is administered by an interdepartmental
group composed of staff members drawn from a wide
range of departments interested in parasitology. Grad-
uate study leading to the M.S. and Ph.D. degrees is
made available for students with a bachelor's degree in

a basic level of biological sciences, requiring some famil-

iarity with botany, zoology, bacteriology, biochemistry,
and physiology. In addition, genetics has important
applications in the fields of clinical microbiology,
medicine, forestry, nutrition, and molecular biology.
Therefore, graduate work leading to the Ph.D. degree
may be supervised by faculty members from the vari-
ous departments where work related to genetics is
being done.
The interdepartmental group arrangement allows stu-
dents of genetics to approach their field from several
points of view: some may study the more purely theo-
retical aspects of the subject; others may focus on its
application in particular disciplines (in forestry or physi-
ology, for example). Genetics is also viewed as a uni-

fying discipline; and each student, regardless of the
area of specialization, must obtain a fundamental
knowledge of genetics.

An undergraduate major in genetics or its equivalent in
the biological sciences is the standard preparation.
However, students with undergraduate degrees in such
fields as mathematics, psychology, and chemistry are
welcome, with the understanding that subject matter
deficiencies must be removed early in the graduate
work.

In addition to laboratory and other facilities for re-
search, many field stations of the University are avail-
able for students interested in natural populations; and
working relationships have been established with the
San Francisco Zoo, San Francisco Museum of Natural
Sciences, and the Institute of Forest Genetics at Placerville.
The State Department of Public Health laboratories, the Bi-
ological group at San Diego State College, and the Or-

zation for Tropical Studies in Costa Rica.
cialized research equipment. One of the largest plant pathology reprints libraries in the world and an herbari- um are also maintained.

Plant Physiology

This program is administered by an interdepartmental group consisting of faculty members from a wide range of departments, including Botany, Cell Physiology, For- estry and Conservation, and Soils and Plant Nutrition. Graduate studies are available leading to the M.S. and Ph.D. degrees, offering students broad opportunities for work, study, and research on growth and development, hereditary potentialities, effects of environmental conditions, and other aspects of plant physiology.

The program emphasizes fundamental training. Appli- cants should have prior preparation in both theoreti- cal and biological sciences, although deficiencies can be removed during the early stages of graduate study. General subject requirements for admission to the M.S. or Ph.D. degree programs are similar.

In addition to conventional chemical laboratories, spe- cialized facilities include controlled environmental growth chambers and glasshouse space as well as field, forest, and laboratory culture areas. Equipment for the analysis of developmental and physi- ological processes and their biochemical or biophysical aspects include computers, electron microscopes, atomic absorption spectrometers, gas chromatographs, and other modern instrumentation.

Range Management

This program is administered by an interdepartmental group consisting of faculty members from the Depart- ment of Forestry and Conservation and related depart- ments on the Berkeley campus. The program is de- signed to enable students with a B.S. degree in range- management, forestry, in other range management fields, or in related disciplines who desires to specialize in some aspect of range management. Such as grass or brushland ecology, forage in relation to livestock or wildlife management, or rangeland vegeta- tion manipulation.

Excellent laboratory and field facilities include several experimental range properties and large areas of wild- land ranges that are easily accessible from Berke- ley. The staff is actively involved in both theoretical and practical research.

Soil Science

Graduate study in soil science is supervised by an interdepartmental group drawn from the staff of the Depart- ment of Soils and Plant Nutrition and other depart- ments within the College of Natural Resources, with person with whom students arrange programs of study and to whom they may go for advice.

Inquiries regarding details of the various graduate pro- grams may be directed to the appropriate graduate adviser in the chosen field. Names of advisers for the various graduate departments in the College are given in the graduate course section of this catalog.

Undergraduate Courses

Bioenergetics (Bloe.)

Department Office (Cell Physiology), 313 Hilgard Hall

Undergraduate Advisers: Richard Malkin and Bob Buchanan

Upper Division Courses

Bloe. 101. Flow of Energy and Matter in the Living World. (3) Three 1-hour lectures per week. Prerequisites: Chemistry 1A, 1B, or 8A. Biology 1B. Nature and types of energy; energy conversion through photosynthesis, fermentation, and respiration; energy utilization in biological work at the molecular, cellular, and organismal levels; evolutionary development of biological energy production. Mr. Buchanan (S)

Bloe. 107. Energy Transformations in Living Cells. (3) Three 1-hour lectures per week. Prerequisites: Chemistry 1A, 1B, or 8A; Biology 1B. Nature and types of energy; energy conversion through photosynthesis, fermentation, and respiration; energy utilization in biological work at the molecular, cellular, and organismal levels; evolutionary development of biological energy production. Mr. Buchanan (W)

Bloe. 117. Light and the Biosphere. (3) Three 1-hour lectures per week. Prerequisites: Chemistry 1A, 1B, or 8A; Biology 1B. The interaction of life and light systems in the physical nature of electromagnetic radia- tion; mechanisms of light generation and detection; light regulation of biological systems; utilization of light energy to drive biochemical processes. Mr. Buchanan (W)

Bio 198. Directed Group Study or Investigation. (1-5) Prerequisite: consent of the instructor.

Conservation of Natural Resources (CNR)

Department Office, 112 Glanmilt Hall

Undergraduate Adviser: Paul L. Gersper (in charge)

Lower Division Courses

CNR 49. Introduction to Conservation of Natural Resources. (3) Two 1 1/2-hour meeting per week; one 2-day field trip. Lectures and discussion will intro- duce students to the philosophy and educational op- portunities of the major and attempt to develop the student's interests and educational goals, relative to the environmental field of population, environment, and re- sources. A paper on the student's interests, academic objectives and plan will be required. To be taken P/NP. Intended primarily for lower division students in the

NOTE: For key to symbols, see page 36.
CNR major.
The Staff (Mr. Miller in charge) (F, Sp)
CNR 99. Supervised Independent Study and Research. (1-5) Prerequisite: lower division standing, consent of instructor, and approval of the department. Research on topics relevant to Conservation of Natural Resources that are not covered in depth by other courses, must be taken on a pass/no pass basis. The Staff (Mr. Gersper in charge) (F, W, Sp)

Upper Division Courses

CNR 109. Junior Seminar in Conservation of Natural Resources. (4) Two hour discussion per week. Prerequisite: Junior standing or consent of instructor. A project group, seminars and discussion will provide students experience with group process, and prepare them for the environmental problem solving and assist in crystallizing the students' interests and educational goals. An oral presentation, a written academic plan and written contributions to the group project will be required. Intended primarily for juniors in the Conservation of Natural Resources major. The Staff (Mr. Dahstien and Mr. Rosh in charge) (W, Sp)

CNR 109A Junior Seminar in Conservation of Natural Resources. (4) Two hour discussion per week. Prerequisite: senior standing or consent of instructor. In-depth seminars will provide an opportunity to fully examine a topic of special interest with skills and interests into a holistic perspective. Students will be encouraged to approach environmental issues in an active manner by means of 1-hour oral presentation and a major paper (equivalent to a senior thesis) will be required. Intended primarily for graduating seniors in the CNR major. The Staff (Mr. Cobb and Mr. Gersper in charge) (F, W, Sp)

CNR 107. Field Study in Conservation of Natural Resources. (1-6) Prerequisite: consent of instructor. Supervised experience in off-campus organizations relevant to specific aspects of Conservation of Natural Resources. Regular individual meetings with faculty sponsor and written reports required. The Staff (Mr. Gersper in charge) (F, W, Sp)

CNR 108. Directed Group Studies for Advanced Undergraduates. (1-6) Prerequisite: consent of instructor. The Staff (Mr. Gersper in charge) (F, W, Sp)

CNR 109. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a pass/no pass basis. The Staff (Mr. Gersper in charge) (F, W, Sp)

IDS 10A-10B-10C. Environmental Issues. (4-4-4) See Interdepartmental Studies for the complete description of this course.

IDS 10L-10M-10N. Environmental Issues—Special Projects. (2-2-2) See Interdepartmental Studies for the complete description of this course.

Conservation and Resource Studies (CRS)

Department Office, 112 Glammill Hall
Undergraduate Major Advisers: Conservation of Natural Resources. The Staff (Mr. Gersper in charge). Reverse Division Courses

CRS 23. World Resources for Food and Agriculture. (4) Three hours of lecture per week. Survey of major factors that affect the production, processing, distribution, and utilization of food. Principles of agriculture including physical, biological, social, and economic factors. The place of agriculture in national and world affairs. The outlook for world food. Mr. Waldron, Mr. Stokstad (W)

CRS 40. Environmental Chemistry. (3-4) Three hours of lecture and one-half 1-hour discussion section per week. Prerequisites: high school chemistry and consent of instructor. Lectures will provide an understanding of the chemical properties of the environment, especially how they relate to pollution and environmental degradation. Students with insecure background in chemistry may enroll for 3 instead of 4. Ms. Young, Mr. Huismen (W, Sp)

CRS 40L. Environmental Chemistry Laboratory. (2) One hour of lecture and 3 hours of laboratory per week. Prerequisites: concurrent enrollment in course CRS 40 and consent of instructor. Applications and problems of various techniques for chemical analysis as applied to environmental chemistry. Ms. Young (W, Sp)

Upper Division Courses

CRS 101. Urban Garden Ecosystems. (6) Three hours of lecture and one-half 2-hour discussion and demonstration per week. Study of urban garden and recreation ecosystems, with emphasis on basic ecological concepts and techniques and animal systems. Mr. Williams (F), Mr. Vlamis (W), Mr. Rabe (Sp)

CRS 110. Ecosystematology. (4) Three hours of lecture and one-half 2-hour discussion per week. Prerequisite: any ecology course, or one quarter of interdepartmental Studies 10, or consent of instructor. Concepts of the role of ecosystems in which man is dependent component, planning agent, indifferent observer: how to deal with complexity; the systems approach to problem solving; determining systems boundaries; ecological concepts; ecosystem management. Mr. Schultz (W)

CRS 115. Environmental Philosophy and Ethics. (4) Three hours of lecture and one-half 2-hour discussion per week. Prerequisite: any philosophy course, or consent of instructor. A critical analysis of human environments as physical, socio-economic and technocultural ecosystems. The role of ideolog, belief, attitudes and behavior. An examination of contemporary environmental literature and the philosophies embodied therein. Ms. Merchant (F)

CRS 118. Linear Models of Natural Resource Problems. (4) Three hours of lecture and 1 hour of discussion per week. Prerequisites: Math 16A and 16B and Statistics 0, or consent of instructor. Use of linear and stochastic models in the analysis of natural resource problems. Methods include linear programming, input-output analysis, and simulation. Mr. Just (F)

CRS 130. Resource Development Law and Administration. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisite: division standing and consent of instructor. Review of environmental quality laws, environmental planning and administration, with emphasis on the federal and California environmental impact processes. Legislation, procedures of agencies, court decisions, role of consultants, citizens, relationship to development and the economy. Mr. Fairfax (Sp)

CRS 131. Environmental Law, Planning, and Administration. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisite: division standing and consent of instructor. Review of environmental quality laws, environmental planning and administration, with emphasis on the federal and California environmental impact processes. Legislation, procedures of agencies, court decisions, role of consultants, citizens, relationship to development and the economy. Mr. Fairfax (Sp)

CRS 132. Environmental Impact Assessment. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisite: course 131 or Conservation of Natural Resources 19IF or equivalent and consent of instructor. Methodologies of describing and assessing human actions and their impact on the environment, with emphasis on the California impact law and processes. Mr. de Janvry (W)

CRS 133. Environmental Impact Reporting. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisite: course 131 or Conservation of Natural Resources 19IF or equivalent and consent of instructor. Methodologies of describing and assessing human actions and their impact on the environment, with emphasis on the California impact law and processes. Mr. de Janvry (W)

CRS 134. Economics of Land Use. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisites: Econ 10A and consent of instructor. Methodologies of describing and assessing human actions and their impact on the environment, with emphasis on the California impact law and processes. Mr. de Janvry (W)

CRS 135. Economics of Natural Resource Policy. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisites: Econ 10A and equivalent and consent of instructor. Methodologies of describing and assessing human actions and their impact on the environment, with emphasis on the California impact law and processes. Mr. de Janvry (W)

CRS 136. Agriculture: Economic and Policy Analysis. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisites: Econ 10A and equivalent and consent of instructor. Methodologies of describing and assessing human actions and their impact on the environment, with emphasis on the California impact law and processes. Mr. de Janvry (W)

CRS 137. History of Resource Use in the United States from Colonial Times to Present. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: consent of instructor. Examination of the history of the development and use of natural resources—land, water, agriculture, timber, minerals, petroleum—in the United States. Elements of historical geography and the history of technology as well as political, economic, and social history are included. Ms. Merchant (W)

CRS 151. Economic and Political History of Resources in Twentieth Century United States. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: consent of instructor. Examination of the economic and political history of the development and use of United States capital with respect to impact on resources and environment. Examination of the history of the development and use of natural resources, and the role of government in effective resource exploitation and environmental degradation from the Progressive Era, New Deal, the Great Society to the present. Mr. LeVeene (W)

CRS 161. Agriculture in Economic Development. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: consent of instructor. The role of agriculture in development and the role of developing agriculture, and the role of agricultural development in the transformation of natural resources; policy issues in rural development. Mr. de Jamyny (W)

CRS 163. Economic Analysis of World Agricultural Problems. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Economics 100A, or ECON 100A, or equivalent. Socioeconomic factors in the organization and operation of agriculture, with specific emphasis on the agricultural and economic aspects of world hunger. Mr. Stokstad (W, Sp)

CRS 164. Economic Analysis of World Agricultural Problems. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Economics 100A, or ECON 100A, or equivalent. Socioeconomic factors in the organization and operation of agriculture, with specific emphasis on the agricultural and economic aspects of world hunger. Mr. Stokstad (W, Sp)

CRS 170A-1170B. Sociology of Rural Development. (4) Three hours of lecture per week. Prerequisite: Economics 100A, or ECON 100A, or equivalent. Socioeconomic factors in the organization and operation of agriculture, with specific emphasis on the agricultural and economic aspects of world hunger. Mr. Stokstad (W, Sp)

CRS 191B. Environmental Biology. (4) Three 1-hour lectures per week. Prerequisite: One course in introductory general chemistry and one course in introductory general biology. Mr. de Janvry (W)

CRS 191C. The Use of a Computer in Understanding Quantitative Phenomena in the Biological Sciences. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: An elementary course in a life science. An introductory course for students desiring to use the computer to investigate quantitative phenomena in the biological sciences. Emphasis is on the importance of hypothesis and model formulation, and on the interpretation of results based upon the models developed from the particular hypothesis. Mr. Stokstad, Mr. de Janvry (W)

IDS 10A-10B-10C. Introduction to Environmental Issues. (4-4-4) See Interdepartmental Studies for the complete description of this course.

IDS 10L-10M-10N. Introduction to Environmental Issues—Special Projects. (2-2-2) See Interdepartmental Studies for the complete description of this course.

IDS 80. Introduction to Environmental Physics. (4) Formerly Physics 80. See Interdepartmental Studies for the complete description of this course.

IDS 120. Environmental Education and Design. (5) See Interdepartmental Studies for the complete description of this course.
Entomology (Ent.)

Department Office, 137 Giannini Hall
Undergraduate Adviser: John T. Doyen

Lower Division Courses

Ent. 10. The Natural History of Insects. (4) Three lecture hours and one 1-hour discussion period per week. Prerequisites: course 100 and 101, or their equivalents. This introductory course is designed for students with special emphasis on their significance in relation to plants and animals, including humans. Mr. Frankie (F)

PM 20. Introduction to the Philosophy, Ecology, and Economics of Pest Management. (4) Lectures, 4 hours per week. Introduction to the systems approach to pest control, including the philosophy, goals, ecological basis, strategy and tactics of integrated control. Consideration will be given to cropping systems, ecology, natural, and artificial controls, and system interactions. Mr. Falcon, Mr. Day, Mr. Woodward (W)

Upper Division Courses

Ent. 100. General Entomology. (5) Three hours of lecture and six hours of laboratory per week. Prerequisites: course 102 and 103 or consent of instructor. Study of immature and adult stages of insect groups restricted to those with important biological importance. Techniques of collecting and studying living insects, emphasis on aquatic insects, and other arthropods important to the health of animals and man. Mr. Sylvester (F)

Ent. 101. Insect Classification. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: course 100. Classification of insects to the family level with emphasis on identification. Mr. Doyen (F)

Ent. 102. Functional Insect Anatomy. (2) Two hours of lectures per week. Prerequisite: course 100. Comparative study of the functional aspects of insect anatomy. Mr. Pipa (F)

Ent. 103. Environmental Physiology of Insects. (2) Three hours of lecture per week. Prerequisite: general biology, zoology, or entomology. Recommended course 103L or equivalent. A study of the physiological characteristics of insect organ systems. Mr. Pipa (F)

Ent. 103L. Laboratory in Insect Physiology. (2) Two hours of laboratory per week. Prerequisite: Entomology 103 (may be taken concurrently). Experimental studies of the principal organ systems of insects. Mr. Pipa (F)

Ent. 104. Systematic Entomology. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites: courses 100, 101, 103, and consent of instructor. A beginning course in ecology and comparative aspects of insect adaptations to the environment. Mr. Heinrich (W)

Ent. 103L. Laboratory in Insect Physiology. (2) Two hours of laboratory per week. Prerequisites: Entomology 103 (may be taken concurrently) or consent of instructor. Enrollment limited to students in the Senior class. Mr. Vose (W)

Ent. 106. Field Entomology. (5) One hour of lecture and three hours of laboratory per week; field trips to be arranged. Prerequisite: course 100 and 101. Emphasis on relation of insects to habitats and life zones through comparative studies of insect families. Collection of insect groups restricted to those with important economic or ecological data. Specimens will be coded and preserved for ecological purposes. Mr. Schlinger.

Ent. 108. Aquatic Entomology. (5) Three hours of lecture and 8 hours of laboratory per week, which includes two 1/2-day field trips and one weekend field trip per quarter. Prerequisites: Entomology 101 and permission of instructor. Study of immature and adult stages of aquatic insects, emphasis on aquatic insects as indicators of environmental quality and as predictive agents of environmental stress. Mr. Resh (Sp)

Ent. 110. Destructive and Beneficial Arthropods. (5) Three hours of lecture and six hours of laboratory per week. Life histories and habits of destructive and beneficial insects. Techniques of identification of adult and immature stages of representative species; recognition of characteristic damage; principles involved in management.先生s are T. F. Schlinger and J. D. M. Tout.

Ent. 117L. Laboratory in Pesticide Chemistry and Toxicology. (4) Three hours of lecture per week. Prerequisites: Entomology 117 (may be taken concurrently) and consent of the instructor. Exercises and demonstrations on chemistry, metabolism, and various biological effects of selected pesticides and related chemicals. To be given in odd-numbered years. Mr. Casida, Mr. Gordon (Sp)

Ent. 119. Insect Behavior. (2) Two 1-hour lectures per week. Prerequisite: Entomology 100, 102 and 103 are recommended. An introduction to insect behavior. Physiological substrates, genetic basis, influence of the environment upon behavior and relationships between insects will be discussed. Mr. Loher (Sp)

Ent. 119L. Insect Behavior Laboratory. (2) Two 1-hour laboratory periods per week. Prerequisite: Entomology 119 (may be taken concurrently). Laboratory in locomotion, orientation, feeding behavior, communication, reproductive behavior. Mr. Loher (Sp)

Ent. 130. Biological Control of Insect Pests and Weeds. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: course 100 and 101. Theories and practical applications of biological control: population phenomena; the biology of the entomophagous insects. Mr. Callagheone, Mr. Hagen (F)

Ent. 140. Insect Pathology. (5) Four hours of lecture and three hours of laboratory per week. Prerequisites: course 100 and at least one course in a microbiological science. Principles of physiological ecology and insect microbiology; infectious and noninfectious diseases of insects; diagnosis, therapy, and microbial control. Mr. Tanada (W)

Ent. 150. Medical and Veterinary Helminthology. (3) Two 1 1/2-hour lectures per week. Helminthic infections of man and domestic animals. Biology, host-parasite relationships, pathogenesis, therapy, and control. Mr. Weinmann (F)

Ent. 150L. Helminth Laboratory. (3) Six hours of laboratory and one hour of discussion per week. Prerequisite: Entomology 150L (may be taken concurrently). Methods of handling and identifying parasitic helminths, postmortem examinations, laboratory diagnostic techniques, experimental manipulation of host helminths. Mr. Weinmann (F)

Ent. 153. Medical and Veterinary Entomology. (3 or 4) Three or 4-1/2 hours of lecture per week. Role of insects and other arthropods in transmission and causation of diseases of humans and domestic animals (3 units). Optional 1 unit covers management of insects and other arthropods important to the health of man and livestock. Mr. Furman, Mr. Anderson (W)

Ent. 153L. Medical and Veterinary Entomology Laboratory. (2) Six hours of laboratory per week. Prerequisite: Entomology 153L (may be taken concurrently). Techniques of collecting and studying living arthropods. Mr. Scharnke (W)

Ent. 172. Principles and Methods of Entomological Research. (4) Four hours of lecture per week. Techniques and purposes of the scientific method in entomology; research techniques in the laboratory and in the field; presentation and evaluation of data. Mr. Sylvester (F)

Ent. 177. Field Studies in Entomology. (1-5) Prerequisite: Entomology 177L. For students with special experience in off-campus organizations relevant to specific aspects of entomology. Regular individual meetings with faculty sponsor. Consent of instructor required. The Staff (Mr. Schlinger in charge), F, W, Sp.

Ent. 177B. Field Study in Veterinary Medical Practice. (1-5) Prerequisite: consent of instructor. For pre-veterinary students supervised by the Department of Veterinary Science. Two 1-hour lectures and three hours of laboratory per week. Prerequisites: course 100A-100B or consent of instructor. Introduction to the systems approach in veterinary medicine. Mr. Feldmann, F, W, Sp.


Ent. 199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 35. Must be taken on a pass/no pass basis. The Staff (Mr. Schlinger in charge) (F, W, Sp).

IDS 136. Biological Deterioration of Wood. (3) See interdepartmental Studies for a complete description of this course.

For additional courses in insect pests, see Pest Management, for graduate courses in Entomology, see index.

Forestry (For.)

Department Office, 145 Mulford Hall

Resource Science

Lower Division Course

*RS 80. Introduction to Problem Solving in Natural Resource Systems. (3) Lectures, 3 hours per week. Prerequisites: Mathematics 16A, 16B. Biology 11A or 11B, or consent of instructor. Introduction to the tools and concepts which are most productive in natural resource problem solving. Emphasis will be given to the scientific methods and the system approaches with applications of simple cause and effect relationships, conceptual and mathematical models.

General Forestry

Lower Division Course

For. 10. Conservation of Forest and Wildland Resources. (4) Three hours of lecture per week. Prerequisites: use and management of forests and other wildlands in relation to the needs of society for wood, water, forage, and recreation; forestry and conservation policies and programs. Mr. Zinke (F)

Upper Division Courses

For. 100A-100B. 100C. Field Study of Forestry and Wildland Resources. (5-4-6) 408 hours of field experience. Prerequisites: one college level course (8A-8B or equivalent) and biology (one college level course) or consent of instructor. Chemical composition of forests, the determination of forest stand characteristics; principles in forest site interrelationships, pathogenesis, therapy, and control. Mr. Zinke (F)

For. 100B. Resource Management I. (5-4-6) 408 hours of field experience. Prerequisites: one college level course (8A-8B or equivalent) and biology (one college level course) or consent of instructor. Chemical composition of forests, the determination of forest stand characteristics; principles in forest site interrelationships, pathogenesis, therapy, and control. Mr. Zinke (F)

For. 100A. The Resource Environment. (4) Four hours of lecture and three hours of laboratory per week. Prerequisite: Statistics 29 or equivalent. Design and implementation of systems for information gathering, processing and interpretation for natural resource management. Mr. Wensel (F)

For. 102. Forest Photogrammetry and Photo Interpretation. (4) Three 1-hour lectures and one 3-hour laboratory per week. Specifications for aerial photographs for forest use; identification and analysis of aerial photographs; mapping from aerial photographs; fundamentals of photogrammetric interpretation; forest interpretation applied to forestry problems. Mr. Cotter, Mr. Cooper (W, Sp).

For. 103. Forest Harvesting Systems. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: course 100A-100B-100C or consent of instructor. Design and operating of harvesting systems; engineering, cost, aesthetic, and protection aspects of forest roads, structures, and logging facilities.

NOTE: For key to symbols, see page 36.
For. 106. Introduction to Forest Insects and Diseases. (3) Three 1-hour lectures and one 1-hour laboratory per week. Prerequisite: consent of instructor. Introduction to the identification and control of forest insects and diseases. (W)

For. 113. Forest Regulation and Management. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 110–110B. Objectives of forest regulation and management; forest planning; evaluation of alternatives; forest resource evaluation; and biomass production. (Sp)

For. 115. Wildland Resource Policy. (4) Three 1-hour lectures and 1-hour discussion per week. Prerequisite: consent of instructor. Client-oriented approach to wildland recreation; user attitudes and behavior; trends in the use of wildlands; wildland recreation resource inventory; current management problems and alternatives. Concepts and methods will be used to develop plans for particular recreation areas. (Sp)

For. 117. Sociology of Natural Resources. (3) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: consent of instructor. Sociological and ecological perspectives on the relationships between societies and wildland ecosystems; social definition of natural resources; identification and planning of recreation and natural resource management; environmental communications; decision-making by social groups; public involvement; and the interrelationship of forest and rangeland. (F)

For. 120. Soils in the Forest Environment. (3) Two hours of lecture and three hours of laboratory per week. The interaction of soils and forests; soil as a factor in forest management. (W)

For. 121. Dendrology. (3) Two hours of lecture and three hours of laboratory per week. The study of trees and associated woody species, including their identification, taxonomy, anatomy, physiology, and genetics; and a review of the literature of the fields. Mr. Allard (F)

For. 122. Forest Influences. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 110–110B or consent of instructor. Effects of fire on wildland vegetation and environment; fundamentals of fire behavior; organization and dynamics of fire; computer simulation of fire behavior, including the relationship of fire to man's manipulation of ecosystems; computer simulation of fire; computer simulation of fire and natural resource management. Mr. Wakimoto (W)

For. 123A–123B–123C–123D. Ecology of Renewable Natural Resources. (4–3–3–3) 123A: three 1-hour lectures and one 3-hour laboratory per week. The study of the ecology of wildland ecosystems including one weekend field trip per quarter; 123B: three 1-hour lectures per week and four 3-hour field trips per quarter; 123C: three 1-hour lectures per week and two weekend field trips per quarter; 123D: five 1-hour lectures per week and 20 hours of laboratory or field trips per quarter. Prerequisite: 6 units of biology 123A is prerequisite for 123B; 123B and 123C must be taken concurrently; 123A, 123B, and 123C are prerequisite for 123D. Mr. Zinke (Sp)

For. 123C. Wildland Animal Dynamics. (3) Review of the ecological concepts useful in prediction, evaluation, and management of wildlife populations. The Staff (Mr. McBride in charge) (W)

For. 123D. Wildland Animal Dynamics. (3) Review of the ecological concepts useful in prediction, evaluation, and management of wildlife populations. The Staff (Mr. McBride in charge) (W)

For. 125. Principles of Silviculture. (5) Four 1-hour lectures and three 3-hour laboratory sessions per week. Prerequisite: course 110–110B or consent of instructor. Objectives of forest ownership; control of investment and growing stock; forest property organization; management planning; and the conditions of forest ownership. The Staff (Mr. Teegarden (Sp)

For. 127. Ecology of Renewable Natural Resources. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 110–110B or consent of instructor. Ecology of renewable natural resources. The Staff (Mr. Stone in charge) (F, W, Sp)

For. 128. Range Ecology. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 141 and 143 or consent of instructor. Principles and practices with particular reference to ruminants on wildland ranges. Mr. Rosiere (W)

For. 129. Range Animal Nutrition and Management. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 143 or equivalent preparation in range ecology. Principles and practices with particular reference to ruminants on wildland ranges. Mr. Rosiere (W)

For. 130. Range Economics. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 143 or equivalent preparation in range ecology. Principles and practices with particular reference to ruminants on wildland ranges. Mr. Rosiere (W)
Gen.100L. Genetics Laboratory. (4) Two hours of lectures per week and six hours of laboratory per week. Prerequisite: course 100 or 150. Principles of genetics utilizing chiefly microorganisms and Drosophila with emphasis on both the molecular and organismal aspects of the subject.

Ms. Sung (W); Ms. St. Lawrence (F)

Gen.101. Topics in Genetics. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: course 100 or 150. Primarily for majors. Selected advanced topics are treated in depth. Lectures, original literature and student participation are employed to develop appreciation of the intellectual rigor of genetics. Ms. St. Lawrence (W)

Gen.106. Food Chemistry and Processing. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: course 100 or 150. An introduction to research and clinical laboratory techniques in human genetics. Contemporary methodology in karyotyping, electrophoresis, enzyme assay and cell culture will be emphasized, recent advances in prenatal and heterozygote carrier diagnosis will be included. Ms. Palmour (Sp)

Gen.159L. Human Genetics Laboratory. (3) One hour of lecture and six hours of laboratory per week. Prerequisite: course 159, and consent of instructor. An introduction to research and clinical laboratory techniques in human genetics. Contemporary methodology in karyotyping, electrophoresis, enzyme assay and cell culture will be emphasized, recent advances in prenatal and heterozygote carrier diagnosis will be included. Ms. Palmour (Sp)

Gen.170. Plant Cell Genetics. (4) Lectures, 3 hours per week; discussion 1 hour per week. Prerequisites: Gen. 100 or 110 or consent of instructor. The biological basis for genetic manipulation of plants is developed through an integrated presentation of concepts and techniques of plant genetics, somatic cell genetics, and microbial host plant interactions.

Ms. Sung, Mr. Fretting, Mr. Panopoulos (F)

Gen.180. Junior Seminar for Honors Program. (2) Recitation 2 hours per week. Prerequisites: consent of Honors Adviser (based upon eligibility for honors program). Introduction to honors program. Assigned topics, drawn from genetic research, are prepared and presented by individual students for criticism and discussion by the class. Graded pass/not pass.

Mr. Kelly (Sp)

Gen.185. Research for Honors Thesis. (2-5) Variable hours of individual meetings. Prerequisites: course H185 or consent of Honors Adviser. Individual research of literature, or laboratory work, as arranged with Honors Adviser and individual faculty. Must be taken for at least two consecutive quarters to fulfill honors program requirements, for a maximum of 10 units.

Mr. Kelly (F, W, Sp, Su)

Gen.187. Honors Thesis Writing and Seminar. (2) Recitation 1 1/2 hours per week. Prerequisites: two or more terms of course H185. Final term of honors program. Provides opportunity to write and submit honors thesis. Each student is required to present orally his thesis research for discussion and criticism by fellow honors students. Graded pass/not pass.

Mr. Kelly (Sp)

Gen.191. Experimental Courses in Genetics. (2-5) Meetings to be arranged. Three hours of lecture and 2 hours of laboratory per week. Prerequisite: consent of instructor. Recent developments in genetics of special interest to the staff and students. Intended for majors. May be repeated for credit.

The Staff (F, W, Sp)

Gen.196. Lectures in Advanced Genetics. (4) Four hours of lecture per week. Prerequisite: consent of instructor. Selected topics in advanced genetics. May be repeated for credit.

The Staff (W, Sp)

Gen.199. Directed Group Study. (1-5) Prerequisite: consent of the instructor.

The Staff (Mr. Thomson in charge) (F, W, Sp)

Gen.199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (Mr. Thomson in charge) (F, W, Sp)

Gen.200. Genetics Laboratory. (4) Two hours of lecture and one hour of discussion per week. Prerequisites: course 100 or 150. Principles of genetics utilizing chiefly microorganisms and Drosophila with emphasis on both the molecular and organismal aspects of the subject.

Ms. Sung (W); Ms. St. Lawrence (F)

Gen.210. Resource Genetics. (5) Three hours of lecture and 2 hours of discussion per week. Prerequisites: Biology 1 or an equivalent, Genetics 100. Mendelian, developmental and population genetics, cytogenetics and evolution. Differences from 100 by less details of molecular and more quantitative genetics and microevolution. Topics in section meetings include gene conservation, genetic vulnerability, development of resistance, breeding, genetic engineering concepts. Mr. Libby (Sp)

Gen.213. Organic Evolution. (5) Four hours of lecture and two hours of discussion per week. Prerequisite: course 100 or 150. A general introduction to the multidisciplinary contributions to the field with emphasis on underlying genetic and ecological processes. Given in alternate years.

F)

Gen.214. Cytogenetics. (5) Four hours of lecture per week and one hour of demonstration per week. Prerequisite: course 100 or 150. Chromosome rearrangements (including their relationship to rearrangements in DNA) and changes in chromosome number are discussed in regard to their stability, segregation, transmission and effect on gene action. Evolutionary implications and unusual chromosome systems are also considered.

Ms. Taylor (Sp)

Gen.215. General Human Genetics. (5) Lectures, 4 hours per week, discussion 1 hour per week. Prerequisite: Biology 1A or 1B or consent of instructor. Principles of genetics in man and other mammalian systems at the molecular, organismal and population levels. For students interested in human biology. Cannot be taken for credit by students who have completed Genetics 100.

Ms. Thomson (W)

Gen.218. Advanced Human Genetics. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: consent of instructor (knowledge of basic genetic principles required). A detailed study of the genetics process in man. Emphasis on chromosomal structure and function, human biochemical genetics and gene regulation, the mutation process, and human behavioral studies. Includes functions as well as clinical dysfunctions.

Ms. Palour (Sp)

Gen.219. Human Genetics Laboratory. (4) Four hours of laboratory per week. Prerequisite: course 100. The concepts and techniques of human genetics will be demonstrated in an integrated discussion of human genetics and karyotyping. Ms. Oace (F)

Note: For key to symbols, see page 36.
NS 109. Food Process Engineering. (5) Three 1-hour lectures, three 2-hour laboratory courses, and a course in bacteriology or consent of instructor. An introduction to engineering principles, process technology, safety and quality regulations underlying the processing and preservation of foods. Mr. Delumen (Sp)

NS 110. Food Toxicology. (3) Three hours of lecture per week. Prerequisite: course 106 and a course in physiology. Principles and problems in evaluating the wholesomeness and safety of foods, food components. Mr. OeLumen (Sp)

NS 111. Food Microbiology. (3) Three hours of lecture per week. Prerequisites: a course in bacteriology or microbiology. A study of the microorganisms involved in food fermentations and food spoilage. The recognition, enumeration, and control of these organisms. The action of these organisms in foods. Thermal processing. Microbiological quality control. Mr. Chang (F)

NS 134. Food Management. (3) Nine hours of clinical laboratory, fieldwork and discussion per week. Pre-requisite: course 106 or nutrition courses NS 106 (may be taken concurrently). Experimental study of functions and effects of food ingredients and processes on the nutritive value of foods. Techniques of quality assurance, production and purchasing; menu planning for various socio-economic groups; sensory and quality evaluation of food products. Ms. Kenden, Mr. Baldamus (Sp)

NS 135. Food Systems Organization and Management. (4) Three hours of lecture, three hours of clinical laboratory, demonstration and fieldwork per week. Pre-requisite: courses 104, 106 & 134. Principles of organization and management applied in institutions and service systems; production scheduling, purchasing and cost accounting, quality control, promotional and purchasing systems. Ms. Fitzpatrick (Sp)

NS 150. Experimental Nutrition. (5) Four hours of lecture and one hour of section meeting per week. Prerequisite: course 103, Biochemistry 102, and a course in physiology. Experimental basis for present concepts in science of nutrition. Effects of changes in nutrient supply on cellular metabolism. A. Williams (F)

NS 160. Human Nutrition. (5) Four hours of lecture and 1 1/2 hours of discussion or dry lab per week. Placement in course 103, Introductory Foods 103A or NS 102 or Biochemistry 104 with a grade of C or better. Scientific basis of the metabolic and nutritional needs of normal individuals throughout the life cycle. Methods for assessment of nutritional status will be demonstrated. Ms. King (W)

CRS 160. Economics of Food and Nutrition. (3) See Conservation and Resource Studies for a complete description. Mr. Day, Mr. Wilhertm (W)

NS 161. Therapeutic Nutrition. (5) Five hours of lecture per week. Prerequisite: course 160. Biochemistry, physiological, and nutritional basis for therapeutic treatment of various conditions and diseases by dietary means. Ms. Calloway (Sp)

NS 161L. Therapeutic Nutrition Laboratory. (2) Two hours of lecture per week. Prerequisite: course 161. Methodology and laboratory techniques commonly used in dietary therapy. Ms. Butterfield (Sp) and Mr. Day (Sp)

NS 170. Experimental Nutrition Laboratory. (5) Two hours of lecture and nine hours of laboratory per week. Prerequisite: course 150 or 160. Methods and experimental techniques used in nutrition research. Two 2-hour laboratory courses and one 3-hour laboratory course. Ms. Carpenter (W), Mr. Chang (Sp)

NS 181. Clinical Dietetics I. (4) Graduate major course. 9 hours of clinical laboratory, fieldwork and discussion per week. Prerequisite: course 134, concurrent enrollment in course 150, 151, and 210. Experiences in caring for patients in required major courses and consent of instructor. In- tended primarily for students in the Coordinated Program in Dietetics. Methods of nutritional care planning and evaluation for patients with medical disorders requiring modified diets. Clinical chemical methods for determining serum, urine, and tissue composition and therapeutic significance; assessment of therapeutic diets and formulated foods; emphasis on endocrine, cardiovascular and renal system. Ms. King (Sp)

NS 183. Clinical Nutrition III. (8) Two hours of lecture and 12 hours of clinical laboratory, fieldwork and discussion per week. Prerequisite: course 182, maintenance of 2.5 GPA in required major courses and consent of instructor. Intended primarily for students in the Coordinated Program in Dietetics. Continuation of course 182, planning for surgical trauma, cancer, gastrointestinal and hepatic disorders, inherited metabolic disorders and combined system diseases. Nutrition and drug therapy; critical care; and evaluation of selected patients. Ms. Calloway (F)

NS 190. Introduction to Research In Nutritional Sciences. (2) Two hours of lecture per week. Prerequisite: course 103, and 103L or Chemistry 5. Pros- eminar in current research. Ms. Little (F, W, Sp)

NS 197. Field Study In Food and Nutritional Sciences. (1-5) May be repeated for credit. Supervised experiences in areas relevant to specific aspects of foods and nutritional sciences. Regular individual meetings with faculty sponsor and advisor. Ms. Fitzpatrick (W, Sp)

NS 198. Directed Group Study. (1-5) Prerequisite: consent of instructor. The Staff (F, W, Sp)

NS 199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a pass/not passed basis. The Staff (F, W, Sp)

RO 401. Community Dietetics. (3) Minimum of 6 hours of discussion and 72 hours of clinical fieldwork during the quarter; additional effort may be required to achieve desired competency. Prerequisite: course 182, a 2.5 GPA in required major courses and consent of instructor. Supervised practice of dietetics in a community setting. Students are expected to provide greater responsibility to entry level practitioner competency. Preparation, presentation and evaluation of a nutrition education unit to a specified audience. To be taken on a pass/not passed basis. Ms. Fitzpatrick (F, W, Sp)

RO 402. Hospital Dietetics. (8) Minimum of 16 hours of lecture/discussion and 192 hours of clinical fieldwork during the quarter; additional effort may be required to achieve desired competency. Prerequisite: course 183, a 2.5 GPA in required major courses and consent of instructor. Supervised practice of dietetics in a hospital setting with progressively greater responsibility to entry level practitioner competency. Considers the atheriosclerotic, nephrotic, surgical trauma, cancer, gastrointestinal and hepatic disorders, inherited metabolic disorders; the rationale of disease and specific aspects of foods and nutritional sciences. Regular individual meetings with acuity sponsor and other advanced students. Mr. Falcon

RO 403. Research Dietetics. (3) Minimum of 6 hours of discussion and 72 hours of clinical fieldwork during the quarter; additional effort may be required to achieve desired competency. Prerequisite: course 182, a 2.5 GPA in required major courses and consent of instructor. Supervised practice of dietetics in metabolic, research design and administration of research diet; ethics of human research; equipment and data handling. To be taken on a pass/not passed basis. Ms. Fitzpatrick (W, Sp)

RO 490. Clinical Dietetics Seminar. (1-2) Two hours of lecture, discussion, field trip and/or clinical presentation per unit per week. Prerequisite: courses 161, 162, 181, 183 and 135; a 2.5 GPA in required major courses and consent of instructor. May be repeated for credit up to 6 units. Seminars and discussions on professional issues; case presentations by professionals and students; special topics in clinical dietetics. The Staff (F, W, Sp)

RO 497. Field Study In Clinical Dietetics. (2-6) Two hours of discussion and 24 hours of clinical fieldwork per unit during the quarter. Prerequisite: courses 161, 162, 181, 183, 135; a 2.5 GPA in required major courses and consent of instructor. May be repeated for credit up to 8 units. Supervised practice of dietetics in specialized clinical settings. To be taken on a pass/not pass basis. The Staff (F, W, Sp)

For graduate courses in Nutritional Sciences, see In- dex.
Plant Nutrition (PN)

Department Office, 108 Hilgard Hall

Undergraduate Adviser: Norman Terry

Upper Division Courses

PN 115. The Nutrition of Green Plants. (3) Three hours of lecture per week. Prerequisite: Biology 1A–1B. Evolution of modern concepts of plant nutrition, including functional aspects of inorganic and organic nutrients, photosynthesis, nitrogen metabolism. Mr. Terry (W)

PN 117. The Nutrition of Green Plants Laboratory. (4) One 1-hour lecture and three 3-hour labs per week. Prerequisite: Biology 1A–1B or consent of instructor. Principles of mineral nutrition of plants illustrated by laboratory and greenhouse experiments. Mr. Jacobson (F)

PN 120. Introductory Plant Biochemistry. (3) Three hours of lecture per week. Prerequisite: Biology 1A–1B. Introduction to the biochemistry of plant processes. Mr. Terry (W)

PN 198. Directed Group Study. (1–5) Selected topics in plant nutrition for advanced undergraduates. The Staff (W, Sp)

PN 199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (W, Sp)

(Total Graduates in Plant Nutrition, see Index.)

Plant Pathology (PP)

Department Office, 147 Hilgard Hall

Undergraduate Adviser: O. C. Huisman

Resource Sciences

Lower Division Courses

RS 23. Introduction to Microbiology of Natural Resources. Three hours of lecture per week. Prerequisite: a course in Biology, Chemistry 88, or consent of instructor. A general survey, from the standpoint of natural resources, of microbiology, including bacteria, fungi, algae, viruses, and protozoa. Emphasis is placed on their biological activities in relation to our natural resources and human welfare. Mr. Thomson (in charge) (W)

RS 23L. Introduction to Microbiology of Natural Resources—Laboratory. (2) Six hours of laboratory per week. Prerequisite: RS 23 (may be taken concurrently), and consent of instructor. Experiments designed to acquaint students with techniques for handling viruses, bacteria, fungi, algae and protozoa, and effects of these microorganisms on foods, fiber, and human health. Designed to accompany course RS 23. Mr. Thomson (in charge) (W)

Plant Pathology

Lower Division Course

PP 20. Plant Diseases and the Protection of Plant Resources. (3) Formerly Plant Pathology 114. Three hours of lecture per week. The causes and nature of plant diseases, their role in the ecosystem, their historical and present impact on man, the effects of man’s activities on disease, and the problems of protecting wild and cultivated plants. Mr. Cobb (Sp)

Upper Division Courses

PP 120. Plant Diseases. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: Biology 1A–1B or consent of instructor. A general course on the nature, cause, and control of plant diseases. Mr. Raabe (F); Mr. Morris (Sp)

PP 197. Field Study in Plant Pathology. (1–5) Supervised experience in off-campus organizations relevant to specific aspects of plant pathology. Regular individual meetings with faculty sponsor and written reports required. The Staff (Mr. Weinhold in charge) (F, W, Sp)

PP 198. Directed Group Study. (1–5) Prerequisite: consent of instructor. Special topics will be offered from time to time. The Staff (Mr. Hancock in charge) (F, W, Sp)

PP 199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (W, Sp)

(Total Graduates in Plant Pathology, see Index.)

Political Economy of Natural Resources (PENR)

Department Office, 207 Giannini Hall

Undergraduates Advisers: James Boles (in charge), Alain de Janvry, Richard Just, Bob Lee, Phil LeVeen, and David Nunally, Peter Berck, Michael Hanemann (in charge).

Lower Division Course

PENR 1. Introduction to Political Economy of Natural Resources. (4) Three hours of lecture and 1 hour of discussion per week. Introduction to theories of economics and political systems affecting environmental quality and natural resource allocation over time. Mr. de Janvry (F)

Upper Division Courses

PENR 100. Microeconomic Theory with Applications to the Natural Resources Sector. (5) Formerly PENR 100A. Four hours of lecture and one hour of discussion per week. Prerequisites: PENR 1, or Economics 101, and 102, or consent of instructor. Theory of the consumer, theory of cost and production, theory of the firm, welfare economics, imperfect and imperfect competition. Applications to the demand for supply of energy and food, the structure of the U.S. energy industry, etc. Mr. Hanemann (W)

PENR 101. Economic Theory of Intertemporal Resources. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: PENR 100 or Economics 101, or consent of instructor. The nature of public goods; uncertainty and risk aversion. Intertemporal consumption and production theory; optimal management of exhaustible and renewable natural resources; the economics of recycling. Mr. Norgaard (Sp)

PENR 102. Macroeconomics of Growth and the Environment. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: PENR 100, Economics 104A, or consent of instructor. History of economic thought: relationships between historical conditions, ideologies, economic theories, economic policy, and the environment. Alternative theories of political economy, the state, and the place of nature in society. Mr. Sarris (Sp)

PENR 103. The Role of Government in Resource Allocation. (4) Formerly numbered 100C. Three hours of lecture and one hour of discussion per week. Prerequisites: PENR 100 or Economics 104A, and PENR 101; or consent of instructor. Analysis of political decision making and the relationship between political and economic behavior. Theories of regulation, collective action, and bureaucracy. Alternative perspectives on the role of the state. Mr. LeVeen (P)

PENR 195. Senior Thesis. (5) Prerequisite: senior standing in PENR.

PENR 197. Field Study in Political Economy of Natural Resources. (1–5) Prerequisite: consent of instructor. Supervised experience in off-campus organizations relevant to specific aspects of political economy of natural resources. Regular individual meetings with faculty sponsor and written reports required. The Staff (Mr. Boles in charge) (F, W, Sp)

PENR 198. Directed Group Studies for Advanced Undergraduates. (1–5) Prerequisite: consent of instructor. The Staff (Mr. Boles in charge) (F, W, Sp)

PENR 199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (Mr. Boles in charge) (F, W, Sp)

Soil Resource Management (SRM)

Department Office, 108 Hilgard Hall

Undergraduate Adviser: Rodney T. Arkley

Upper Division Courses

SRM 160. Soil Management. (3) Three hours of lecture per week. Prerequisite: senior standing in soil resource management. Estimation of soil fertility by soil and tissue analysis and plant growth methods; use of fertilizers, soil physical properties related to management problems. Mr. Arkley, Mr. Day, Mr. McCell (Sp)

SRM 161. Soil and Water Conservation. (3) Two hours of lecture and one hour of discussion per week. Analysis of contemporary and perennial problems; soil pollution by pesticides, heavy metals, radioactive materials; disposal and recycling of wastes on the soil; the loss of agricultural land to urban use; soil erosion and nutrient depletion water yield; soil salinization. Mr. Waldron (F)

SRM 162. Use of Soil Information in Land-Use Planning. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: any upper division Soil Science course. Review and discussion of environmental impacts of various land-management practices with particular reference to soil characteristics. Interpretation of current soil-research data and soil survey information in making land-use decisions. Mr. M. Waldron (W)

SRM 166. Senior Seminar in Soil Resource Management. (2) Two 1-hour-discussion sessions per week. Prerequisite: senior standing in soil resource management. Integration of the social and management aspects of soil resource management. The Staff (Sp)

SRM 196. Directed Group Study. (1–5) Prerequisite: consent of instructor. Group study or investigation of special problems. The Staff (F, W, Sp)

SRM 199. Supervised Independent Study and Research for Undergraduates. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

Soil Science (SS)

Department Office, 108 Hilgard Hall

Undergraduate Adviser: Norman Terry

Lower Division Courses

SS 10. The Soil and Its Significance to Humans. (4) Formerly RS 18. Three hours of lecture and one hour of laboratory per week. Prerequisite: High School chemistry and biology recommended; Introduction to soils, their relationship to ecosystems, their significance to mankind, and interpretation of soil data for land-use decisions. Mr. Gersper (F)

SS 10L. The Soil and Its Significance to Humans (Laboratory). (1) Formerly RS 18L. Three hours of laboratory per week. Prerequisite: SS 10 (may be taken concurrently.) Laboratory, demonstrations and field trips. Mr. Williams (F)

NOTE: For key to symbols, see page 36.
Upper Division Courses

SS 100. Soil Characteristics. (4) Three hours of lecture and three hours of laboratory per week, and one field trip per week. Prerequisite: Chemistry 1A-B and Introduction to physical, chemical, and biological properties of soil. Mr. Day (F)

SS 101. Development and Morphology of Soils. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: SS 100 or equivalent and introductory courses in geology and biology; or consent of instructor. Development, morphology, and classification of the world’s soils as related to the factors: climate, biota, geology, topography and time; soils as functioning, integrating components of ecosystems. Mr. Gersher (Sp)

SS 101F. Development and Morphology of Soils. (Field trips. Prerequisite: SS 101 should be taken concurrently. Saturday excursions in connection with SS 101)

SS 102. Soil Physics. (3) Three hours of lecture and six hours of laboratory per week. Prerequisite: course 100, Mathematics 16A. Analysis of important physical processes occurring in soil and the soil physical properties affecting them. Mr. Walton (W)

SS 103. Soils of California and the Western United States. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 100, 101, and 103 and consent of instructor. Field study of soils, with emphasis on their characteristics, morphology, and genesis. Fine grains in classifying and mapping soils, and preparation of soil survey reports. Practice in identifying and evaluating soils for agricultural, range, forest, and other use. Mr. Arky (W)

SS 105. Summer Field Course. (6) Six weeks of daily field work. Prerequisite: course 100, 102, 103, and consent of instructor. Field study of soils, with emphasis on their characteristics, morphology, and genesis. Fine grains in classifying and mapping soils, and preparation of soil survey reports. Practice in identifying and evaluating soils for agricultural, range, forest, and other use. Mr. Begg (Extracourse)

SS 110. The Soil as a Medium for Plant Growth. (5) Five hours of lecture per week. Prerequisite: Chemistry 1A-B, 2A-B, 8A or 1C, and 103 and consent of instructor. Physical properties of soil, their activities in relation to soil organic matter, soil properties, the rhizosphere, and biogeochemical cycling. Mr. Schneider (Sp)

SS 111L. Soil Microbiology Laboratory. (2) Six hours of laboratory per week. Prerequisite: consent of instructor. Preparation and enrollment in course 111. Laboratory work to acquaint the student with soil microorganisms, their diversity, their activities in relation to soil organic matter, soil properties, the rhizosphere, and biogeochemical cycling. Mr. Schneider (Sp)

SS 112. Soil Chemistry. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 110. Physicochemical properties influencing the availability of elements in soils to plants. Mr. Doner (W)

SS 113. Soil Chemistry Laboratory. (3) Three 3-hour laboratories per week. Prerequisite: course 112. Liquid, solid, and gaseous phases of soils; cation exchange, solubility, buffering, salinity, reactions; chemistry of macronutrients and micronutrients. Mr. Doner (W)

SS 198. Directed Group Study. (1-5) Selected topics in soil science for advanced undergraduates. The Staff (F, Sp)

SS 199. Supervised Independent Study and Research. (1-6) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, Sp)

Wood Science and Technology (WST)

Department Office, 378 Richmond Field Station

Undergraduate Adviser: Barney Klamecki

Lower Division Course

WST 10. Wood as a Renewable Natural Resource: Concepts and Conflicts. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 110, and consent of instructor. Wood as a renewable, biodegradable resource in meeting needs of society for shelter and consumer products. Renewable and non-renewable resource systems, and properties and uses of wood relative to ecological and environmental considerations. Mr. Wilcox, Mr. Arbanbright (W)

Upper Division Courses

WST 131. Anatomy and Physical Characteristics of Wood. (4) Two 1 1/2-hour lectures and one 3-hour laboratory per week. Prerequisite: consent of instructor. Development, classification, and use rating. Mr. Arkley (W)

WST 132. Mechanical Processing of Wood. (3) Three hours of lecture and one 1-hour discussion per week. Prerequisite: upper division and graduate students from other departments may be admitted with consent of instructor. Production methods for converting log to lumber, veneer and plywood; product requirements; retention of log quality to product quality. Mr. Klamelik (W)

WST 133. Physical Properties of Wood. (4) Three 1-hour lectures and one 1-hour laboratory per week. Prerequisite: course 131 and 12 units of general physics. Density, physical stability, and durability of wood as influenced by such factors as wood characteristics and moisture content, thermal, electrical, and acoustical properties of wood. Mr. Arganbright (F)

WST 134. Mechanics of Wood. (3) Three 1-hour lectures and one 1-hour laboratory per week. Prerequisite: course 131 and 12 units of general physics; upper division students from other departments may be admitted with consent of instructor. Strength and stiffness affecting use, creep, shrinkage, and influence affecting strength; derivation of working stresses, structural elements of wood and wood composites. Mr. Schleichmer (W)

WST 135. Chemical Processing of Wood. (3) Two 1-hour lectures per week; one 3-hour laboratory per week. Prerequisites: course 131 and 4 units of organic chemistry; upper division or graduate students from other departments accepted with consent of instructor. The technology and associated chemistry of processing of wood to produce paper, paperboard, fiberboard and related products, and chemical treatments of wood. Mr. Brink (Sp)

WST 137. Adhesion and Bonding of Wood. (4) Three hours of lecture and 3 hours of laboratory per week. Prerequisite: consent of instructor. Introduction to nature of adhesion; structure, properties, application, and uses of adhesives in bonded wood products; testing and characterization of bonded wood products. Mr. Brink (Sp)

WST 138. Chemistry of Wood and Bark. (3) Two hours of lecture per week and three hours of laboratory per week. Prerequisite: course 131: 4 units of organic chemistry; upper division or graduate students from other departments accepted with consent of instructor. Chemical nature of wood and bark and the analysis and important reactions of their constituents, including carbohydrates, phenolics, lignins, and associated materials. Mr. Zavarin (F)

WST 198. Directed Group Study. (1-5) Meetings to be arranged. Prerequisite: consent of instructor. Group study or investigation of special problems. The Staff (Mr. Graf in charge) (F, W, Sp)

WST 199. Supervised Independent Study and Research. (1-6) Meetings to be arranged. Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, Sp)

IDS 126. Biological Deterioration of Wood. (3) See Interdepartmental Studies for the complete description of this course.

Graduate Courses

Agricultural Chemistry

Administered By An Intercampus Group

Office, 145 Mulford Hall

Graduate Adviser: Mr. Brink

299. Research in Agricultural Chemistry. (1-12) Agricultural chemistry study. Prerequisite: Mr. Brink (in charge) (F, W, Sp)

Agricultural and Resource Economics

Department Office, 207 Giannini Hall

Chairman: Gordon Rausser

Graduate Advisers: Mr. Beck, Mr. Sarris, Mr. Just, Mr. Schmitz

200A. Elementary Mathematical Optimization for Economists. (2) Two hours of lecture per week. Prerequisite: Consent of instructor. Review of calculus and linear algebra in the context of economic optimization. The Kuhn-Tucker theorem. Linear dynamic systems. Phase diagrams. Elementary optimization over time.

200B. Optimization in Linear Economic Models. (2) Two hours of lecture per week. Prerequisite: Consent of instructor. Introduction to linear programming, the simplex procedure, and duality theory. Applications. Mr. Boles (W)

210. Econometrics. (4) Two 2-hour lectures per week. Prerequisite: Statistics 131 and 132 or equivalent. Extensions of multiple regression, including limited dependent variables, social indicators, and distributed lags. Sets of regressions. Estimation in simultaneous equation models.

220. Theory and Measurement of Demand Production and Supply. (3) Three hours of lecture per week. Prerequisite: Economics 201A and 201B or consent of instructor. Development of analytical models for the study of microeconomic problems. Theory and measurement of demand and supply relations. Aggregation of firm and consumer demand relations. Theory of price and output indices. Selected Applications. Mr. Hanemann (F)

221. Applied Welfare Economics. (3) Three hours of lecture per week. Prerequisite: Economics 201A and 201B or consent of instructor. Theory and selected applications of welfare economics in policy evaluation. Synthesis of the "old" and "new" welfare economics. Developement of additional personal models. Second-best analysis. Mr. Schmitz (F)

231. Trade, Markets and Location. (Formerly numbered 230A. Three hours of lecture per week. Prerequisite: Economics 201B or consent of instructor. Development of analytical models for the study of economic and policy issues in international and interregional trade and in the location of specific producing and processing industries. Welfare effects of various trade policies. Mr. Schmitz (W)

232. Markets, Trade and Prices. (Formerly 230B. Three hours of lecture per week. Prerequisite: Econom 201B and ARE 210 or consent of instructor. Theory and models of price formation under competitive and monopoly conditions. International and regional commodity market structures. Commodity futures and markets. Commercial trade policy and customs union. Evaluation of international and international policies relating to commodity price control. Mr. Sarris (Sp)

239. Markets and Trade Workshop. (1-2) Two hours of seminar per week. Prerequisite: consent of instructor. Presentation and criticism of ongoing research by faculty, staff and students. May be repeated for credit. Not necessarily offered every quarter. The Staff (F, W, Sp)

241. Agricultural Policy. (Formerly 240A. Three hours of lecture per week. Prerequisite: consent of instructor. Economic processes which have contributed to the transformation of U.S. agriculture and which have contributed to low resource returns commodity surpluses, and structural changes in the food system. Analysis of political economic systems and impact of various policies on large and small farmers, consumers, the rural community, and the environment. Cal-

249. Agricultural, Food, and Resource Policy Workshop. (2) Two hours of seminar per week. Prerequisite: ARE 210 or consent of instructor. Presentation and criticism of ongoing research by faculty, staff and students. May be repeated for credit. Not necessarily offered every quarter. (F, W, Sp).

251. Agriculture in Economic Development. (3) Formerly 250A. Three hours of lecture per week. Prerequisite: consent of instructor. Origins and nature of underdevelopment in Agriculture. The place and role of agriculture in economic development. Mr. de Janvry (W).

252. Sectoral and Regional Planning in Economic Development. (3) Formerly 260B. Three hours per week. Prerequisite: ARE 210 or consent of instructor. Analysis of policy issues in agricultural development using sectoral and regional models of growth and development. Mr. Adelman (Sp).

258. Rural Economic Development Workshop. (2) Prerequisite: consent of instructor. Presentation and criticism of ongoing research by faculty, staff and students. May be repeated for credit. Not necessarily offered every quarter. (F, W, Sp).

261. Economics of Renewable Natural Resources. (3) Formerly 260A. Three hours of lecture per week. Prerequisite: ARE 210. The theory of optimal management of renewable resources. Open access resources. Extinction. Applications to fisheries and forest. Energy resources. The role of price and quantity regulation. Environmental cost-benefit analysis. Mr. Hanemann, Mr. Berck (W).

262. Economics of Exhaustible Natural Resources. (3) Formerly 260A. Three hours of lecture per week. Prerequisite: ARE 210. The theory of optimal exploitation of exhaustible natural resources, with application to fossil fuels. Welfare analysis of alternative market structures for exhaustible resources. Economic models of supply and demand for energy sources. Taxation policy. Bidding theory and leasing policy. Mr. Berck, Mr. Hanemann (Sp).

269. Natural Resource Economics Workshop. (2) Two hours of lecture per week. Prerequisite: consent of instructor. Presentation and criticism of ongoing research by faculty, staff and students. May be repeated for credit. Not necessarily offered every quarter. (F, W, Sp).

280. Special Topics in Resource, Development, and Trade Economics. (1–3) One to three hours of lecture per week. Prerequisite: consent of instructor. Topics to be announced annually. May be repeated for credit. (F, W, Sp).

288. Seminar in Parasitology. (2) May be repeated for credit. Prerequisite: permission of instructor. May be taken concurrently with course 260. Special topics include nematodes as vectors of disease-producing agents, nutrition, host resistance, and chemical and biological control of nematodes. Mr. Poinar (W).

290. Special Topics in Resource, Development, and Trade Economics. (3) Formerly 260A. Three hours of lecture per week. Prerequisite: ARE 210. To be given in even-numbered years. The genesis of anthropoborne diseases. Mr. Furman, Mr. Anderson (F).

294. Seminar in Insect Biochemistry and Toxicology. (3) Three hours of lecture per week. Prerequisite: Entomology 104 or consent of instructor. Theory, philosophy, and methodologies of systematic entomology. Mr. Dalv, Mr. Powell (F).

292. Seminar in Insect Biochemistry and Toxicology. (3) Three hours of lecture per week. Prerequisite: Entomology 104 or consent of instructor. Theory, philosophy, and methodologies of systematic entomology. Mr. Dalv, Mr. Doyen (F).

299. Research In Entomology and Parasitology. (3–6) Three hours of lecture per week. Prerequisite: permission of instructor. May be repeated for credit. Mr. Allen, Mr. Frankie (F, W).

204. Principles of Systematic Entomology. (3–3–3) Lectures, 3 hours per week. Theory, philosophy, and methodologies of systematic entomology. Mr. Dalv, Mr. Doyen (F).

204A. Contemporary Techniques in Systematic Entomology. (3) Three hours of lecture per week. Prerequisite: Entomology 104 and an upper division course in genetics. Theory, philosophy, and methodologies of systematic entomology. Each offering may be taken separately for credit and in any sequence. Mr. Dalv, Mr. Doyen (F).

204A. Speciation In Insects. (3) Three hours of lecture per week. Prerequisite: Entomology 104 and an upper division course in genetics. Theory, philosophy, and methodologies of systematic entomology. Mr. Dalv, Mr. Doyen (F).

204. Principles of Systematic Entomology. (3–3–3) Lectures, 3 hours per week. Theory, philosophy, and methodologies of systematic entomology. Each offering may be taken separately for credit and in any sequence. Mr. Dalv, Mr. Doyen (F).

204A. Contemporary Techniques in Systematic Entomology. (3) Three hours of lecture per week. Prerequisite: Entomology 104 and an upper division course in genetics. Theory, philosophy, and methodologies of systematic entomology. Mr. Dalv, Mr. Doyen (F).

204A. Speciation In Insects. (3) Three hours of lecture per week. Prerequisite: Entomology 104 and an upper division course in genetics. Theory, philosophy, and methodologies of systematic entomology. Mr. Dalv, Mr. Doyen (F).

210. Principles and Problems in Agricultural Entomology. (3) Three hours of lecture per week. Prerequisite: Entomology 100 or 110. The principles of insect pest management and their relationships following insecticide use; plot design and sampling techniques; legislative controls in agricultural entomology. Mr. Allen (W).

211. Insect-Crop Relationships. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: Entomology 100 or 110. Development, morphology, and life history of important pest species; effects of climate on their life histories and pest status. Mr. Allen (Sp).

214. Concepts and Research in Forest Entomology. (3) Three hours of guided discussions per week. Prerequisite: Entomology 100 or consent of instructor. Discussion of concepts and research from which they are derived. Mr. Rausser (Sp).

214. Concepts and Research in Forest Entomology. (3) Three hours of guided discussions per week. Prerequisite: Entomology 100 or consent of instructor. Discussion of concepts and research from which they are derived. Mr. Rausser (Sp).

215. Principles and Problems in Agricultural Entomology. (3) Three hours of lecture per week. Prerequisite: Entomology 100 or 110. The principles of insect pest management and their relationships following insecticide use; plot design and sampling techniques; legislative controls in agricultural entomology. Mr. Allen (W).

215. Principles and Problems in Agricultural Entomology. (3) Three hours of lecture per week. Prerequisite: Entomology 100 or 110. The principles of insect pest management and their relationships following insecticide use; plot design and sampling techniques; legislative controls in agricultural entomology. Mr. Allen (W).

216. Insect-Vectors of Plant Pathogens. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: Entomology 100 or 110. To be given in odd-numbered years. Role of insects and arachnids in the transmission and causation of plant diseases; the relationship of the pathogens to their vectors and the approaches to control. Mr. Sylvestre (Sp).

230. Biology of Parasitoids. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: Entomology 100, 101. Ecology, biology, and classification of mites and ticks, with emphasis on the phylogeny of free-living forms. Mrs. Hov (W).

231. Insect Vectors of Pathogenic Bacteria. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: Entomology 100, 110. To be given in odd-numbered years. The biology and classification of insect vectors with emphasis on aquatic and holometabolous forms. Mr. Anderson (Sp).

253. Advanced Medical and Veterinary Entomology. (4) Three hours of lecture per week. Prerequisite: Entomology 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. Mr. Hagen (W).

257. Immature Insects. (4) One hour of lecture and nine hours of laboratory per week. Prerequisite: Entomology 100, 110. To be given in odd-numbered years. The biology and classification of immature insects with emphasis on aquatic and holometabolous forms. Mr. Anderson (Sp).

262. Systems Analysis in Entomology. (4) Three hours of lecture per week. May be repeated for credit. To be taken on a satisfactory/unsatisfactory basis. Mr. Weinmann, Mr. Lober (W, Sp).

269. History of Entomology. (4) Three hours of lecture per week. Prerequisite: Entomology 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. Mr. Hagen (W).

280. Special Seminar Topics. (2) May be repeated for credit. The Staff (Mr. Schlinger in charge) (F, W, Sp).

290. Seminar in Agricultural Entomology. (2) May be repeated for credit. Mr. Allen, Mr. Frankie (F, W).

292. Seminar in Insect Biochemistry and Toxicology. (2) May be repeated for credit. Mr. Gordon, Mr. Mittler, Mr. Pipa (W, Sp).

293. Seminar in Parasitology. (2) May be repeated for credit. Mr. Falcon, Mr. Poinar, Mr. Shugart, Mr. Vananda (Sp).

294. Seminar in Systematic Entomology. (2) May be repeated for credit. Mr. Dalv, Mr. Doyen, Mr. Powell (F, W).

295. Seminar in Insect Ecology and Biological Control. (2) May be repeated for credit. Mr. Dalv, Mr. Doyen, Mr. Poulin (F).

296. Seminar in Forest Entomology. (2) May be repeated for credit. Mr. Wood, Mr. Voit, Mr. Loher (F).

298. Directed Group Studies. (1–6) Advanced or research topics which may vary from quarter to quarter. The Staff (Mr. Schlinger in charge) (F, W, Sp).

299. Research in Entomology and Parasitology. (2) May be repeated for credit. Mr. Weinmann, Mr. Lober (W).

NOTE: For key to symbols, see page 36.
Forestry and Resource Management

Department Office, 145 Mulford Hall
Chairman: Dennis E. Teague
Graduate Advisers: Forestry and Woodland Resource Science: Mr. Wenser; Range Management: Mr. Bar- toolome; Wood Science and Technology: Mr. Dickinson

Forest Science

202. Advanced Photographic Interpretation. (3) Two 1-hour lectures and one 2-hour discussion period per week. Prerequisite: a basic course in photo interpretation. A survey of current research in forest photo interpretation and related methods. An analysis of the practical forestry applications of multiple-spectral reconnaissance. Practice of the interpretation of aerial photography and other imagery of forested areas.
Mr. Colwell (Sp)

204. Advanced Forest Mensuration. (2) Two 1 1/2-hour lecture/discussion meetings per week. Prerequisite: Forstey 101 and 104, or equivalent. Advanced topics in forest mensuration and forest inventory.

205. Seminar on Fire as an Ecological Factor. (3) Three hours of lecture per week. Mr. Wakimoto (W)

206. Seminar in Research Methods. (3) Two 1 1/2-hour seminars per week. Identification and statement of research problems; formation of hypotheses; analysis of data; writing; presentation of special topics and general discussion. Orientation varies from academic to professional, depending on the composition of the class.
Mr. Libby (F)

222. Seminar in Forest Influences and Watershed Management. (3) One 3-hour seminar per week. Open to qualified graduate students from other departments.
Mr. Zinke (F)

224. Natural Resource Ecosystems. (3) Two-and-1/2 hours of lecture per week. Derivation of ecosystem structure from ecological backgrounds; relation of ecosystem study to the natural and social sciences; general systems analysis and synthesis; man's role as dependent factor and as a planning agent; the ecosystem as a conceptual tool in resource management.
Mr. Schultz (Sp)

225. Advanced Silviculture. (3) Two 1 1/2-hour lectures per week. Prerequisite: Forestry 125.
Mr. Helms (F)

Wood Science

231. Advanced Wood Anatomy. (3) One 3-hour lecture/discussion per week. Prerequisite: Wood science and Technology 131 or equivalent and consent of instructor. Open to qualified graduate students from other departments.

233. Advanced Wood Mechanics. (3) Two 1 1/2-hour lectures per week. Prerequisite: Wood Science and Technology 134, Civil Engineering 130 or equivalent. Deformation and fracture of wood, mechanics of the cell wall, current topics from contemporary literature.
Mr. Schwind (Sp)

235. Chemistry of Polysaccharides, Lipids, and Extracellular. (4) Four hours of lecture per week. Prerequisite: Wood Science and Technology 138 or 135 (may be taken concurrently) or equivalent; qualified undergraduate students may elect this course. Aspects of polysaccharide structures, biosynthesis, reactions, and distribution of terpenoids, fats, flavanoids, tannins, lignins, monosaccharides and polysaccharides, and nonaqueous liquids occurring in plant material with emphasis on woody plant structures. Mr. Brink, Mr. Zavarin (Sp)

238. Special Topics in Wood Science and Technology. (1-4) Hours to be arranged. Prerequisite: Open to properly qualified graduate students. Advanced study in wood science and technology, primarily for advanced graduate students. Course, including each of its subdivisions, may be repeated. The Staff

238A. Wood Anatomy.
Mr. Allard, Mr. Wilcox (W, Sp)

238B. Wood Chemistry.
Mr. Zavarin (F, Sp)

238C. Chemical Processing of Wood.
Mr. Brink (F, Sp)

238D. Wood Mechanics.
Mr. Schwind (F, Sp)

238E. Wood Physics.
Mr. Arganbright (F, Sp)

238F. Mechanical Processing of Wood.
Mr. Zavarin (F, Sp)

238G. Wood Product Pathology.
Mr. Wilcox (W, Sp)

238H. Wood Adhesion and Adhesives.
Mr. Johns (F, Sp)

238I. Systems Analysis in the Forest Products Industry.
Mr. Kamecki (F, Sp)

239. Seminar in Wood Science and Technology. 
(1) One 1-hour lecture per week. Prerequisite: open to qualified graduate students from other departments.

Special Studies

Chairman: James Fristrom
Graduate Advisers: Mr. Flogging, Ms. St. Lawrence, Mr. Thompson

210. Developmental Genetics. (2) Two hours of lecture per week. Prerequisite: Genetics 159 or consent of instructor. Gene action and development.

(3-3) Three hours of lecture per week. Prerequisite: Genetics 159 and consent of instructor. Clinical delineation of human genetic diseases, including chromosomal abnormalities and polygenic disorders. Genetical aspects of diseases, clinical aspects, and developmental aspects of disease state will be emphasized. Two-quarter sequence beginning fall.
Mr. Fristrom (F, W)

277. Genetics of Gene Regulation In Higher Organisms. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: consent of instructor. The use of specific biochemically-accessible gene systems—especially of maize, Drosophila and mice—to better understand rules of development and evolution. Extensive reading and criticism of primary experimental and theoretical sources.
Mr. Filling (W)

Range Science

244. Seminar in Range Ecology. (3) Three hours of lecture per week.

246. Seminar in Systems Ecology. (3) Two 1 1/2-hour meetings per week. Dynamic simulation modeling and operations research techniques applied to the analysis and management of ecosystems.

Wildlife Science

270. Seminar in Wildlife Biology and Management. (3) Three hours of lecture per week. Prerequisite: For- estry 170 and 175 or equivalent. Reading, conference, and discussion. Reports and discussion of recent studies in wildlife biology and management. Open to qualified graduate students from other departments.

Special Studies

Chairman: James Fristrom
Graduate Advisers: Mr. Flogging, Ms. St. Lawrence, Mr. Thompson

210. Developmental Genetics. (2) Two hours of lecture per week. Prerequisite: Genetics 159 or consent of instructor. Gene action and development.

235A-235B. Clinical Aspects of Human Genetics. (3-3) Three hours of lecture per week. Prerequisite: Genetics 159 and consent of instructor. Clinical delineation of human genetic diseases, including chromosomal abnormalities and polygenic disorders. Genetical aspects of diseases, clinical aspects, and developmental aspects of disease state will be emphasized. Two-quarter sequence beginning fall.
Mr. Fristrom (F, W)

277. Genetics of Gene Regulation In Higher Organisms. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: consent of instructor. The use of specific biochemically-accessible gene systems—especially of maize, Drosophila and mice—to better understand rules of development and evolution. Extensive reading and criticism of primary experimental and theoretical sources.
Mr. Filling (W)
 efficiently resolving requirements for improved nutrition, nonpolluted, more convenient and fresher tasting foods, pressures of competitive cost reduction; and increasing sanitary and wholesomeness regulations. Ms. Morgan (W)

211. Research Methods in Nutritional Sciences, Instrumentation. (O) One hour of lecture and twelve hours of laboratory per week. Prerequisite: graduate standing and consent of instructor. Advanced physical and chemical techniques in food science and nutrition: application of chromatography, radiotopes, ultra-centrifugation, electrophoresis for identification and measurement in nutritional science research. Students may select special problems of their interest. The Staff (F)

212. Research Methods in Nutritional Sciences, Biochemistry. (O) Three and one half hours of lecture and twelve hours of laboratory per week. Prerequisite: graduate standing and consent of instructor. Effects of nutrition on biological and chemical properties of various biological systems. Advanced techniques for methodological experimentation and their application to individual problems of nutritional research. Mr. Chang (Sp)

260. Advanced Human Nutrition. (3) Three hours of lecture per week. Prerequisite: Nutrition 160 or equivalent. An advanced course in human nutrition. In-depth analysis of important topics covering current areas of major interest, research, and controversy. Emphasis on the nutrition of normal individuals.

The Staff (Sp)

299. Directed Group Study. (1-6) Prerequisite: consent of instructor. Advanced study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Mr. Free in charge) (F, W, Sp)

302. Professional Preparation: Supervised Teaching in Nutritional Sciences. (2-6) One hour of lecture and three to fifteen hours of laboratory per week. Prerequisite: graduate standing in food science, nutrition, or closely related field, or consent of instructor. Practiced supervised experience in teaching nutrition and food science at the college and university level; course planning and preparation; presentation and instruction of units.

The Staff (F, W, Sp)

303. Professional Preparation: Supervised Teaching in Nutritional Sciences. (2-6) One hour of lecture and three to fifteen hours of laboratory per week. Prerequisite: graduate standing in food science, nutrition, or closely related field, or consent of instructor. Practiced supervised experience in teaching nutrition and food science laboratory techniques at the college and university level; course content, planning and evaluation; preparation and presentation of instructional units.

The Staff (F, W, Sp)

307. Staff Seminar in Nutritional Sciences. (No credit) The Staff (F, W, Sp)

Other courses in genetics or in closely related subjects are given in the departments of Anthropology, Botany, Microbiology, Psychology, Public Health, and Zoology.

Nutritional Sciences

Department Office, 119 Morgan Hall
Chairman: E. L. Roett Stokstad
Graduate Advisers: Nutrition: Ms. Calloway, Mr. Carpenter; Food Science: Mr. Beldesne

201A–201B. Seminar in Nutrition. (1–1–1) One hour of lecture and one hour of discussion per week. Prerequisite: consent of instructor. For advanced graduate students, primarily for first-year graduate students. Introduction to literature research in food and nutritional sciences.

The Staff, 201A (F), 201B (W), 201C (Sp)

204. Nutritional Aspects of the Metabolism of Carbohydrates and Lipids. (2) One hour of lecture and one hour of discussion per week. Prerequisite: Biochemistry 102 and 102L, or consent of instructor. Emphasis on the control of diabetes and carbohydrate metabolism. Ms. Williams (W)

205. Biochemical Aspects of Protein Nutrition. (2) Two hours of lecture and two hours of laboratory per week. Prerequisite: Biochemistry 100A–100B–100C, or 102, or consent of instructor. Emphasis on the control of protein metabolism. Mr. Carpenter (F)

206. Innovations in Food Processing. (2) Two hours of lecture per week. Prerequisite: Nutritional Sciences 106 and 107. Current and new methods of

NOTE: For key to symbols, see page 36.

Plant Pathology

Department Office, 147 Hilgard Hall
Chairman: A. R. Weihold
Graduate Advisers: Mr. J. R. Parmeter, Jr., Mr. T. Jack Morris

201. Seminar in Plant Pathology. (1) One hour of lecture per week. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

202. Biology of Plant Pathogenic Fungi. (5) Four hours of lecture and three hours of laboratory per week. Prerequisite: course 120 and 208A, and a course in introductory mycology. Taxonomy, ecology, and behavior of plant pathogenic fungi with emphasis on problems in plant disease control and management.

To be given in alternate years. Mr. Parmer (W)

204. Bacteria in Relation to Plant Diseases. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: Plant Pathology 120 and consent of instructor. Characterization of viruses which cause plant disease; environmental factors relating to incidence and field spread of virus infections; approaches to control.

To be given in alternate years. Mr. Gold, Mr. Morris (F)

208A–208B. Research Methods in Plant Pathology. (2–2) One hour of lecture and three hours of laboratory per week. Prerequisite: Plant Pathology 120 or consent of instructor. May be taken concurrently. 208A. Sterile technique, culture purification and preservation, isolation and purification of pathogenicity. 208B. Measurement and control of environmental variables, photography, scientific method. May be taken separately for credit and in any sequence.

The Staff (Mr. Weinhold in charge) (F, W, Sp)

210. Epidemiology and Control of Plant Disease. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Plant Pathology 202. Theory and practice of plant disease control and management: cultural, chemical, biological and genetic methods. Epidemiology of plant disease, inoculum-disease relationships, factors involved in the development of epidemics. To be given in alternate years.

Mr. Lindow (F)

212A–212B. Advanced Plant Pathology. (2–2) Two hours of lecture per week. Prerequisite: Plant Pathology 120 or introductory course in plant pathology. Principles broadly applicable to fungal, bacterial, viral and nutritional diseases of plants. 212A. Historical development of concepts in plant pathology. 212B. Principles of plant pathology. May be taken separately for credit and in any sequence.

212A: Mr. Wilhelm (W), Mr. Weinhold (Sp), Mr. Schrock (Sp)

212B: Mr. Weinhold (F), Mr. Schrock (Sp)

213. Physiology of Plant Diseases. (3) Three hours of lecture per week. Prerequisite: Chemistry 5 and 8A–8B, or equivalent. Recommended: Botany 140; Biochemistry 102; Physiology and biochemistry of parasitic relationships. To be given in alternate years.

Mr. Huisman (W)

222. Diagnosis of Plant Disease. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: consent of instructor. Experience in field and laboratory diagnosis of plant diseases. To be given in alternate years.

Mr. Weinhold (Sp)

2222. Diagnosis of Plant Disease. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: consent of instructor. Experience in field and laboratory diagnosis of plant diseases. To be given in alternate years.

Mr. Weinhold (Sp)

601. Individual Study for Master's Students. (1–6) Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the Master's degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Mr. Weinhold in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1–6) Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctorate.
degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Weinhold in charge) (F, W, Sp)

Soils and Plant Nutrition

Department Office, 108 Hilgard Hall
Acting Chairman: L. J. Waldron
Graduate Advisers: Soil Science: Mr. Done; Plant Physiology: Mr. Jacobson

Plant Nutrition

206. Seminar in Plant Physiology. (2) One 1 1/2-hour meeting per week. Prerequisite: qualified graduate standing in soil science, plant physiology, and related subjects. The Staff (F, W, Sp)

298. Special Study for Graduate Students. (1-6) The Staff (F, W, Sp)

299. Research in Plant Nutrition. (1-12) Prerequisite: graduate standing and consent of instructor. The Staff (F, W, Sp)

601. Individual Study for Master’s Students. (1-8) Individual study for the comprehensive or language requirements in consultation with the field adviser. Units may not be used to fulfill either unit or residence requirements for a Master’s degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Jacobson in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. McColl in charge) (F, W, Sp)

Staff Seminar in Soil Science. (No credit) The Staff (F, W, Sp)

School of Optometry

School of Optometry Office, 350 Minor Hall
Professors: Irving Fett, Ph.D.; Ferde, O.D., Ph.D.; Monroe J. Hirsh, O.D., Ph.D. (Emeritus)
Robert W. Mandel, O.D., Ph.D.

Julie F. Jones, O.D., Ph.D.

Clinical Professors: Robert W. Lister, O.D.; Edwin B. Mehr, O.D.; Irvin W. Silberstein, O.D.

Associate Clinical Professors: Leslie D. Kuzma, O.D.; Robert L. Stamer, M.D.; Eugene Y. Tsujimoto, O.D.


Lecturers: Danell R. Carter, O.D., Ph.D.; John D. Grisham, M.D., M.S.; Michael G. Harris, O.D., M.S.


Please note: All undergraduate programs listed herein pertain only to those students entering Fall 1975 and later. Students already matriculated should refer to the 1976-79 General Catalog.

The School of Optometry provides training in the practice of optometry, drawing upon the principles of anatomy, physiology, and psychology, and includes the study of both environmental and personal factors influencing visual performance.

The four-year program leads to the degree of Doctor of Optometry, which qualifies one to take the state board examinations in all states. The first year is devoted to the study of basic sciences which form the background for optometry; the second and third years are devoted to the science of optometry and the acquisition of technical skills; the fourth year is devoted to the practice of optometry and the detailed study of specialized areas.

The School of Optometry also offers an undergraduate program in physiological optics leading to the B.S. degree. The primary purpose of this curriculum is to prepare students for the graduate program in physiological optics.

The graduate program in physiological optics leads to the Master of Science degree and the Doctor of Philosophy degree. Offered in cooperation with other departments of the University, this program is designed to prepare students for a career in teaching and research in the sciences of vision.

For further information consult the Announcement of the School of Optometry, available at 360 Minor Hall.

Physiological Optics

An undergraduate program in physiological optics is offered which leads to the B.S. degree. The primary purpose of this program is to prepare students for the graduate program in physiological optics rather than the practice of optometry.

The graduate program in physiological optics is a field of study leading to the M.S. and Ph.D. degrees. The program is accredited by the Group in Physiological Optics, representing faculty from the School of Optometry.

Those interested in this graduate program should familiarize themselves with the regulations of the Graduate Division and, in addition, should contact the adviser of the Group in Physiological Optics as early as possible. Admission to this program requires a bachelor’s degree in physics, physiology, physiological optics, psychology, or a doctor’s degree in medicine or optometry.

For further details on the requirements for the B.S., M.S., and Ph.D., please consult the adviser of the Group in Physiological Optics, School of Optometry.

Letters and Science List: for regulations governing this list, see the Announcement of the College of Letters and Science.

Optometry

Upper Division Courses

100. Introduction to Optometric Research. (4) Two 1-hour lectures, one 1-hour discussion, and 3 hours laboratory per week. Optometric research: history, current problems, contribution of scientific method, relation to clinical practice. Practicum, including laboratory and clinical observation and clerkships.

M. Carter and Staff

109A-109B. Introduction to Optometry. (2–2) One 1-hour seminar and one 2-hour laboratory per week. Introduction to the practice of optometry, its history, and present status. Discussions on the role of the optometrist in health care delivery system and on clinical optometric practice. Clinic observation.

M. Carter and Staff (F, W)

109A-109B-109C. Clinical Clerkship. (1–1–1) One 3-hour laboratory per week. Basic examination procedures, general anatomy, psychology, consideration of diagnosis, treatment, and prognosis of visual anomalies. M. Carter and Staff (F, W)

114B. Ophthalmic Optics. (3) Formerly 104. Two 1-hour lectures and one 2-hour laboratory per week. Optics of the eye, visual anomalies, and photometry. The theory of the lensometer and the lens gauge. Laboratory exercises in lens measurements, layout, edging and mounting.

M. Kors

114B. Ophthalmic Optics. (3) Formerly 105. Two 1-hour lectures and one 2-hour laboratory per week. Optics of the eye, visual anomalies, and photometry. The theory of the lensometer and the lens gauge. Laboratory exercises in lens measurements, layout, edging and mounting.
hour lectures and one 3-hour laboratory per week. Prerequisite: Optometry 114A. Ophthalmic lens materials, lens aberrations and their control, absorptive lenses, refractive errors from radiation and mechanical injury, multifocal lenses, anisometria. Laboratory exercises in fabrication of spectacle lenses to a prescription.

114C. Ophthalmic Optics. (2) Formerly 106. One 1-hour laboratory and one 2-hour laboratory per week. Prerequisite: Optometry 114B. Theoretical and practical considerations in the design of ophthalmic lenses and frames. Emphasis is on the physiological and psychological requirements of the individual patient with particular regard to visual performance, configuration of bone structure and skin tissues, safety and appearance.

126. Epidemiology of Refractive Error. (2) Two 1-hour lectures per week. The refractive state of the eye and its determinants. Consideration of refractive error. Mr. Kors (F)

127A. Clinical Examination of the Visual System. (4) Formerly 127. Two 1-hour lectures and three 3-hour laboratories per week. Prerequisite: grade of C or higher in Optometry 127A. Diagnosis of diagnostic elements of the optometric examination. Theory and techniques of examination of fundus and retina, symptoms and signs related to anomalies of the sensory, motor, and optical components of the visual system.

127B. Clinical Examination of the Visual System. (4) Formerly 130. One 2-hour lecture and two 3-hour laboratories per week. Prerequisite: grade of C or higher in Optometry 127B. Confirmation of diagnostic elements of the optometric examination. Theory and techniques of examination procedures. Interpretation of symptoms and diagnoses of eye diseases. Mr. Harris (F)

127C. Clinical Examination of the Visual System. (3) Formerly 170. One 2-hour lecture/week. Prerequisite: grade of C or higher in Optometry 127B. Continuation of diagnostic elements of the optometric examination.

128. Introduction to Pathology. (3) Two 1 1/2-hour lectures per week. Prerequisite: Anatomy 108/108L, Physiology 107/107L, Basic pathological processes in human development, senescence and disease. A correlated survey of disturbed functions in disorders of visceral systems, including disturbances of electrolyte and fluid balance and of metabolism.

131. Ocular Implications and Manifestations of Systemic Disease. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: grade of C or higher in Optometry 127A. Confirmation of diagnostic elements of the optometric examination. Theoretical considerations of systemic disease and implications of vision care.

132. Anomalies of Binocular Vision. (5) Five 1-hour lectures and two 3-hour laboratories per week. Prerequisite: Physiological Optics 160. Heterophoria, strabismus, and amblyopia. Detection, measurement, classification, etiology, symptomatology, signs, and prognosis of latent and manifest disorders of binocular fixation, both constant and nonconstant, orthoptics and visual training. Clinical aspects of anisometropic visual observations.

133. Ocular Disease Recognition. (3) Formerly 139. One 1-hour and two 1-hour laboratory per week. Clinical examination procedures for the detection and diagnosis of ocular disease. Principles of binocular vision and assessment of the prognosis for their treatment.

134. Ocular Disease Recognition. (3) Formerly 139. One 1-hour and four-hour laboratory per week. Clinical examination procedures for the detection and diagnosis of ocular diseases. Funduscopy, tonometry and perimetry.


140A. Principles of Pharmacology: General and Ocular. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: Optometry 128. Basic principles of drug action. Pharmacodynamics, mechanisms of action, toxicology. Emphasis on those agents used in ophthalmic drugs in various ocular diseases, especially as they relate to the eye and vision.

140B. Ophthalmic Pharmacology. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: Optometry 140A. Actions, uses, contraindications of ophthalmic preparations with emphasis on diagnosis and treatment.

152. Advanced Geometric Optics. (5) Two 1-hour lectures and two 1 1/2-hour lectures. Prerequisite: Physics 105A. Gaussian optics. Aberration and dispersion, unique aspects of wave optics, design and characteristics of ophthalmic instruments.

158A. Pediatric Optometry. (2) One 1-hour lecture and one 3-hour laboratory per week. The psychology of infants and children. Ophthalmic screening, examination, management, and treatment of pediatric patients. Methods of assessing visual and perceptual functions related to educational development. Review of procedures used by other professionals in the management of children's health and education.

158B. Geriatric Optometry. (2) Two 1-hour lectures per week. The psychological, physiological, social, and ocular changes associated with aging. Ocular and vision problems of the elderly. Examination and treatment of ocular changes in geriatric patients. Special problems of new aphakic patients and institutionalized and bed-ridden patients.

158C. Low Vision. (4) Three 1-hour lectures and one 3-hour laboratory per week. Optical principles of low vision aids. Epidemiology, etiology, signs and symptoms of low vision. Aims of low vision rehabilitation and treatment of the low vision patient, interdisciplinary rehabilitation resources, counseling and referral.

161. Contact Lenses. (1) One 1-hour lecture per week. The physical basis for fitting of contact lenses. Effects of a contact lens on the tears, lids and cornea. Instrumentation used in monitoring the ocular response to contact lenses.

162. Contact Lenses. (5) Formerly 161. Three 1-hour lectures and two 3-hour laboratories per week. Ophthalmic lens materials, design and characteristics of ophthalmic instruments.

177. Public Health Optometry. (4) Two 1-hour and two 3-hour laboratory per week. The doctor-patient relationship, communication in ophthalmic practice; special problems in communication; applied psychology for ophthalmists; suggestion and hypnosis.

178. Ophthalmic Lens Materials. (1) One 1-hour lecture per week. Elements of a research proposal; fundamentals of scientific inquiry; experimental design and analysis of data.

180A. The Practice of Optometry. (3) Two 1 1/2-hour lectures per week. Laws governing the practice of optometry. The establishment, management, and economics of an ophthalmic practice. Professional organizations and their functions and methods for delivering of ophthalmic services.

180B. The Practice of Optometry. (3) Three 1-hour lectures per week. Continuation of Optometry 180A.

Mr. Cohn (F)

180A. Ophthalmology Research Project. (1) One 1-hour lecture per week. Elements of a research proposal; fundamentals of scientific inquiry; experimental design and analysis of data.

180B. Ophthalmology Research Project. (1) One 1-hour lecture and one 1-hour laboratory per week. Prerequisite: passing grade in Optometry 180A. Thesis research for optometry students, presentation of research results.

Mr. Cohn and Staff

190C. Optometry Research Project. (3) Two 1-hour lectures and one 3-hour laboratory per week. Composition of thesis, research, and analysis of data. Mr. Cohn (F)

Mr. Marg (F)
Physiological Optics

Upper Division Courses


102. Diptogics of the Eye, (4) Three 1-hour lectures and one 2-hour laboratory per week. The eye as an optical instrument, image forming properties, optical defects, accommodation (quality, dimensions, optical constants), schematic eyes, cardinal points, ametropia, accommodation, retinal image size, blur circles, defraction, aberrations, scatter, and absorption. Mr. Freeman (Sp).

103. Ocular Embryology, (1) One 1-hour lecture per week. Prerequisite: Ocular Anatomy (may be taken concurrently). Basic principles of choroidal embryology. Development of the eye, ocular appendages and orbital contents. Developmental abnormalities. Mr. Van Sluyters (F).

110. Optics, (5) Four 1-hour lectures and one 3-hour laboratory per week. Geometric methods applied to the optics of mirrors, lenses and prisms. Principles of optical systems. Design of optical instruments. Mr. Mandel (F).

111. Optics, (4) Three 1-hour lectures and one 3-hour laboratory per week. Selected topics in physical and geometrical optics; interference, polarization of light, and their applications. Mr. Miller, Mr. Bailey.

121. Visual Neuroanatomy, (3) Two 1-hour lectures and one 2-hour laboratory per week. Anatomy and central nervous system; visual pathways, cranial nerves II, III, IV, V and VI and the autonomic visual pathways. Introduction to the motor and sensory systems. Mr. Stark and Mr. Cohn (W).

125. Vegetative Functions of the Eye, (4) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: ocular anatomy, or consent of instructor. Consideration of vegetative function which includes formation and drainage of aqueous humor; intraocular pressure; metabolism of the lens; properties of the vitreous; physiology of the cornea, sclera, retina and tear film. Mr. Miller (W).

125L. Laboratory in Vegetative Functions of the Eye, (3) One hour of laboratory lecture and Donner's labs per laboratory week. Prerequisite: course 102 and 125 (may be concurrent). Laboratory experiments in vegetative functions of the eye. Mr. Miller (F).

129. Internal and External Ocular Movements, (4) Three 1-hour lectures and one 2-hour laboratory per week. Motor mechanisms, control and stimuli in accommodation, convergence, and pupillary responses. Dynamics of this triad, zone of single, clear binocular vision. Kinematics of ocular rotations, degrees of freedom, measurement, and analysis of eye movement patterns. Mr. Stark (W).

130. Introduction to Pathology and Clinical Medicine, (4) Formerly 112. Eight 1-hour lectures per week. Prerequisite: grade of C or higher in PO 101, 125 and 151. Basic pathological processes in human development, senescence, and disease underlying physiology and histology. Basic techniques of physical examination and interpretation of common symptoms and signs relating to major disease processes. Mr. Medemeyer (W).

132A. Monocular Sensory Processes of Vision—Light and Color Aspects, (4) Three 1-hour lectures and one 2-hour laboratory per week. Light thresholds, light and dark adaptation, luminosity, retina, photometry, ocular transmission, principles of illumination, mechanism of color discrimination (hue, saturation, luminosity). Color perception. Mr. Schor (F).

132B. Monocular Sensory Processes of Vision—Psychophysical Considerations, (4) Four 1-hour lectures and one 2-hour laboratory per week. Prerequisite: P.O. 132A. Psychophysical methodology. In- cremental flicker, spectral and temporal summation, flicker sensitivity, perception of motion. Simultaneous and successive contrast, brightness constancy, afterimages, perceived brightness. Form vision, visual resolu- tion, border contrast, Mach bands, contrast sensitiv- ity. Mr. Adams (W).

151. Neurophysiology of Vision, (3) Two and one-half hours of lecture and one 1-hour laboratory per week. Properties of neurons of the visual pathway based on single unit and gross-evoked potential recordings from normal and visually deprived mammals. Mr. Marg (Sp).

160. Binocular Vision and Space Perception, (4) Three 1-hour lectures and one 2-hour laboratory per week. Retinal suppression, binocular and monocular magnification effects, fixation disparity, fusional areas; perception of size, shape, direction and distance. Mr. Flom (F).

175. Recent Advances in Physiological Optics, (1) One 1-hour class per week. Prerequisite: consent of instructor. Recent advances in physiological optics and optometry. Mr. Marg (Sp).

190. Group Studies for Advanced Undergraduates, (1-5) Group studies of selected topics. Mr. Freeman, Mr. Cohn (F, W, Sp).

195. Supervised Independent Study and Research, (1-5) One 1-hour lecture and one 1-hour laboratory per week. Prerequisite: certification by the instructor. Single-unit studies with a grade-point average of at least 3.0, a study or research interest in the basic science of physiological optics and intentions of graduate study in physiological optics should take this course instead of Optometry 499. Must be taken on a passed/not passed basis. Mr. Freeman (in charge) (F, W, Sp).

Graduate Courses

201A. Seminar in Physiological Optics, (2) One 2-hour seminar per week. Prerequisite: consent of instructor. Current topics in physiological optics. Mr. Marg (Sp).

201B. Seminar in Physiological Optics, (2) One 2-hour seminar per week. Prerequisite: consent of instructor. Current topics in physiological optics. Mr. Marg (W).

201C. Seminar in Physiological Optics, (2) One 2-hour seminar per week. Prerequisite: consent of instructor. Current topics in physiological optics. Mr. Marg (Sp).

202. Applied Human Physiological Optics, (4) Four hours of lecture or recitation per week. Prerequisite: consent of instructor. Ocular or binocular or monocular or macular death systems from a control and systems approach is made available to non-engineers using computer simulation techniques, and biologist-oriented directed study. Mr. Stark (Sp).

207. Simulation of Visual Systems, (4) Two hours of lecture and six hours of laboratory per week. Prereq- uisite: standing in permission of instruc- tor. Unit-sets of monotonic mammalian visual systems from a control and systems approach is made available to non-engineers using computer simulation techniques, and biologist-oriented systems approach. Mr. Stark (Sp).

208. Neurosensory Physiology of Vision, (4) Two 1-hour lectures and two 1-hour laboratories per week. Prerequisite: consent of instructor. Lecture and labora- tory demonstrations on the neural mechanisms under- lying the sensory and central processes of visual per- ception. Mr. Adams (W).

250. Neurophysiology of Visual Development, (2) Two hours of lecture per week. Prerequisite: consent of instructor. Single-unit studies of developing mammalian visual systems. Mr. Adams (W).

252. Neurophysiology of Visual Development, (2) Two hours of lecture per week. Prerequisite: consent of instructor. Single-unit studies of developing mammalian visual systems. Mr. Adams (W).

260. Vegetative Physiology of the Eye, (4) Four hours of lecture per week. Prerequisite: consent of instructor. Analysis of eye movements of radiant sources, normal and altered visual experience including mono- cular or binocular deprivation, strabismus, astigmatism and anisometropia. Evaluation of initial and partial contributions to the development of the visual system. Mr. Van Sluyters (F).

300A—300B—300C. Teaching Methods in Physiological Optics, (2—2—2) Two hours of class per week per quarter. Prerequisite: grade point average of at least 3.0, a study or research interest in the basic science of physiological Optics. Teaching in instruction methods and materials, in physiological Optics and optometry, observation of classes in session, practice teaching in classroom and laboratory. Can be taken more than once for credit. Mr. Flom (F, W, Sp).

401. Applications of Electronics and Computers in Physiological Optics and Optometry, (3) Formerly numbered 491. Two hours of lecture and two hours of laboratory per week. Prerequisite: graduate standing in physiological optics, optical or biological optics. The study of vision requires the application of electronic and computer techniques. Topics will cover the recording of bioelectric phenomena, neural potentials, single unit and complex computer processing and displays, and computer interactive systems used in physiological optics and optometry. Mr. Marg (F, Sp).

601. Individual Study for Master's Students, (1-8) Prerequisite: consent of instructor. Individual study for the comprehensive training of an optics unit which may be used to meet either unit or residence requirements for the master's degree. Must be taken on a satisfactory/unsatisfactory basis. Mr. Adams (F, W, Sp).

602. Individual Study for Doctoral Students, (1-8) Individual study in consultation with the adviser in physiological optics. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for the Ph.D. May not be used for unit or residence requirements. Must be taken on a satisfactory/unsatisfactory basis. Mr. Adams (F, W, Sp).
Graduate curricula in the School of Public Health provide preparation for positions of leadership in health agencies, and for research and teaching in the health sciences.

The professional degrees Master of Public Health (M.P.H.) and Doctor of Public Health (Dr.P.H.) are offered in the area of biomedical and environmental health sciences, including epidemiology and biostatistics, and in the area of social and administrative health sciences, including family and community health services, health behavior, health planning, policy and regulation, and health services administration. Particular attention may also be given to special areas of concern such as population, environmental pollution, disease control, health and medical care delivery, community mental health, and forensic science.

Programs of study leading to the following academic degrees are administered by groups of faculty from the School of Public Health and other departments:

- Biostatistics, M.A., Ph.D.
- Comparative Pathology, M.S., Ph.D.
- Environmental Health Sciences, M.S., Ph.D.
- Epidemiology, M.S., Ph.D.

Students are encouraged, and in most programs are required, to begin studies in the fall quarter because of the order in which courses are scheduled. Separate applications for admission must be submitted to the Graduate Division of the University and to the School of Public Health no later than February 1 for admission to the following fall quarter.

For further information consult the Announcement, School of Public Health, University of California, Berkeley, CA 94720.

**Biomedical and Environmental Health Sciences**

**Department Office, 113 Haviland Hall**

**Professors:**
- Chi Loong, Ph.D.
- Robert Cooper, Ph.D.
- James L. Herdy, Ph.D.
- Stewart H. Mein, D.V.M., Ph.D.
- William J. Oswald, Ph.D.
- William C. Reeves, Ph.D.
- S. Leonard Synne, Ph.D.
- Michael E. Tarter, Ph.D.
- Constantine H. Tempelis, Ph.D.
- Nevan A. Vedros, Ph.D.
- Warren Winkelstein, Jr., M.D., M.P.H.

**Associate Professors:**
- Robert J. Brand, Ph.D.
- Steve Law, M.D.
- George F. Sonsibeaug, D.Clin.

**Assistant Professors:**
- Gurumo C. Buching, Ph.D.
- Judith B. Cohen, M.S.P.H.
- Mary-Olaire King, Ph.D.

**Professors:**
- Ralph S. Fadenberger, Jr., M.D., Ph.D. (Adjunct)

**Associate Professor:**
- Thomas H. Miller, M.D., M.S.

**Assistant Professor:**
- Adam Bont, M.D., M.S.

**Lecturers:**
- James M. Bubinga, Ph.D.
- Washington Chin, M.P.H.
- Nathaniel E. Cramer, Ph.D.
- Richard W. Emmons, M.D.
- Paul H. Herrman, M.D.
- Carol A. Langhauser, M.A.

**Social and Administrative Health Sciences**

**Department Office 513 Earl Warren Hall**

**Professors:**
- Richard M. Bailey, D.B.A.
- Michel L. Blud, M.D., M.P.H.
- William H. Brown, Ph.D. (In Residence)
- Leonard J. Duhl, M.D.
- Sheldon Margen, M.D.
- Richard H. Noyes, M.D.
- M.P.H. (In Residence)
- David B. Starks, Dr.P.H.
- Daniel Wallace, M.D., M.P.H.
- Jesse M. Bieman, M.D., M.P.H.

**Associate Professors:**
- Carol D'Onto, Ph.D.
- David E. Havas-Gauthier, Ph.D. (Acting Chairman)

**Assistant Professors:**
- Joan R. Bloom, Ph.D.
- Albert Chang, M.D., M.P.H.
- Andrew A. White, Ph.D.
- Meredith A. Winkler, M.D., Ph.D.
- Richard C. Brown, M.D.
- John Carey, M.D.
- Mayberry Dewhirst, Ph.D.
- Kate Fittlmore, Ph.D.
- Constance Fraser, M.A.
- Annette Faller, M.S.W.
- Lorette God, Ed.D.
- Harold C. Gustafson, Dr.P.H.

**Field Program Supervisor:**
- Russell G. Anderson, M.M.P.

**Associate Field Program Supervisor:**
- Elizabeth Miller, M.P.H.

**Field Program Supervisor:**
- Sahil R. Brother, M.P.H.
- C. Jean Morton, M.S.W., M.P.H.

**Biomedical and Environmental Health Sciences**

The Department of Biomedical and Environmental Health Sciences in the School of Public Health is concerned with the impact of environmental forces on the health of human populations. Areas of special interest include the study of arthropod-borne viral illnesses, air and water pollution in the etiology of cancer and other diseases, social-psychological factors in the chronic diseases, host-parasite relationships in infectious diseases, immunological responsiveness in host susceptibility to disease, the toxicology of chemicals in the environment, the human health aspects of the work place, and forensic science.

The common theme of these activities is to better understand the causes of major disease problems affecting human health in order that effective prevention programs can be developed. Since these problem areas require interdisciplinary approaches, students are encouraged to develop broad programs of study both within the School and on the campus.

A variety of degree programs are offered with specialization in biostatistics, environmental health sciences, epidemiology, medical microbiology, immunology, parasitology, and comparative pathology.

**Upper Division Courses**

149. Introduction to Occupational Health and Industrial Hygiene. (3) Two 1 1/2-hour lectures per week. Survey of concepts involved in the recognition, evaluation and control of occupational health hazards. Defines the function of industrial hygiene within the context of occupational health. Mr. Rappaport, M.P.H.

150. Environmental Health Sciences. (3) Two 1 1/2-hour lectures per week. The elements of public health sanitation and of sanitary control of the environment. Survey of water, air, and waste water pollution in the setting of the living man's environment. Mr. Oswald, M.S.P.H.

151. Introductory Forensic Science Laboratory. (3) Two one-hour lectures and two-hour laboratory periods per week. An introduction to the nature of proof as it applies to the analysis and interpretation of physical evidence. Mr. Cooper, M.S.P.H.

152. Trace Microanalysis. (5) Two 1-hour lectures and two 3-hour laboratory periods per week. Prerequisite: upper division standing in a natural or physical science. A systematic approach to the microanalysis of materials using chemical and physical techniques. Emphasis is on materials of forensic and environmental significance. Dr. Sasha (F).

153. Instrumentation and Trace Analysis. (5) Two 1-hour lectures, one 1-hour lecture-discussion, and two 3-hour laboratory periods per week. Prerequisite: chemistry 1 A-C, 5, 8 A-C, or equivalents. Instrumental analysis as applied to the identification and characterization of materials. Emphasis is on materials of forensic and environmental significance. Dr. S. Sana (F).

154. Forensic Toxicology. (3) Two 1-hour laboratory periods per week. Prerequisite: upper division standing in a natural or physical science. Detection and estimation of toxic substances in the human organisms by chemical and physical means. Systematic analysis as scientific study of normal and abnormal constituents to determine presence or absence of toxic substances in relation to legal standards of proof. Mr. Shulgin (Sp)

154L. Forensic Toxicology Laboratory. (3) One 1-hour lecture-discussion and two 3-hour laboratory periods per week. Prerequisite: upper division standing in a natural or physical science. Course 154 may be taken concurrently. Laboratory in detection and estimation of toxic substances in the human organism by chemical and physical means. Mr. Shulgin (Sp)

155. Microbiology of Water and Waste Water. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisite: consent of instructor. Principles of microbiology applicable to the aquatic environment and to waste water. Mr. Cooper (W)

156L. Water and Waste Water Microbiology Laboratory. (3) Two 3-hour laboratory periods per week. Prerequisite: course 156L (may be taken concurrently). A laboratory course in water microbiology with emphasis on the effect of microorganisms on water quality. Mr. Cooper (W)

160A. Introduction to Probability and Statistics in Biology and Public Health. (4) Three 1-hour lectures, one 3-hour laboratory per week. Prerequisite: two years of high school algebra. Descriptive statistics, probability, probability distributions, point and interval estimation, hypothesis testing, with binomial and normal distributions.

160B. Introduction to Probability and Statistics in Biology and Public Health. (3) Two 1-hour lectures, one 3-hour laboratory per week. Prerequisite: course 160A or consent of instructor. The chi-square test, bivariate normal distributions, regression, and correlation with biomedical applications.

160C. Introduction to Probability and Statistics in Biology and Public Health. (4) Three 1-hour lectures, one 3-hour laboratory per week. Prerequisite: course 160A or consent of instructor. Design of experiment, analysis of variance, non-parametric statistics, with biomedical applications. Mr. Salvin, Miss Langhauser (F)

161A. Introduction to Biostatistics. (2) Three 1-hour lectures, one 3-hour laboratory per week. Prerequisite: course 161A or consent of instructor. The chi-square test, bivariate normal distributions, regression, and correlation with biomedical applications.

161B. Introduction to Biostatistics: Survival Analysis and Application of Life Tables. (3) Three 1-hour lectures per week. Prerequisite: course 161A.

**NOTE:** For key to symbols, see page 36.
3-hour lecture-discussion per week. Prerequisite: course 262A or consent of instructor. Ex- ploratory study of epidemiologic approaches to the study of the etiology of selected neoplastic diseases as well as consideration to medical microbiology. Experiments will be conducted in fluorescent antibody techniques, preparative and analytical centrifugation, disc electrophoresis and immunoelectronmicroscopy. Mr. Tempeiis (Sp)

272. Advanced Medical Virology. (3) Two 1-hour lectures per week. Prerequisite: course 182L or equivalent and consent of instructor. Principles of genetic toxicology with emphasis on the evaluation of genetic hazards from environmental and industrial chemicals. To be offered 1979/80 and 1980/81 only. Mr. Whorton (Sp)

273. Medical Mycology. (3) Two 1-hour lectures per week. Prerequisite: course 180B or equivalent. Immunologic bases underlying diagnostic procedures, active and passive immunization, problems of vaccine development and infectious diseases. Mr. Misener (W, Sp)

274. Advanced Forensic Science: Criminalistics. (4) One 2-hour lecture and two 3-hour laboratories per week. Prerequisite: courses 278, 279 and consent of instructor. Theory and practical procedures applicable to medical microbiology. Experiments will be conducted in fluorescent antibody techniques, preparative and analytical centrifugation, disc electrophoresis and immunoelectronmicroscopy. Mr. Tempeiis (Sp)

275. Advanced Forensic Science: Forensic Biology. (4) One 2-hour lecture-discussion and three 3-hour laboratories per week. Prerequisite: course 278 or equivalent. A detailed analysis of advanced procedural and interpretational problems in forensic science. Mr. Thornon (F)

276. Current Problems in Epidemiology. (3) One 3-hour lecture-discussion per week. Prerequisite: course 175 or consent of instructor. May be repeated for credit. Guest lecturers and staff present their current epidemiologic research, emphasizing the bases for development of epidemiologic research programs, methods employed, and difficulties encountered. Course given on a satisfactory/unsatisfactory basis. Limited to 10 students. Mr. Reeves (Sp)

277. Epidemiology of Arthropod-Borne Diseases and Zoonoses. (3) One 3-hour discussion per week. Prerequisite: course 275A or consent of instructor. Group discussion of the transmission cycles and methods of laboratory and field study of arthropods and their relationship to the understanding of these two groups of infectious diseases. Mr. Reeves, Mr. Emmons (Sp)

278. Epidemiology of Noninfectious Diseases. (3) One 3-hour discussion per week. Prerequisite: courses 175 and 160A or consent of instructor. Analysis and discussion of selected topics illustrating the theory and practice of the application of epidemiologic methods to the study of noninfectious diseases. Co-limited to the first 15 qualified students each quarter. Pre-enrollment required. Mr. Syne (W, Sp)

279. Genetics and Epidemiology. (3) Two 1 1/2-hour laboratory courses per week. Prerequisite: courses in epidemiology, statistics, genetics and consent of instructor. The interaction of genetics and environmental factors in the etiology and distribution of disease in human populations. Ms. King (F)

280A. Pathobiology. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: courses 180A, 180B, and consent of instructor. Limited to 10 students. Studies of the pathological processes of infectious diseases. Mr. Madin (F)

280B. Pathobiology. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: courses 180A, 180B, and consent of instructor. Limited to 10 students. Studies of the pathological processes of infectious diseases with emphasis on animal models. Mr. Vedros (W)

280C. Pathobiology. (4) One 1-hour lecture and three 3-hour laboratories per week. Prerequisite: courses 180L-180M, 182L. Recommended courses Zoology 113, 181, Physiology 105 or equivalent. Limited to 10 students. Studies of biochemical and cellular aspects of infectious diseases and cancer using cell culture systems. Mrs. Buehning (Sp)

281. Public Health Immunology. (3) Three 1-hour lectures per week. Prerequisite: course 180A-180B or equivalent. Immunologic bases underlying diagnostic procedures, active and passive immunization, problems of vaccine development and infectious diseases. Mr. Tempelis (Sp)

282. Advanced Methods in Medical Microbiology. (3) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: course 180A-180B or equivalent and consent of instructor. Theory and practical procedures applicable to medical microbiology. Experiments will be conducted in fluorescent antibody techniques, preparative and analytical centrifugation, disc electrophoresis and immunoelectronmicroscopy. Mr. Tempeiis (Sp)

283. Medical Mycology. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 180A-180B or equivalent and consent of instructor. Mycology and host interactions of pathogenic fungi; pathogenesis of fungal diseases including immunity and treatment. Mr. Vedros (W)

284. Advanced Methods in Medical Microbiology. (3) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: course 180A-180B, 180L or equivalent and consent of instructor. Theory and practical procedures applicable to medical microbiology. Experiments will be conducted in fluorescent antibody techniques, preparative and analytical centrifugation, disc electrophoresis and immunoelectronmicroscopy. Mr. Tempeiis (Sp)

285A. Advanced Forensic Science: Criminalistics. (4) One 2-hour lecture and three 3-hour laboratories per week. Prerequisite: courses 151, 152, 155 or equivalent. A detailed analysis of advanced procedural and interpretational problems in forensic science. Mr. Thornon (F)

285B. Advanced Forensic Science: Forensic Biology. (4) One 2-hour lecture-discussion and three 3-hour laboratories per week. Prerequisite: course 293 or equivalent. A detailed analysis of advanced procedural and interpretational problems in forensic science. Mr. Sensabaugh (Sp)

291C. Principles of Occupational Diseases. (3) One 3-hour lecture-discussion per week. Prerequisite: BioEnv 253, Physiology 109, and Anatomy 108 or consent of instructor. Principles of diseases caused or influenced by the occupational environment including pathophysiology and clinical presentation of disease states. To be offered 1979/80 and 1980/81 only. Mr. Whorton (Sp)

291K. Genetic Toxicology. (2) Two 1-hour lectures per week. Prerequisite: BioEnv 253 or consent of instructor. Principles of genetic toxicology with emphasis on the evaluation of genetic hazards from environmental chemicals. To be offered 1979/80 and 1980/81 only. Mr. MacGregor (W)

295. Seminars. (1–4) The Staff (F, W, Sp)

295N. Epidemiology Seminar, Section I. (1–4) Prerequisite: open to beginning graduate students in epidemiology or consent of instructor. Fall— Letter grade: Winter— In Progress; Spring— Letter grade. Mr. Reeves (F, W, Sp)

295N. Epidemiology Seminar, Section II. (1–4) Prerequisite: open to advanced graduate students in epidemiology or consent of instructor. Course may be repeated. To be given on a satisfactory/unsatisfactory basis. Mr. Reeves (F, W, Sp)

295S. Epidemiology Seminar, Section III. (1–4) Designed to permit any qualified graduate student to pursue special study under the direction of a faculty member. The Staff (F, W, Sp)

298. Group Study. (1–6) The Staff (F, W, Sp)

299. Individual Research. (1–8) The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1–6) Individual study for the comprehensive or language requirements in consultation with the field adviser. Course may be taken to prepare requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1–6) Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (and other terminal degrees). May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

Note: The following sections have been established for courses 197, 198, 199, 293, 295N, 601 and 602. The courses may be repeated for credit, but some sections may not be given every quarter.

K. Environmental Health Sciences
L. Biostatistics
N. Epidemiology
P. Biomedical Laboratory Sciences
IDS 238. Environmental Design, Stress and Health. See Interdepartmental Studies for the complete description of this course.

Social and Administrative Health Sciences

The Department of Social and Administrative Health Sciences in the School of Public Health is concerned with understanding and utilizing the forces influencing the delivery of health programs. The scope of faculty and student interests in health research and practice is broad. Numerous aspects of health problems and issues are studied: administrative, behavioral, biological, political and economic.

Faculty and graduate students usually identify with both a substantive area of knowledge (Behavioral Health, Health Policy, Planning, and Regulation, Family and Community Health, and Health Care Administration) and a level of a number of established career paths in the health professions (behavioral sciences, community mental health, health administration and planning, hospital administration, maternal and child health, public health education, public health nutrition, or public health social work). Students are urged to study health problems or concerns which can be considered most effectively through an interdisciplinary approach.

Because of the breadth of subject interests, graduate students are expected to make extensive use of related departments on the Berkeley campus such as...
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as: anthropology, business administration, city and regional planning, education, genetics, nutritional sciences, psychology, public policy and social welfare. Opportunities for supervised field experience are offered by many health agencies in nearby communities, the state and the nation. For physicians, limited training programs are designed to meet certification requirements for medical board specialties such as preventive medicine, pediatrics, and obstetrics and gynecology. Both the Master of Public Health and the Doctor of Public Health degree programs are offered.

Upper Division Courses

102. Administrative Behavior and Processes in Health Agencies. (3) Two 2-hour lectures and one 2-hour laboratory session per week. Introduction to health administration, focusing on organization structure, budget, and personnel management. Prerequisite: consent of instructor. Use of cases, games, and simulations. (W)

*107. Introduction to Medical Care Administration. (3) Two 1-hour lectures, one 2-hour group discussion per week. Prerequisite: consent of instructor. Use of cases, games, and simulations. One unit may be earned by submitting a term paper. (W)

*109. Medical Care Problems and Programs. (3) Two 2-hour lecture-discussions per week. Review of current issues in organizing and financing medical care in the United States. Not designed for students interested in medical care or public health administration programs in the School of Public Health. (F)

125A. Maternal Health. (2) One 2-hour lecture per week on public health aspects of care before, during, and after pregnancy. Programs for maternity care. Mr. Medina (W)

125B. Relationship of Human Growth and Development To MCH Programs. (2) One 2-hour lecture per week. Principles of human growth and development in public health programs. (F)

125C. Mental Retardation and Associated Handicaps. (2) One 2-hour lecture per week. Principles of programs for children with severe mental retardation and their families; community programs for care of children with handicapping conditions. Mr. Chang (Sp)

126. Principles of Maternal and Child Health. (3) One 2-hour lecture per week. Health and social problems of mothers and children. (Sp)

127. Health Programs for the School Age Child. (2) One 2-hour lecture per week. A general introduction to organized health service programs for preschool and school age children. Mr. Chang (Sp)

128. Health Programs of Adolescence. (2) One 2-hour lecture per week. Prerequisite: consent of instructor. Issues and problems in the physical and mental heath of adolescents, and a critical study of current problems for this age group. Mr. Brown (W)

130A–130B. Selected Topics in Health Education. (2–2) One 2-hour lecture per week; field observations with scheduled conferences. Topics and laboratory demonstrations and field experiences will vary from year to year. 130A: Mrs. Tassan (F); The Staff (W, Sp); 130B: Mrs. Tassan, Mrs. Anderson (W), Mrs. Anderson (Sp)

132. Planning Health Experiences for the School Age Child. (3) One 2-hour lecture, one 1-hour discussion and one one-half day field visit per week. Principles of planning health experiences for the school age child. Mr. Weddle (W, Sp)

134. Community Health Education. (2) One 2-hour lecture, one 2-hour laboratory per week. Prerequisite: fall quarter: limited to students in nutrition and food science. Spring quarter: limited to undergraduate students. Fall quarter: limited to graduate public health students not specializing in public health education. A general introduction to the scope and nature of educational activities in a public health program. Mrs. D'Oro (F) _____ (W, Sp)

138A. Alcohol and Other Drugs: Behavioral Problems. (3) One 3-hour lecture-discussion per week and one one-half day field visit per week. Prerequisite: upper division or graduate standing. Presentation of latest research findings on psychological, sociological, and physiological correlates of alcohol and drug problems. Mr. Seiden, Mr. Romano-V (W, Sp)

203B. Legal Aspects of Hospital Administration. (3) Formerly 111. One 3-hour lecture-discussion per week. Prerequisite: for majors in hospital administration or consent of instructor. Development of the hospital as a social institution, its role and functions in health care delivery; analysis of current problems and trends in hospital operations and in hospital environments. Mr. H. Blum (W)

204. Macroeconomics of Health Services. (4) Two 2-hour lecture/discussions per week. Prerequisite: principles of microeconomics or consent of instructor. Application of basic concepts of microeconomics and public finance to the provision of health services. Analysis of methods of financing health services from both public and private sources are examined; use of cost-benefit analysis in comparing various health programs. Mr. H. Blum (W)

205. Microeconomics of Health Services. (4) Two 2-hour lecture-discussions per week. Prerequisite: principles of microeconomics or consent of instructor. Application of basic concepts of microeconomics to the production and delivery of health and medical care services in the United States. Mr. H. Blum (W)
225A—225B—225C. Problems and Programs in Maternal and Child Health. (2—2—2) Two 2-hour seminars plus one 7-hour seminar per week. Prerequisite: consent of instructor. Critical analysis of the impact of research, previous training in pediatrics or obstetrics, or equivalent experience. Consent of instructor required for all but 225C. 225A focuses on problems in the care of pregnant women; 225B on women's health problems; 225C on health and social needs of mothers and children. Programs for meeting these needs.

226. Application of Genetics to Public Health. (2) Two 2-hour lectures per week. Prerequisite: consent of instructor. Basic principles of genetics and recent advances in their application to public health programs.

227. International Maternal and Child Health. (2) One 2-hour lecture per week. Prerequisite: graduate standing in public health or consent of instructor. Major health and child health programs outside of the United States. May be repeated for credit.

228. Evaluation of Programs of Health Care for Mothers and Children. (3) Formerly 2217. One 3-hour lecture-discussion per week. Prerequisite: graduate standing in the School of Public Health or consent of instructor. Review of principles and practice of evaluation of programs and projects in the public and private sectors designed to provide health care for mothers and children.

229. Programs and Services for Handicapped Children and Youth. (2) One 2-hour lecture per week. Organization, scope, funding, implementation, and evaluation of health services for children with special needs, youth and their families at national, state, and local levels. Programs and services for physical and mental handicaps and developmentally disabled children of all types.

Miss Koss, Miss Fraser (W)

230. Health Services for Young Children in Day Care and Child Development Programs. (2) Formerly IDS 225B. Two 2-hour lecture and discussion per week. Prerequisite: consent of instructor. Assessment of needs, planning, development, and implementation of health services for children in day care and related child development programs.

Mr. Chang (W)

231. Community Organization and Concepts Basi- c to the Change Process. (3) One 3-hour seminar per week. Prerequisite: consent of instructor. Social and political factors which facilitate the effectiveness of groups in promoting public health activities.

Mr. Maynard (F, W)

232. Community Organization and Concept Development. (2) Three 1-hour sessions per week. Prerequisite: major in public health education or consent of instructor. Introduction to literature, theory, and current programs in public health education.

Mr. Fisher (Sp)

234A. Public Health Education: Programs, Planning and Evaluation. (2) One 2-hour seminar per week. Prerequisite: major in public health education or consent of instructor. Introduction to literature, theory, and current programs in public health education.

W, Sp

239A—239B. Proseminar in Behavioral Sciences in Public Health. (3—3) One 3-hour seminar per week. Either A or B may be taken independently. Current developments in the behavioral sciences as they relate to the solution of public health problems.

Mr. Rannov, M. Seniden, 239A (W), 239B (Sp)

241. Current Developments in Public Health Nutrition. (3) Two 1-hour lectures per week. Prerequisite: previous course work in nutrition. Critical analysis of current public health nutrition problems and methods of assessing nutritional status of individuals and populations.

Ms. Shapiro (F)

243B, 243C. Public Health Nutrition: Programs and Issues. (3) Two 2-hour discussion-lecture sessions per week. Prerequisite: graduate standing in Public Health or Nutritional Sciences or consent of instructor. Critical analysis of current programs and issues in solving public health nutrition problems, implications for public policy.

Ms. Pack (Sp)

244L. Laboratory in Public Health Nutrition. (1—3) One 3-hour laboratory per week. Prerequisite: admission to 243A. Field experiences in agencies whose work relates to public health nutrition services. May be repeated for credit.

Ms. Murali, Ms. Groll, Ms. Shapiro, Ms. Brother

244. Public Health Nutrition for Physicians. (2) One 2-hour lecture-discussion per week. Prerequisite: major in medicine: a medical degree. A review of current nutrition findings and their implication for physicians.

W

245. Biochemical Evaluation of Nutritional Status. (2) Two 1-hour lectures per week. Prerequisite: Nutritional Sciences 160 and one of Biochemistry 103 or 102L, or equivalent, or consent of instructor. Evaluation of the biochemical methods presently used to assess the nutritional adequacy of vitamins and other nutrients in humans, including accuracy of methods, specificity, and apparatus required, standards, and accuracy of laboratory surveys.

Mr. Sauberlich (W)

250. Perinatal Health Services. (2) One 2-hour lecture-discussion per week. Prerequisite: graduate standing in the School of Public Health or consent of instructor. Perinatal health services as they apply to the needs of perina- tal patients, and to the organization of those services.

M. Fruch (W)

251B. Indian Health Care-Past, Present and Future. (3) One 2-hour lecture and one 1-hour discussion per week. Prerequisite: enrollment in School of Public Health. Analysis of the historical development of field of Indian health care with emphasis on policy legislation, and programs affecting Indian health. Intensive study on historical development of federal policy towards Indians, with progression to present Indian health policy. To be offered 2179, 1980-81 only.

251D. Power Relationships, Community Clinics and Medical Care. (3) Three hours of lecture per week.
291G. The Patient as Consumer and Advocate. (3)

3-hour lecture-discussion per week. Sociology of consumerism and institutional response. To be offered 1978/79 and 1979/80 only. Mr. Kayes-Bautista (Sp)

293. Introduction to the Principles, Process and Methods of Public Health Evaluation. (3) Two 1-1/2 hour lecture-discussions per week. Prerequisite: graduate standing in the School of Public Health or consent of instructor. An introduction to the principles and methods of evaluation in a public health setting. Course covers models of evaluation, design, purposes, administrative aspects.

(W)

294U. Dynamics of Health Teams. (2) One 2-hour lecture-discussion per week. Prerequisite: consent of instructor. The course examines the roles and functions of various health professionals and their relationship on health teams. The process of thinking and the teamwork for delivering health services and utilization of health manpower are analyzed.

Miss Morton, Miss Pock, Mr. Chang, Miss Fraser, Mrs. Adler (W, Sp)

294V. Health Behavior: Individual and Community. (3) Two 1-hour lectures and one 2-hour discussion per week. An introduction to major literature and social concerns with implications for public health: the individual, family, group and community life, dimensions of society and community, social behavior, process of and approaches to behavioral change.

(F, W, Sp)

295. Field Study In Public Health. (1-5) Supervised individual study for the comprehensive or language proficiency requirements (or the doctoral degree. Must be taken for courses 197, 198, 199, 295 through 299, 601 and 602. The courses may be repeated for credit, but some sections may not be given every quarter.

A. Program/CLinic Administration
B. Planning, Policy and Regulation
C. Corporate Management
F. Maternal and Child Health
G. Health Education
H. Behavioral Sciences
J. Public Health Nutrition

IDS 175. Introduction to the Ethics and Value Aspects of Planning and Systems Design. (4) See Interdepartmental Studies for the complete description of this course.


Graduate School of Public Policy

Graduate School of Public Policy Office, 2607 Hearst Avenue

Professor:
David L. Krip, J.D. 
C. Bartlett McCure, M.A. 
Arnold Melzner, Ph.D.

Associate Professor:
Eugene S. Barbach, Ph.D. 
Lee S. Friedman, Ph.D.

Acting Assistant Professor:
Henry Brady

Undergraduate Courses

The undergraduate courses in Public Policy deal with the substance of American public policy, how it is made, how its effects can be gauged, and what the purposes of policy should be. The courses consider both the policy process and particular policy issues. By examining different policy problems in their political and social contexts, students should gain a greater sensitivity to the forces which shape and carry out public policies and to the impact of social, political, economic and legal power.

Courses are designed for students in diverse disciplines and professional schools. There are prerequisites for enrollment in the courses unless specifically noted otherwise in the course descriptions below. The training provided by the courses is useful to those interested in combining the substantive perspectives of the social sciences with the intricacies of contemporary problems; to those considering professional study; and to the informed and politically aware citizen.

Graduate Courses

Through an examination of a wide variety of contemporary American domestic policy areas, graduate courses enable students to conduct systematic work in the design and assessment of public policies. Among the skills emphasized are those facilitating the application of political, organizational, economic, quantitative and legal analysis to the full range of the policy process—from policy initiation through policy adoption, implementation, and evaluation. By developing these skills, students from the professional schools and academic disciplines should find their strengthened analytical capabilities useful in their own field of concentration. Unless otherwise noted in the course descriptions below, there are no prerequisites for enrollment in these courses.

Masters in Public Policy

The professional degree, the Master of Public Policy, is designed to provide students with the knowledge, analytical skills, and sensitivities needed to conduct public policy studies. The primary focus is on American domestic policy issues. Students with baccalaureate backgrounds are accepted into this program. Those completing the Masters program are qualified to take responsible positions with government and policy research organizations, and to work in the private sector on matters related to public policy. Some graduates work primarily as policy analysts while others pursue administrative and political careers which involve the initiation and utilization of policy studies. The two-year Master's degree program consists of a required first-year core curriculum, a summer internship, and a second year devoted to elective courses and a policy study of the student's choice. The first-year core curriculum consists of courses in political analysis, quantitative analysis, economic analysis, quantitative techniques, legal analysis and a workshop where students perform policy studies on selected issues.

Ph.D. in Public Policy

The Ph.D. program prepares students for careers in advanced policy research in academic institutions, research institutes and government agencies. The Ph.D. program is oriented toward the generation of new knowledge, theories, and methodologies in public policy analysis. The program is small and admission is highly selective.

Information

Brochures and information on admissions procedures and student financial assistance are available from the Graduate School of Public Policy, University of California, 2607 Hearst Avenue, Berkeley, CA 94720.

Undergraduate Courses

170. Evaluating Changes In The Political Process. (6) Two 2-hour lectures per week. Institutional problems and reforms dealing with the presidency, Congress, courts, bureaucracies, political parties, campaigns and elections. Emphasis on the strengths and weaknesses of current operations and of the changes that are proposed or of those containing the conflicting values and interests associated with institutional change.

Mr. Sindler (W)

174. Issues In Environmental Policy. (6) Two two-hour lectures per week. In-depth study of environmental problems and policies in the nation with special attention to California. Present positions and policies of the environmental movement will be examined, together with those of industry, labor, government and the public generally. The politics of environmental policy making and the policy priorities required for early resolution of environmental problems will be discussed. Approved for 1979/80 only. Mr. Behr (Sp)

175. Making Legislative Policy. (6) Two two-hour lectures per week. Discussion of the practical factors influencing governmental action or inaction in Sacramento including the effect and effectiveness of action by constituents, lobbyists, the media, the Administration, local government, and labor and management on the passage or failure of legislation. Different policy topics include selected environmental and social issues, the current tax revolt and the budget process. Approved for 1979/80 only. Mr. Behr (F)

177. Quantitative Approaches To Policy Analysis. (6) Two two-hour lectures per week. Directed to students who wish to learn about the policy uses and abuses of statistical techniques, computer simulation, and mathematical models. Presents an opportunity to develop a constructively critical eye for appropriate use of these techniques. Topics include river pollution and recycling, plea bargaining, jury design and policy allocation, off-shore oil, western strip-mining, timber harvesting and land leasing, school finance policies and residential choice.

Mr. McGuire
179. The Rise and Fall of Recent American Social Policies. (5) Two 2-hour lectures per week. Judged against a background of scholarly controversy and the recent legal trends in public policy, this course will explore the role of government in addressing social problems. Emphasis on the political, economic, and social dimensions of policy formulation and implementation.

Mr. Singh (F)

180. The Economics of Public Problem-Solving. (5) Three 2-hour lectures per week. The course will focus on the economic principles underlying policy analysis and decision-making. Topics will include cost-benefit analysis, risk assessment, and public choice theory.

Mr. Becchetti (F)

181. Ethical Dilemmas in Public Policy. (5) Two 2-hour lectures per week. An exploration of ethical issues in public policy, including the role of values in policy formulation and implementation. Prerequisite: Economics 101A or their equivalents.

Mr. Meltsner (F)

182. Political Skill in the Making of Public Policy. (5) Two 2-hour lectures per week. An examination of the political skills used in the development of public policy. Focus on the role of political actors in policy formulation and implementation.

Mr. Bardach (Sp)

*183. Taxes, Politics and Public Policy. (5) Two 2-hour lectures per week. An introduction to the politics of taxation at various governmental levels. The course will cover the history of taxation, its role in the economy, and the challenges of tax reform.

Mr. Friedman (F, W)

184. The Economics of Public Problem-Solving. (5) Four hours of lecture and one hour of faculty supervised research per week. Prerequisite: Economics 104A or their equivalents. An examination of the economic principles underlying policy analysis and decision-making. Topics will include cost-benefit analysis, risk assessment, and public choice theory.

Mr. Becchetti (F)

185. An Introduction to the Politics of Policy Advising. (5) Four hours of lecture per week. An introduction to the role of policy advisors in the development of public policy. The course will cover the theory and practice of policy analysis and decision-making.

Mr. Friedman (F, W)

186. WRITING IN THE DISCIPLINES: writing and discussion per week. Examines the conflicts of interest expressed in the Bakke and De Funis cases. The role of the courts and of the political process in determining such conflicts will also be considered.

Mr. Sinde (Sp)

187. Legal Institutions and Public Policy. (5) Two 2-hour lectures per week. Issues of public policy are increasingly resolved by the judiciary. How does judicial policy making differ from policy making as carried out elsewhere in government? How has the involvement of the courts in issues of public policy changed the character of the judiciary? Among current issues intertwining law and policy to be discussed: abortion, preferential admissions and exclusionary zoning. Mr. Kip (W)

190. Directed Group Study. (1-5) Meetings to be arranged. Prerequisite consent of instructor. Group study of a selected topic or topics in Public Policy. Credit and grade to be awarded at the end of the term. Open only to majors who have completed the core curriculum.

Mr. Tannenbaum, Mr. Trow (F, Sp)

191. Supervised Independent Study and Research. (1-5) Prerequisite: open only to majors who have completed the core curriculum. An opportunity for students to work on a selected topic or topics in Public Policy. Credit and grade to be awarded at the end of the term. Open only to majors who have completed the core curriculum.

Mr. Tannenbaum, Mr. Trow (F, Sp)

192. Microeconomic Organization and Policy. An integrated course on the use of quantitative techniques in public policy analysis: statistical and econometric analysis of policy-relevant data, survey design, development of formal policy models based on decision theory, and mathematical programming and computer simulation. The student develops a modest facility in the uses of quantitative techniques through extensive practice in their application to public policy applications.

Mr. Brady, Mr. McGuire (F, W)

215A–251B. Microeconomic Organization and Policy. (4-4-4) Two 2-hour sessions per week. Emphasis on the quantitative analysis of public policy issues. Topics include taxation, regulation, and public choice theory.

Mr. Meltsner (F)

216. Legal Institutions and Public Policy. (5) Two 2-hour lectures per week. Examines the role of the courts and of the political process in determining such public policies and applied to specific policy areas. Ability to analyze the effects of alternative policy actions in terms of (1) efficiency, (2) resource allocation, and (3) equity is stressed. Policy areas are selected to show a broad range of actual applications of theory as well as to discuss a wide variety of policy strategies.

Mr. Friedman (F, W)

218A–218B. Professional Development Seminar. (2-2) One and 1/2 hours of lecture per week. Emphasis on the role of the courts and of the political process in determining such public policies and applied to specific policy areas. Ability to analyze the effects of alternative policy actions in terms of (1) efficiency, (2) resource allocation, and (3) equity is stressed. Policy areas are selected to show a broad range of actual applications of theory as well as to discuss a wide variety of policy strategies.

Mr. Friedman (F, W)

220. Law and Public Policy. (4) Two 1/2-hour sessions per week. Focuses on the legal aspects of public policy by examining key issues such as civil liberties, constitutional rights, and the role of the courts in shaping public policy.

Mr. Friedman (F, W)

221A–221B. Professional Development Seminar. (2-2) One and 1/2 hours of lecture per week. Emphasis on the role of the courts and of the political process in determining such public policies and applied to specific policy areas. Ability to analyze the effects of alternative policy actions in terms of (1) efficiency, (2) resource allocation, and (3) equity is stressed. Policy areas are selected to show a broad range of actual applications of theory as well as to discuss a wide variety of policy strategies.

Mr. Friedman (F, W)
An examination of the political environment surrounding policy advising and the application of analytical position to assess the likely effectiveness of their consideration is devoted to organizational effectiveness and problems of organizational design and reorganization. Mr. Meitser, Mr. Welner (Sp).

258A–258B. Advanced Quantitative Models in Policy Analysis. (4) Three hours of lecture and one hour of conference per week. Prerequisite: consent of instructor. Examination of selected policy problems in mental health. Special emphasis on political, organizational, and fiscal problems. Students are encouraged to do field research. Mr. Bardach

258A. Urban Policy and Political Economy. (4-4-4) Three hours of lecture per week. Prerequisite: consent of instructor. Examination of the urban policy and political economy as applied to domestic policy analyses. Emphasis will be on descriptive and policy-oriented approaches. Mr. Trow

257. Implementation and the Policy Process. (4) Three hours of lecture per week. Prerequisite: consent of instructor. The process of implementing any new public policy. The effect of policy delay, the direction of goals, and minimal results from maximal effort. This course examines the political and organizational factors producing these problems and considers strategies for confronting them. Mr. Bardach (W)

258. Cost Benefit Techniques in Policy Analysis. (4) One 3-hour session per week. Prerequisite: Econ 100A or equivalent, or consent of instructor. The principles of cost benefit analysis and their application to a variety of policy issues. Public goods; social choices regarding expenditures; externalities; and market failure. Mr. McGwire (W)

259A. The Use of Microeconomics in Policy Analysis. (4) One 3-hour session per week. Prerequisite: Econ 100A, 101A, or its equivalent, or consent of instructor. Covers the diverse uses of microeconomic theory as applied to domestic policy analyses. Emphasis will be on the acquisition of analytic skills. Examination of the impact of the internalization of externalities on the policy process. Mr. McGwire (W)

260. Inflation as a Social Policy. (4) Two 2-hour lecture sessions per week. Prerequisite: consent of instructor. The personal and institutional consequences of inflation, unemployment and economic growth. Pros and cons of alternative economic policies paid to describing social impacts of inflation, reviewing proposed solutions, and determining the impacts of inflation on individuals, state and local government. 2nd businesses can cope with persistent "stagnation". Mr. Brady (Sp)

261. Policy in Higher Education. (4) Three hours of lecture per week. Prerequisite: consent of instructor. This seminar will explore current problems and issues in American higher education with special attention to the role of research universities that shape policy in this area. The seminar will include the history and structure of higher education, political context, finance, and governance. Mr. Tannenbaum

253. Seminar in Mass Communication Policy. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Examination of selected public policy issues involved in the regulation and operation of the mass media. Particular attention will be directed at policy questions stemming from recent technological innovations. Dr. Tannenbaum (F)

244A–244B. Issues in Mental Health Policy. (4-4) Three hours of lecture per week. Prerequisite: consent of instructor. A seminar examining mental health policy problems in mental health. Special emphasis on political, organizational, and fiscal problems. Students are encouraged to do field research. Mr. Bardach

256. Policies for Youth. (4) Three hours of lecture per week. Prerequisite: consent of instructor. This seminar deals with the transition between youth and adulthood in contemporary society. Seminar participants will consider some of the problems associated with this transition and efforts that are being made or might be made by public and private agencies to deal with these problems in the U.S. and abroad. Mr. Trow

271. Law and Social Change. (4) Formerly 271A–271B. Three hours of lecture per week. Prerequisite: limited to graduate students only those who have completed 258A and have consent of instructor. An introduction to the legal profession for social work students. Mr. Bardach

272. Sex Discrimination, Public Policy and the Law. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Consideration of the legal issues in sex discrimination. Examination of legal and practical barriers to legal policy. The role and limits of current policies and legal analysis will be explored. Mr. Kirp

280A–280B. Strategies for Emerging Public Policies. (4-4-4) Three hours of lecture per week. Prerequisite: consent of instructor. A series of courses will examine different policy issues. Emphasis will be on examining the perspectives of the major actors, policy alternatives, and feasibility estimates will be analyzed. Class efforts will include designing implementable policy strategies. The Staff

292. Directed Advanced Study. (1–12) Prerequisite: consent of instructor and graduate advisor. Open to qualified graduate students interested in pursuing special study and research under direction of a member of the staff. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) Individual study is encouraged to pursue special study and research under direction of a member of the staff. The Staff (F, W, Sp)

Related Courses in Other Departments

1. IDS 209A–209B–209C. Economics of Decision, Inferring, and Organization. (8–8–4) See Interdepartmental Studies for the complete description of this course. Mr. McGwire

2. IDS 244A–244B. Compliance: Public and Private Law Enforcement. (4–4) See Interdepartmental Studies for the complete description of this course. Mr. Bardach, Mr. Kagan

Law 237. Education Policy and Law. See Law for the complete description of this course. Mr. Kip (W)

Law 243-2A. Family Law: The Child, the Family and the State. See Law for the complete description of this course. Mr. Kip, Mr. Coons (W)

Mass Communications 103. The Communication Media in Public Policy. (5) See Mass Communications for the complete description of this course.

School of Social Welfare

School of Social Welfare Office, 120 Haviland Hall


Associate Professors: Leonard S. Miller, Ph.D. Robert Pruger, D.S.W. Kenneth Rosen, Ph.D. Charlene Brown, D.S.W.

Lecturers: Margaret Allen, Ph.D. Lawrence H. Boyd, Jr., Ph.D. Marianne Pennekamp, D.S.W.

Coordinator of Field Work: Dorothy Tumer, M.S.W.

Field Work Consultant: Franklin Bauer, M.A.

Doris Britt, M.S.W.

Graduate Program

The School of Social Welfare is a graduate professional school which offers:

1. A program of studies which leads to the degree of Doctor of Social Welfare and which prepares students for careers in teaching, research, policy development and administration in the field of social welfare and in the profession of social work. It is open to applicants who already have completed the master's degree in an accredited school of social work and who give evidence of intellectual and other qualifications essential to successful doctoral study.

2. A two-year program of studies for the Master of Social Welfare degree in preparation for the professional practice of social work. Applicants must have completed the master's degree in social welfare, and prepares for the same careers. Applicants must evidence ability to successfully complete doctoral study and must have undergraduate preparation as outlined below.

Applications for admission to any of these programs should be submitted as early as possible beginning in September and no later than February 1, for admission in the following academic year. Admission to the School is contingent on admission to graduate standing; for details see the booklet Admission to Graduate Study.

The Department of Social Welfare administers an under-graduate group major in social welfare in the College of Letters and Science. For further information, consult the Announcement of the School of Social Welfare, available from the School Office, 120 Haviland Hall.

Undergraduate Group Major, L&S

The group major in social welfare, leading to the degree of Bachelor of Arts in the College of Letters and Science, offers a general education and prepares students for careers in liberal arts and public service work. It provides students with the opportunity to test their career interest in social work prior to pursuing graduate professional education and prepares them for community service positions beginning directly upon graduation with the bachelor's degree. Applications to the major are considered in Fall on a first-come/first-served basis. Number of units and prerequisite courses completed are considered for admission.
Major Requirements

Lower Division. Psychology 1, Sociology 1A, and Statistics 2. Recommended: Anthropology 3, Economics 1, Political Science 1.

Upper Division. Social Welfare 102A--102B (3-3), 103A--103B (2-2), 110A--110B (5-5); and a minimum of five courses chosen from the following list, with three of the courses taken in the same department and two selected from the other departments: Anthropology 1--140, 142, 144, 149, 150, 152; Economics 100A, 100B, 133, 134, 155; Political Science 102, 103, 181, 182, 183, 189; Psychology 130, 140, 150, 151, 160; Political Science 120, 135, 138, 154, Sociology 120, 130, 140, 142, 157, 160, 162, 163.

Honors Program. Eligible social welfare majors, upon recommendation of their advisers, may enroll in an honors program. A candidate for honors must complete an honors seminar in social welfare and social work problems (Social Welfare H195A--H195B--H195C). A senior essay is part of the work of the final quarter of the seminar. The essay will be on a topic of special interest to the student. It must meet criteria established to assure breadth and depth and will be produced with reference to a timetable for completion. Some time in the senior seminar is devoted to the planning and writing of the essay.

Upper Division Courses

102A--102B. Social Work as a Profession. (3-3) Three hours of lecture-discussion per week. Prerequisite: course 110A or 110B (may be taken concurrently); course 103A--103B must be taken concurrently. An introduction to the practice of social work: values and ethics; the social welfare professions; the use of behavioral and social science; and the relationship between them. (Sp)

103A--103B--103C. Field Practicum (2--2--2) Eight hours of field work per week. Prerequisite: course 102A--102B. Supervised field work in a community agency for at least two consecutive quarters, where primary focus is use of self in helping role. This course is designed to make use of specific content taught in course 102. (F, W, Sp)

110A--110B. The Social Services. (5--5) Three hours of lecture and one hour of discussion per week. Prerequisite: 110A to 110B. Social work as an institution. The background and development of the social services in relation to economic, political, and social change; analysis of the organization and delivery of social services in an industrial society. (F, W, Sp)

110C. Social Welfare Policies and Programs. Analysis of social welfare policies and programs including public assistance, social insurance, urban renewal, anti-poverty program, and emerging policies for income maintenance. (Mr. Gilbert, Sp)

111. Seminar in Social Policy. (6) Formerly 110C. Four and one-half hours per week. Prerequisite: course 110A--110B or consent of instructor. Examination of social welfare policies and programs. Readings and discussion of research papers on various aspects of social welfare policy. (W, Sp)

197. Field Study in Social Welfare. (1-8) Supervised experience related to specific aspects of social welfare in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. The Staff (F, W, Sp)

198. Group Study for Advanced Undergraduates. (1-6)

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

Graduate Courses

All graduate classroom courses in social welfare are open to qualified students from other departments, with consent of the instructor.

200--204B. Development of the Person. (2--2) One 1 1/2 hour session per week. Physical, psychological, and social development and adaptations of the person, as related to social welfare. Sequence beginning in the fall semester. (Sp)

201A--201B. Social Organization and Social Welfare. (2--2) One 1 1/2 hour session per week for 2 units: an additional 1 1/2 hours every other week for students electing the topic. Study of the structure and dynamics of communities, organizations, groups and families, as related to social welfare. Credit and grade will be assigned upon completion of the sequence. Sequence beginning (W). (W, Sp)

203B. Development of the Social Deviant. (2) One 1 1/2 hour session per week. Prerequisite: course 200A--200B or consent of instructor. Deviant behavior and welfare implications of minority status, educational and occupational incapacity, deviance, sexual deviance, and problems of the nonconforming minority members of society. (Sp)

210A--210B. Psychodynamics and Psychopathology. (2--2) One 1 1/2 hour session per week. Prerequisite: consent of instructor. A study of family and group dynamics of normal and psychopathological behavior. (Sp)

211. Seminars in Human Development and Pathology. (2) One 1 1/2 hour session per week. Prerequisite: course 200A--200B or consent of instructor. Deviant behavior and welfare implications of minority status, educational and occupational incapacity, deviance, sexual deviance, and problems of the nonconforming minority members of society. (Sp)

212. Seminars in Social Organization and Social Welfare. (2) One 1 1/2 hour session per week. Prerequisite: consent of instructor. Seminar topics to be selected annually. (Sp)

220A--220B. Social Policy and Social Welfare. (2--2) One 1 1/2 hour session per week. Prerequisite: 200A--200B or consent of instructor. Seminar topics to be selected annually. (Sp)

221. Law and Social Welfare. (2) One 1 1/2 hour session per week. Legal information for social workers with emphasis on family law. (Mr. Avetebuck, F, W, Sp)

222A--222B. Social Welfare Policy in Community Mental Health. (2--2) One 1 1/2 hour session per week. Prerequisite: graduate standing.

222A. Issues in Mental Health and Social Policy. Major factors influencing the provision of mental health services to individuals, families, groups and communities: implications of different help-oriented models for mental health intervention programs; reciprocal relationships between mental health policy and social work practice.

222B. Designing Solutions to Mental Health Problems. How mental health problems are defined; how optimum solutions to such problems are determined; new directions in the roles of community mental health social workers. (Mr. Segal, W)

230. Social Welfare Policies and Programs. (2) One 1 1/2 hour session per week. Prerequisite: graduate standing. Analysis of particular program areas such as child welfare, corrections, family welfare, health, medical care, mental health, mental retardation, religion, welfare, and social work, etc. (Topics) will be announced annually. (Sp)

231. Poverty as a Social Welfare Problem. (2) One 1 1/2 hour session per week. Prerequisite: graduate standing. The distribution and changing map of poverty in the United States; analysis of alternative ways to influence them by societal supports, and major issues and trends in the delivery of social services. (Mrs. O'Day (W), W, Sp)

239A--239B--239C. Seminars in Social Welfare Policy and Administration and Planning. Three hours and one consultation hour per week. Primarily for doctoral students. Sequence beginning (F). (239A--239B) Social work problems and their solutions; applications to social welfare; 239C, selected problems of social welfare policy. (W, F, Sp)

240A--240B--240C. Social Work Methods with Individuals and Groups. (3-3) Three hours of lecture and one hour of discussion per session. Basic principles of social work practice with individuals, families, and small groups. (Ms. Gambrill, Mrs. Oxley, Mrs. Pennekamp, F, W, Sp)

241A--241B--241C. Social Work Methods With Special Population Groups. (2--2--2) One 1 1/2 hour session per week. Advanced study of social work practice with individuals, groups, and communities of special population groups such as aged or minority groups. Sequence beginning (W). (241A) Social work practice with special population groups such as old age and old age dependency; (241B) Social work practice with special population groups such as children, youth, and families; (241C) Social work practice with special population groups such as the mentally retarded. (W, F, Sp)

244. Introduction to Community Planning and Organization. (2) Formerly 242A. One 1 1/2 hour session per week. An overview of the field, issues and modes of professional practice. (Mr. Gilchrist, Mr. Kramer, Mr. Specht, F, W)

245. Development of Social Service Programs. (3) Three hour session per week. Principles and methods of program design and proposal writing. (Mr. Kramer, Mr. Gilbert, Mr. Martin, F, W, Sp)

246. Processes of Community Planning and Organizing. (F, W)

248A--248B--248C. Theory and Practice of Social Work. (2--2--2) Two seminar hours per week. Prerequisite: admission to the predoctoral program or consent of instructor. Analysis of the historical, philosophical, and theoretical bases of social work practice with individuals, groups, organizations, and communities. (Mr. Miller, F, W, Sp)

250A. Advanced Social Casework, (2) One 1 1/2 hour session per week. Prerequisite: course 240A--240B or consent of instructor. Advanced casework practice; emphasis on supervision, role of the supervisor and learning, role of the supervisee. (F, W, Sp)

251. Specialized Methods of Social Work Practice. (2) One 1 1/2 hour session per week. Prerequisite: consent of instructor. A study of various specialized methods of social work practice, including corrections, family and child welfare, medical, psychiatric, public welfare, and school social work practice. (F, W, Sp)

252. Social Welfare Administration. (2) Formerly 254A. One 1 1/2 hour session per week. Theories of organizational behavior and the practice of administration. Special problems of human service agencies. (Mr. Miller, F, W, Sp)

253. The Management Cycle in Social Welfare Administration. (2) Formerly 254B. One 1 1/2 hour session per week. Methods used in program and field administration and their relationship to the management cycle. (W, F, Sp)

NOTE: For key to symbols, see page 36.
254. Efficiency in Social Welfare Administration. (2) One 1 1/2-hour session per week. A study of welfare programs and the problems they present, emphasizing the economic, political and social implications of such programs. Emphasis is given to evaluation of the cost and effectiveness of the programs. Prerequisite: consent of instructor. Mr. Leiby (Sp)

255. Community Planning Theories and Methods. The study of the processes and methods by which communities are planned. Topics include both theoretical and practical aspects of community planning. Prerequisite: consent of instructor. Ms. Weiss (F, W, Sp)

256A-256B. Media and Methods in Social Work. (2-2) One 1 1/2-hour session per week. A study of the use of mass media, especially radio and television, in social work practice, with an emphasis on the ethical, legal, and social implications of the use of media. Prerequisite: consent of instructor. Mr. Segal (Sp)

257. The Good Bureaucrat. (2) One 1 1/2-hour session per week. An examination of the functions of the bureaucratic system, with particular emphasis on the role of the individual in the bureaucratic environment. Prerequisite: consent of instructor. Mrs. Eulau (W)

258. Methods of Supervision in Social Work. (2) One 1 1/2-hour session per week. A study of the techniques and principles of supervision, with an emphasis on the interaction between supervisor and supervisee. Prerequisite: consent of instructor. Ms. Embree (F, W, Sp)

259A-259B-259C. Seminars in Social Work Theory, (3-3-3) Two seminar hours and one consultation hour per week. Primarily for doctoral students. Prerequisite: consent of instructor. Mrs. Eulau (W)

260. An Introduction to the Profession of Social Work. (2) One and 1/2 hours of lecture per week. A survey of the origins, values, activities, and structures of the profession of social work. The focus is on the profession of social work rather than the institution of social welfare. Prerequisite: consent of instructor. Mr. Miller (F)

261. Mental Health Consultation. (2) One 1 1/2-hour session per week. An introduction to the principles and techniques of mental health consultation, with an emphasis on the role of the consultant in various settings. Prerequisite: consent of instructor. Ms. Eulau (W)

262A-262B-262C. Social Welfare Research Theory and Practice. (2-2-2) At least one 1 1/2-hour session per week in lecture and/or laboratory. Primarily for M.S.W. students. A study of the methods and techniques of research in social welfare, with an emphasis on the role of the researcher in the application of research to social problems. Credit and grade will be assigned upon completion of the course in even-numbered semesters, and for the completion of each quarter in odd-numbered sections. The Staff (W, Sp)

268. Policy Analysis and Research in Social Welfare. (3) Two seminar hours per week. An introduction to social policy analysis and research, with a focus on the role of the social welfare professional in the development of social policy. Prerequisite: consent of instructor. Mr. Leiby (Sp)

288A-288B-288C-289D. Research Methods and Techniques in Social Welfare. (4-4-4-4) Two 1 1/2-hour sessions of lecture and one and a half hours of laboratory per week. 288A. two hours of lecture and three hours of discussion. Primarily for doctoral students. 288A. Introduction to probability theory, the logic of social research, and basic statistics. Mr. Boyd (F)

289A. Philosophies of Social Welfare. (3-3-3) Two seminar hours per week, depending upon units, and two 1/2-hour sessions of laboratory per week. Primarily for doctoral students. 289A. Study of the material relating to the origins, values, and ethical, legal, philosophical, artistic issues of social welfare. (3) Two seminar hours and Individual meetings with faculty. Primarily for doctoral students. Supervised practical experience in planning, observing, and writing reports on social problems.Attention to formal organization, style, selection of media of publication, and preparation of manuscripts. Graded on a Satisfactory/Unsatisfactory basis. Mr. Leiby (Sp)

289C. Values In social work practice, combining a review of the literature and enrolls about 100 students each quarter. It is located in its own small building at the center of the campus and has a lounge and library as well as classrooms and faculty offices. The College members teach together a course at the University. Part of the academic program is a weekly meeting of the entire College for discussion of matters of general intellectual interest, often involving presentations by guest speakers or by members of the College. Students take an active part in governing the College.

The academic work of the College is carried on through a series of small 10-unit seminars on topics in the humanities, social sciences, and natural sciences as they affect human and social questions. Focusing on topics of contemporary relevance approached from the point of disciplines and points of view, the seminars are often co-taught by instructors from different disciplines. Since the sessions are taken for 10 units (Strawberry students normally take, in addition, a single 5-unit course outside the College), there is time to explore a topic intensively and to receive maximum assistance from the faculty. The course work consists of wide-ranging reading, library research, individual and group reports, and class discussions. There is considerable writing, including a long research paper by each student.

Students may enroll for a single quarter or several quarters of Strawberry seminars, after which many move on to majors elsewhere in the University. Other students remain at the Strawberry major, an individualized progam of Strawberry and non-Strawberry courses plus a senior thesis, carried out with the advice of the Strawberry faculty. Strawberry courses usually fulfill the Reading and Composition and breadth requirements of the College of Letters and Science, but students should check before enrolling about which requirements a particular seminar may fulfill.

Those most likely to benefit from the College are students who want to learn to work independently in groups; who want to explore crucial issues of contemporary life; who like to work in a close-knit community; and who want to write, talk, and speak more clearly and effectively. In this sense the College prepares students for a variety of majors and for all the careers in which these things are important (for example, law, teaching, social work, politics, writing, administration, publishing, etc.).

A sampling of seminar topics in recent years includes the following: The Food Crisis; Contraception, Sexuality, and Population Control; Technology in a Democratic Society; A Critique of Mass-Mediated Culture; Cinema and Television; The Image of War; Modern American Society; A Critique of Mass-Mediated Culture; Cinema and Television; The Image of War; Culture and Personality; Utopias; Critical Perspectives on Art.

299. Individual Research for Graduate Students. (1-9) Designed to permit any qualified graduate student to pursue research in a subject of his own choosing under the direction of a faculty member. The Staff (W, F, Sp)

298. Group Study for Graduate Students. (1-9) Designed to permit any qualified graduate student to pursue research in a subject of his own choosing under the direction of a faculty member. The Staff (F, W, Sp)

297. Workshop in applied research and statistics with special reference to social welfare. Mr. Boyd (F)

296. Individual Study for Graduate Students. (1-9) Designed to permit any qualified graduate student to pursue research in a subject of his own choosing under the direction of a faculty member. The Staff (F, W, Sp)

288. Policy Analysis and Research in Social Welfare Program Design, particularly for graduate students, is a major field advisor. Intended to provide an opportunity for qualified specialized for the preparation of the students for the various examinations required for candidates for the D.W. May be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/un satisfactory basis. The Staff (F, W, Sp)

IDS 175. A Non-Hierarchical Introduction to Operations Research. A four-quarter sequence in Operations Research for students in the Interdisciplinary Advisory Program and Graduate Students. The Staff (F, W, Sp)


IDS 190A-190B-190C. Principles and Applications of Psychoanalysis. A three-quarter sequence in Psychoanalysis for students in the Interdisciplinary Advisory Program and Graduate Students. The Staff (F, W, Sp)

IDS 220. Ethical Perspectives on Health Issues: Bioethics. A three-quarter sequence in Bioethics for students in the Interdisciplinary Advisory Program and Graduate Students. The Staff (F, W, Sp)

Special Studies

College Seminars Program ("Strawberry Creek College")

College Seminar Program Office, Building T-9
Office (642-1640) and Library (642-1004): Room 100, Bldg. T-4

Administered by the Campus Energy and Resources Group, Professor C. Bart Mc Guire, Chairman; Professors: Mark N. Christensen, Ph.D.; Anthony C. Fisher, Ph.D.; John P. Holdren, Ph.D.

This campus-wide program offers graduate degrees in Energy and Resources, undergraduate and graduate interdisciplinary courses in the broad area of energy and related fields. The program is associated with energy and information about other energy-related courses, degree programs, and research activities throughout the Berkeley campus. The Energy and Resources Group, which consists of some fifty faculty members from many departments, three faculty members attached full-time to the Program, and representatives of the Lawrence Berkeley and Livermore Laboratories.

The degrees of M.S. and M.A. in Energy and Resources require 50 units of study, to include 28 units in a single energy-related discipline, 16 units in a complementary field, 10 units of interdisciplinary or synthesizing courses or ERG seminar, and a 6 unit research project. For details about the Ph.D. degree, consult the Energy and Resources Program office.

Upper Division Interdisciplinary Courses

100. Energy and Society. (4) Four hours of lecture per week. Energy sources, uses, and impacts: an introduction to the technology, politics, economics and environment of energy in contemporary society. Energy and well-being, energy in international perspective, origins and character of the energy crisis. Emphasis on the convergent role of energy and physical sciences. (Fall, Winter, Spring, (F, W, S))

151A–151B. The Politics of Energy and Environmental Policy. (3–3) Three hours of lecture per week. Prerequisite: Physics or SOC 50, or Physics 6C and Biology 150: consent of instructor. Transport and fate of persistent pollutants, processes governing sources and fate of petroleum in the oceans, impact of human activities on climate, measures of complexity and of stability in lightly exploited and intensely exploited ecological systems. (F, W, S)

Energy and Resources: Mr. Holdren (W)

Energy and Power: (Engineering 160). (4) Four hours of lecture per week. Prerequisite: upper division standing in Engineering or Letters and Science; Physics 5B: Mathematics 1A–1B. Sources, conversion, transmission, and requirements for energy in human society, conversion and use of energy power. Thermostatic principles. Fossil fuel, nuclear fission and fission, and hydroelectric power generation. Geothermal, tidal, and solar energy. Energy and Resources: Mr. Christensen

170. Energy Resources. (4) Three hours of lecture per week. Prerequisite: upper division standing in Engineering or Letters and Science, natural science, or engineering. Comparison of physical (mainly geologic), and economic approaches for energy resources. Considerations of various technologies, economics, and policies affect availability. Focus on energy resources (exhaustible and renewable) and environmental effects of conversion of energy to useful forms. (F, W, S)

Energy and Resources: Mr. Christensen

180. Economics of the Energy Supply Industries. (4) Three hours of lecture per week. Prerequisite: Ene 100 or equivalent; Econ 104A or equivalent. Subject matter: supply and demand; price determination, the economics, finance and industry structure of the oil, gas, coal, uranium, "alternative sources" and electric power industries. Cost and demand estimates. This source will be examined. Energy and Resources: Mr. Fisher

189. Directed Group Studies for Advanced Undergraduate Students. (1–4) Prerequisite: Upper division standing, plus specific courses to be specified by the instructor for each group. Group studies of selected topics. (Course topics varied)

American history and Institutions, the Group Major in Ethnic Studies includes a Breadth Requirement and a Major Requirement. In fulfilling these requirements, students will be expected to work closely with an academic advisor and select an area of emphasis. The areas of emphasis are defined as follows:

1. Social Sciences, comprising subject matter roughly corresponding to the organization of knowledge within the social sciences.

2. Humanities, comprising subject matter roughly corresponding to the organization of knowledge in courses offered in the Division of Humanities in the College of Letters and Science.

3. Community Service, comprising subject matter roughly corresponding to the organization of knowledge in courses offered in the Division of Humanities in the College of Letters and Science.

4. Special Area of Emphasis, which is to be worked out by the student with a committee of no fewer than three faculty members, and which may include a program of study crossing disciplinary boundaries.

Breadth Requirements

1. Demonstrated proficiency in reading and composition.

2. Demonstrated proficiency in alternate systems for the structure and conceptualization of knowledge, which may include at least one course in each of the following, or either B or C: (A) Demonstration of competence in writing in a language other than English; (B) Completion of two courses in such fields as mathematics, statistics, linguistics, computer science, logic; (C) Completion of two courses in such fields as aesthetics, art criticism, liberal arts, life history.

4. Satisfactory completion of six courses outside the student's declared Area of Emphasis.

Major Requirements

1. Completion of 20 units of common core courses totaling 6, 100–200 level courses: E.S. 21, Comparative Survey of Third World Experience; E.S. 120, Comparative Analysis of Racism in America: An Historical Perspective; E.S. 170: Selected issues in methodology for Third World Research.

5. Completion of two additional upper division courses in Ethnic Studies.

6. Completion of six additional upper division courses which form the basis of the declared Area of Emphasis.

Courses in Ethnic Studies

20. Introduction to Ethnic Studies. (5) Hours of lecture per week. Prerequisite: none. The University's relationship to corporate structures, legislative bodies, community people, and specifically Third World people will be analyzed. The University's values will be critically examined. The historical contexts of the University in this country, their development and struggles will be discussed. The University, its structure and conceptualization of knowledge, (F)

21. A Comparative Survey of Third World Experiences in the United States: An Introduction. (5) Three and one-half hours of lecture per week and one and one-half hours of discussion sections per week. Prerequisite: none. A comparative analysis of the political, social, economic, and cultural status of Third World people in the United States: An Introduction. (W)

100. Third World Literature. (5) Hours of lecture per week. Prerequisite: none. The purpose of this course is to explore through the literary works (poetry, novel, short story, oral tradition) the views that various Third World Authors present of different life styles, religion, philosophies, aspirations and oppression from the Third World. (W)

130. A Comparative Analysis of Racism in America: An Historical Perspective. (5) Three hours of lecture and one and one-half hours of discussion per

NOTE: For key to symbols, see page 36.
week. Prerequisite: none. Satisfies American history requirement. A comparative and historical analysis of the development of white racial attitudes toward Afro-Americans, Asian Americans, Mexican Americans and Native Americans to give students a better understanding of the recent experience as well as the meaning and nature of American cultures. Ronald Takaki (F)

131. A Comparative Analysis of Third World Responses to Racism in American and Other Societies. Four hours of lecture and one-half hours of seminar per week. Prerequisite: consent of instructor. A comparative and historical analysis of the third world “Third World” and its experience as an entity, Third World art and literature, and political ideologies. Ronald Takaki (W)

140. Colonialism and “Internal Colonialism”. (5) Formerly Asian American Studies 133. Four hours of lecture and one hour of discussion per week. Prerequisite: Ethnic Studies 21 or consent of the instructor. A critical survey of major writings dealing with the experiences of Third World people under colonialism, in comparison with the experience of minorities under white domination in the United States. Focus is on general theoretical writings of comparative applicability to several groups. Sucheng Chan (F)

141. Third World Politics. (5) Five hours of lecture per week. Prerequisite: Ethnic Studies 128 and approval of the Asian American Studies Program. An analysis of the role of political institutions at federal, state and local levels on Third World people. Understanding of political ideologies, values, and structures of political institutions. (Sp)

146. The Effects of Racism on Child Development. (5) Formerly Asian American Studies 146; Four hours of lecture per week. Prerequisite: consent of instructor. This course will explore the effects of racism on Third World children. Included will be an examination of both traditional and race and personality development. Also considered will be the indirect effects via institutional racism in schools and government agencies. E. Kim (Sp)

147. Third World Women. (5) Five hours of lecture per week. Prerequisite: none. An examination of the contributions of Third World women in various fields: literature, politics, history, philosophy, and economics. An analysis of the roles of Third World women within the family as an institution will also be made. Sucheng Chan (W)

149. Third World Perspective on Crime and Corruption in the United States. (5) Five hours of lecture per week. Prerequisite: Upper division standing and consent of instructor. Advarations in Third World Studies with topics to be announced at the beginning of each quarter. May be repeated for credit with topic change. (Sp)

150. Selected Issues in Methodology for Third World Research. (5) Four hours of seminar per week. Prerequisite: Ethnic Studies 20 or consent of the instructor. Seminar on selected issues in methodology pertinent to research in Third World communities, including a critical analysis of traditional research methods as well as topical racial cross-cultural studies. Topics may vary from quarter to quarter. May be repeated once for credit. E. Kim in charge (Sp)

157. Field Work in Third World Communities. (1-5) Individual conferences to be arranged. Prerequisite: upper division standing and consent of instructor. Supervised experiences relevant to specific aspects of Third World Communities in off-campus, field activities. Includes regular individual meetings with faculty sponsor and written reports required. The Staff (Chairperson in Charge) (F, W, Sp)

158. Supervised Group Study. (1-5) Individual conferences to be arranged. Prerequisite: upper division standing and consent of instructor. Group discussion, research and reporting on topic by students. The Staff (Chairperson in Charge) (F, W, Sp)

199. Supervised Independent Study and Research. (1-5) Individual conferences to be arranged. Prerequisites: upper division standing and consent of instructor. The individual student and consent of an instructor engages in research in an area of interest not covered in courses offered by Ethnic Studies. Must be taken Pass/Fail. The Staff (Chairperson in Charge) (F, W, Sp)

Asian American Studies Program

Program Office, 3407 Dwinelle Hall

Association Chair: Sucheng Chan

Program Director: Ronald Takaki, Ph.D.

Coordinator: Ling-chi Wang, M.A.

Assistant Professors: Elaine H. Kim, Ph.D.

Undergraduate Program

The Asian American Studies Program offers a unified and comprehensive undergraduate curriculum which seeks to make at least three major contributions. First, to introduce students to a wide range of knowledge and leadership in Asian American communities. To do this, the program draws heavily on the curricula of such schools as Education, Public Health, Law, and Sociology. The program itself offers courses that reflect the special needs of Asian American communities. Second, the program explores the hitherto neglected aspects of the cultural, political, and historical experience of Asians in America. In doing so, it provides the undergraduate with thorough instruction on the experiences of Asians in the United States, and prepares students for graduate work in their own and allied fields. Finally, the program provides an opportunity for third world people in America to include instruction which reflects the conditions of Asians and other Third World people living in America.

The Major

The student seeking to major in the Asian American Studies Program shall either have satisfied or be in the process of satisfying the following: (1) the University requirement in Research as the composition; (2) proficiency in an Asian American community language, such as Cantonese, Japanese, or Tagalog; and (3) Asian American Studies 20A. The major shall consist of not less than ten courses, normally 50 units, of which four or 20 units will be the following: 20A, 208, 140A-140B and Ethnic Studies 130. The remaining courses in the major shall constitute a concentration in community studies, the social sciences, or the humanities; all of these courses must be upper division and two of them must be outside of the Asian American Studies Program. For more detailed information about the Asian American Studies Program major, consult the Program advisor in the Program Office, 3407 Dwinelle Hall.

Lower Division Courses

6A. Basic Reading and Composition. (Formerly 6A) Four hours of lecture and 1 hour of discussion per week. A reading and composition course examining the selected literary, socio-political, and historical works related to the Asian American experience. Students will read, discuss and write about such topics as Asian American culture and values, racism, the form and function of communication. E. H. Kim in charge (F)

6B. Ethnic American Reading and Composition. (Formerly 6B) Four hours of lecture and 1 hour of discussion per week. Prerequisite: Completion of Subject A or its equivalent. A reading and composition course examining the literature of the Third World experience in America. Representative works from Asian, African, Chicano, and White literature will be examined not only for their literary significance, but also for their social, cultural, political, and psychological impact. E. H. Kim in charge (W)

6C. Third World Reading and Composition. (Formerly 3C) Four hours of lecture and 1 hour of discussion per week. Prerequisite: Completion of English 1A requirement. A reading and composition course examining the selected literary works from a Third World perspective. Topics will vary quarter to quarter. May be repeated once for credit. The Staff (Chairperson in Charge) (F, W, Sp)

20A. Introduction to the Asian American Experience. (3) Formerly 20A) Four hours of lecture and 1 hour of discussion per week. Prerequisite: English 1A requirement. Satisfies Asian History Requirement. Introduction to the study of the Asian American experience from 1848 to present. Topics include an analysis of the Asian American perspective, cultural roots, immigration, settlement patterns, labor, economic development, family life, and social history. 20B: Community. Introduction to Asian American communities covering the evolution of social, economic and political institutions of Asian American communities and their relationship to the larger American society. Course employs race and class analysis.

20A (F, W, Sp), 20B (W)

Upper Division Courses

120. Comparative History of Asian Experience in America. (3) Three hours of lecture and two hours of discussion per week. Satisfies Asian History requirement. Prerequisite: AsAmSt 20A. A comparative analysis of the similarities and dissimilarities of the Asian experience in America foreign and domestic, on the Chinese individual and community; common Asian experiences in areas such as immigration, labor, economic development, race relations, community institutions and development, and occupational patterns will be analyzed and compared. Sucheng Chan (W)

121A-121B. Chinese American History. (6-9) Three hours of lecture and two hours of discussion per week. Each course satisfies Asian History requirement. Prerequisite: AsAmSt 20A. A two-quarter sequence covering Chinese American history, 1848 to present. Topics include influence of traditional values, economic, and Western migration, patterns of immigration and settlement, labor history; labor history, Chinese American social history; Chinese American communities, the Chinese American experience. E. Kim in charge (Sp)

122. Japanese American History. (5) Three hours of lecture and two hours of discussion per week. Satisfies Asian History requirement. Prerequisite: AsAmSt 20A. A two-quarter sequence covering Japanese American history, 1848 to present. Topics include influence of traditional values, Eastern and Western migration, patterns of immigration and settlement, labor history; labor history, Chinese American social history; Chinese American communities, the Chinese American experience. Sucheng Chan (W)

123. Korean American History. (5) Three hours of lecture and two hours of discussion per week. Satisfies Asian History requirement. Prerequisite: AsAmSt 20A. A two-quarter sequence covering Korean American history, 1848 to present. Topics include influence of traditional values, economic, and Western migration, patterns of immigration and settlement, labor history; labor history, Chinese American social history; Chinese American communities, the Chinese American experience. Sucheng Chan (W)

124. Latin American History. (5) Three hours of lecture and two hours of discussion per week. Satisfies Asian History requirement. Prerequisite: AsAmSt 20A. A two-quarter sequence covering Latin American History, 1848 to present. Topics include influence of traditional values, economic, and Western migration, patterns of immigration and settlement, labor history; labor history, Chinese American social history; Chinese American communities, the Chinese American experience. Sucheng Chan (W)
SPECIAL STUDIES: Ethnic Studies (Chicano) / 249

14A-14B. Pilipino American History, 1898-Pre
eress. Three hours of lecture and two hours of
discussion per week. Prerequisite: AsAmSt 20A or
equivalent. Topics include: consequences of the Span-
lish-American War on Pilipino emigration; condition
in Hawaii and California and the need for Pilipino labor;
community development; changing relations between
the Pilipino and American and foreign powers; the
mvement and World War II on Pilipino Americans; and
temporary issues. (W, Sp)

140A-140B. Analysis and Research in the Asian
American Community: (5-5) Formerly 131 and 137.
140A: four and one-half hours of lecture per week.
140B: three hours of lecture and two hours of discus-
soon per week. Prerequisite: AsAmSt 20A-20B.
40A. Asian American communities in their rela-
tionship to the development of American society and
contemporary world history. (W)
140B: approaches to research in the Asian community,
with emphasis on the San Francisco Bay Area. Pro-
lems of research design, measurement, and data col-
cction, processing and analysis, will be considered.

145. Social Institutions in the Asian American
Communities. (5) Three hours of lecture and two
hours of discussion per week. Prerequisite: AsAmSt
20A-20B or equivalent. An analysis of the insti-
tutions of education, health, law, social welfare, and
other social institutions and their impact on Asian
American communities. Prerequisites will have to oc-
tunity to focus on particular institutions in discussion
sections. (Sp)

146. Selected Topics and Issues in the Asian
American Community: (5) Three hours of lecture and
tone hour of discussion per week. 
146A. Law. (4) Prerequisite: AsAmSt 145. This course
will examine the nature, structure and operation of se-
lected institutions as they affect Asian American
Communities. Prerequisites will have to occun-
tunity to focus on particular issues in discussion sec-
tions. (F, W)

146B. Mental Health. (4) Prerequisite: AsAmSt 145.
This course is designed to acquaint the students with
the basic understanding of the concepts relevant to the
mental health professionals with particular empha-
soon on the service delivery aspect. It attempts to
orrect the traditional deficiencies in the academic cur-
riculum in the area of the ethnical and sociological
complexity of the Asian American communities in the
area. (F)

146C. Housing. (4) Prerequisite: AsAmSt 145. This
course focuses on the role and overall performance of
housing-related institutions in minority communities by
studying their formal/informal structures and by expli-
citing some of the unspoken assumptions that perme-
ate their policies and programs. Primary emphasis will
be placed on analyzing how HUD housing and urban re-
development policies have come to bear on Bay Area Asian
community projects. (Sp)

146D. Health Care. (4) Prerequisite: AsAmSt 145.
In this course we will analyze problems within Asian ghet-
tos. Students will have the opportunity to be in upper di-
livery, profits and power), and the inter-relationships
between those within the framework of American soci-
ety. With this analysis we will study trends for the future
within the health care system and their impact on work-
ing-class and poor people. (F)

146E. Selected Topics and Issues in the Asian Ameri-
can Community: Art and Culture. (4) Three hours of
lecture and one hour of discussion per week. Analysis
of the development of Asian American visual, theater
and literary art forms as they have been affected by Asian
American history, social conditions, family struc-
ture, and the role of art in culture, art education, and the
 elicitation of contemporary community perspectives. 

146F. Media. (4) Prerequisite: AsAmSt 145. Study of
impact of mass media in Asian American cultural;
economic structure, programming contents and com-
unity relations of Bay Area television and radio sta-
tions, newspapers, magazines and periodicals. New
and regulations of the Federal Communication Commission
will be introduced, and to promote community ac-
cess and media. (Sp)

146G. Selected Topics and Issues in the Asian Ameri-
can Community: Labor and Employment. (4) This
course will introduce the student to the historical realties
of labor and examine some of the different strategies for
approaching the problems of employ-
ment, unemployment, exploitation, affirmative ac-
nation, etc. (F)

146R. Religious Institutions. (4) Prerequisite: AsAmSt
145. Historical and social roles of religious institutions
in Asian American communities; overview of Asian
American and American religious history; methodologi-
approaches; response of Asians and social issues,
(5-5). Three hours of lecture and one hour of dis-

cussion per week. Prerequisite: AsAmSt 20A or

equivalent. Topics include: consequences of the Span-
lish-American War on Pilipino emigration; condition
in Hawaii and California and the need for Pilipino labor;
community development; changing relations between
the Pilipino and American and foreign powers; the
mvement and World War II on Pilipino Americans; and
temporary issues. (W, Sp)

140A-140B. Analysis and Research in the Asian
American Community: (5-5) Formerly 131 and 137.
140A: four and one-half hours of lecture per week.
140B: three hours of lecture and two hours of discus-
soon per week. Prerequisite: AsAmSt 20A-20B.
40A. Asian American communities in their rela-
tionship to the development of American society and
contemporary world history. (W)
140B: approaches to research in the Asian community,
with emphasis on the San Francisco Bay Area. Pro-
lems of research design, measurement, and data col-
cction, processing and analysis, will be considered.

145. Social Institutions in the Asian American
Communities. (5) Three hours of lecture and two
hours of discussion per week. Prerequisite: AsAmSt
20A-20B or equivalent. An analysis of the insti-
tutions of education, health, law, social welfare, and
other social institutions and their impact on Asian
American communities. Prerequisites will have to oc-
tunity to focus on particular institutions in discussion
sections. (Sp)

146. Selected Topics and Issues in the Asian
American Community: (5) Three hours of lecture and
tone hour of discussion per week. 
146A. Law. (4) Prerequisite: AsAmSt 145. This course
will examine the nature, structure and operation of se-
lected institutions as they affect Asian American
Communities. Prerequisites will have to occun-
tunity to focus on particular issues in discussion sec-
tions. (F, W)

146B. Mental Health. (4) Prerequisite: AsAmSt 145.
This course is designed to acquaint the students with
the basic understanding of the concepts relevant to the
mental health professionals with particular empha-
soon on the service delivery aspect. It attempts to
orrect the traditional deficiencies in the academic cur-
riculum in the area of the ethnical and sociological
complexity of the Asian American communities in the
area. (F)

146C. Housing. (4) Prerequisite: AsAmSt 145. This
course focuses on the role and overall performance of
housing-related institutions in minority communities by
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citing some of the unspoken assumptions that perme-
ate their policies and programs. Primary emphasis will
be placed on analyzing how HUD housing and urban re-
development policies have come to bear on Bay Area Asian
community projects. (Sp)

146D. Health Care. (4) Prerequisite: AsAmSt 145.
In this course we will analyze problems within Asian ghet-
tos. Students will have the opportunity to be in upper di-
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between those within the framework of American soci-
ety. With this analysis we will study trends for the future
within the health care system and their impact on work-
ing-class and poor people. (F)

146E. Selected Topics and Issues in the Asian Ameri-
can Community: Art and Culture. (4) Three hours of
lecture and one hour of discussion per week. Analysis
of the development of Asian American visual, theater
and literary art forms as they have been affected by Asian
American history, social conditions, family struc-
ture, and the role of art in culture, art education, and the
 elicitation of contemporary community perspectives. 

146F. Media. (4) Prerequisite: AsAmSt 145. Study of
impact of mass media in Asian American cultural;
economic structure, programming contents and com-
unity relations of Bay Area television and radio sta-
tions, newspapers, magazines and periodicals. New
and regulations of the Federal Communication Commission
will be introduced, and to promote community ac-
cess and media. (Sp)

146G. Selected Topics and Issues in the Asian Ameri-
can Community: Labor and Employment. (4) This
course will introduce the student to the historical realties
of labor and examine some of the different strategies for
approaching the problems of employ-
ment, unemployment, exploitation, affirmative ac-
nation, etc. (F)

146R. Religious Institutions. (4) Prerequisite: AsAmSt
145. Historical and social roles of religious institutions
in Asian American communities; overview of Asian
American and American religious history; methodologi-
1A. English Reading and Composition for Native Speakers of Spanish. (5) Five hours of lecture per week. Prerequisite: Subject A and consent of instructor. To acquaint Chicano and bilingual students with methods of expository discourse. An introduction to writing, based on the analysis of models of paragraphs, with an emphasis on unity, coherence, and over-all organization of a full composition. (W)

1B. English Reading and Composition for Native Speakers of Spanish. (5) Five hours of lecture per week. Prerequisite: Subject A and consent of instructor. Designed to acquaint bilingual students with the study of the research paper form of expository discourse. Study includes methods for assembling, organizing, and incorporating materials into a unified composition of a particular subject within the Chicano experience. (W)

20. Introduction to Chicano Culture, (5) Four hours of lecture and one hour of discussion per week. A multidisciplinary approach to the Chicano experience as it is reflected in the arts and media. (Sp)

40. Introduction to Chicano Literature in English. (5) Four hours of lecture and one hour of discussion per week. This course will introduce students to modern Chicano literature written in English, and will provide necessary background for understanding more specialized courses in the area. (Sp)

50. Introduction to Chicano History, (5) Four hours of lecture and one hour of discussion per week. A general overview of the Chicano historical experience in the United States. Topics include origins of Chicano culture, labor conflict, immigration patterns, and impact of Mexican cultural values on Chicano social and political institutions. (F)

70. Chicanos In American Society, (5) Four hours of lecture and one hour of discussion per week. To encourage a critical approach to the study of the effects of U.S. institutions on the Chicano life. To explore the relationship between social and political institutions and the nature of social inequality. (F)

101A. Models for Research in Chicano Studies. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: English 10 or equivalent. The course will examine various theoretical and methodological issues presently existing in Chicano Studies research. The student will be introduced to the major theoretical approaches that have been used in social science research on the Chicano experience. (F)

101B. Research In the Chicano Community, (5) Three hours of lecture and two hours of discussion per week. Prerequisite: CS 101A or equivalent. A sequence to CS 10A concentrating on an analysis of the various applied qualitative and quantitative research methods used in studying the Chicano community. Topics include: research problem design, data collection (e.g., use of census data, demographic data, etc.); measurement, processing, and analysis, and various field methods (e.g., participant observation, oral history, survey questionnaires, etc.). Discussion will also include the social and ethical implications of Chicano community research. (W)

130. Introduction to Chicano Art, (5) Three hours of lecture and three hours discussion per week. Prerequisite: Course 20 or equivalent. The course will focus on the history and development of the Chicano creative experience. To be offered 1979/80 only. (F)

131. Chicano Images In Art: the Chicano Poster. (4) Four hours of lecture per week. Prerequisite: Chicano Studies 130 or consent of Instructor. To introduce the student to Chicano images and styles in poster art; to review and analyze the political movements of the Chicano poster art of the 60's; and explore future directions in Chicano poster art. (W)

132. Mural Art In the Chicano Community. (4) Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 130 or Consent of Instructor, To give students an historical perspective of the Mexican mural Renaissance in Mexico from the 1920's to the present mural art in the Chicano Community. (Sp)

135. The Chicano Popular Cultural Expressions. (5) Four hours lecture and one hour discussion per week. Prerequisite: Consent of instructor. An ethnographic course designed to study the understanding and appreciation of the multi-faceted cultural expressions in literature, music, drama, and the visual arts of the Chicano. (W)

136. The Chicanos and Thier Music. (5) Four hours lecture and one hour discussion per week. Prerequisite: Consent of instructor. Study of the historical, economics, sociology, politics, folklore, and thought of Mexican-Americans as manifested in their music. The course will survey Mexican and Chicano music from pre-conquest times to the present, with emphasis on the historical ballad, "The Corrido." (W)

141B. Chicano Poetry. (5) Four hours of lecture and one hour discussion per week. Prerequisite: Consent of instructor. An exploration of the reading and composition requirement, course 20 or equivalent. Review and analysis of the history and development of poetry. Particular emphasis on Movement Poetry and its relationship to Third World consciousness. (W)

141C. Chicano Short Story, (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Consent of instructor. An exploration of the reading and composition requirement, course 20 or equivalent. An exploration and analysis of works by Chicana writers and the vision they present of themselves. (W)

142. Major Chicano Authors. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 40, and a reading knowledge of Spanish. The course will examine: (1) major prose works of a selection of prominent writers, (2) their biographies to better understand their work, (3) critical commentary which their work has elicited, and (4) practice a socio-historical approach. The course is offered in Spanish. (W)

143. Chicano and Latin American Literature. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Course 20, or 50, or equivalent. A study of the relationships and parallels between Latin American and Chicano literature; emphasis on the literature of protest as a constant underlying current from the Conquest to the present. (W)

149. Creative Writing, (5) Three hours of lecture and three hours discussion per week. Prerequisite: Consent of instructor. The course is offered in English, a reading knowledge of Spanish is required. This is an intensive craft in Chicano literature, issues and problems encountered by Chicano writers and the role of the Chicano artist in society. The student will be practicing in the genre of the student's choice. (Sp)

150A. History of the Southwest: Spanish and Mexican Period, (5) Three hours of lecture and one hour discussion per week. Prerequisite: Chicano Studies 50 or equivalent. Focus of the course is on the impact of the Spanish colonization of Mexico and its territories, the impact of the colonization on indigenous cultures and on the shaping of Chicano culture. The course will also examine the role played by Chicanos in the development of the Southwest. (W)

156B. History of the Southwest: Mexican and United States War to Present, (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 70 or equivalent. Focus of the course is on the Mexican-United States War that begins with Mexican-United States War of 1846 and on U.S. expansionism and its impact on Chicanos and the development of the Southwest. (W)

152, Chicano Labor History, (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 50 or consent of instructor. A detailed survey of two topics: the impact of the Chicano labor force, both rural and urban, and the participation of Chicanos in labor organizations, such as union campaigns. This period covers from the nineteenth century to the present. (W)

160A. Political Economy of La Raza, (5) Four hours of lecture and one hour of discussion per week. Prerequisite: consent of instructor. A study of the political economy of the Chicano from pre-conquest times to the present. Topics include: the impact of the colonization on Indigenous cultures and Chicanos; the social and ethical implications of Chicano community research. (F)

160B. The Political Economy of the Southwest, (5) Four hours of lecture and one hour of discussion per week. Prerequisite: CS 70 or equivalent. Examination of process of incorporation of the Southwest into the 19th century American economy; the development of the area; segmentation of rural and urban labor force; analysis of historical use of Chicano labor in agriculture, mining, and railroad construction. (W)

170, Institutional Racism in the Chicano Community, (5) Four hours of lecture and one hour of discussion per week. Examination of the sociopolitical and institutional structures and processes that produce discrimination against Chicanos. The focus will be on economic institutions such as banks and the labor market and political institutions (the state, political parties), and their interaction. The relationship between institutions and discrimination will also be examined. (W)

171A. Chicano Political Organization, (5) Four hours of lecture and one hour of discussion per week. Prerequisite: course 70. Introduction to political development of Chicanos in the United States; analysis of contemporary Chicano political movements and ideologues. The political organization of Chicano movement to other social movements in the United States and abroad. (F)

172A. Chicanos and the Educational System, (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 70. This course will provide an historical and contemporary analysis of the U.S. educational system and its relation to the Chicano community. The course will examine and evaluate the various theoretical perspectives on education and how they have been translated into institutional practices. Race, class and culture will be the dominant themes in analyzing the Chicano educational experience. The course will conclude with a review of educational reform and an exploration of alternative educational institutions. (W)

173. The Chicano Family, Sex Roles, and Children, (6) Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 20. Course topics include changing family structure and the role of the Chicano woman and men within the family. The role of the Chicano family in the larger society and the relationship of the Family to other social institutions. (F)

174A. Chicanos, Law and Criminal Justice, (5) Four hours of lecture and one hour of discussion per week. Prerequisite: CS 50, or consent of instructor. An examination of the development and function of law, the organization of the American criminal justice system, and its effects on the Chicano community; response to these institutions by Chicanos. Mr. Trujillo (F)

174B. Chicanos and Correctional Institutions, (5) Four hours of lecture and one hour of discussion per week. Prerequisite: course 174A and course 70 or equivalent. Analysis of the organization and function of
correctional institutions in society; theories of criminal behavior and Chicano criminality; rehabilitative and treatment models; socio-psychological and cultural implications of Chicano incarceration in race and gender-oriented prison groups; and alternatives to formal correctional facilities. Mr. Trujillo (W)

175. La Chicana. (5) Formerly 399. Five hours of lecture per week. Prerequisite: upper division standing or consent of instructor. Expository composition directed to the needs of Native American students. (W)

176. Chicano and Mental Health. (5) Five hours of lecture per week. Prerequisite: C.S. 70 or consent of instructor. Mental health issues as they relate to the Chicano Studies with topics to be placed in the context of examination and understanding of the concept of mental health as defined by Chicanos. (Sp)

178. Chicano and Health Care. (5) Replaces Chicano Literature with topics to be announced at the beginning of each quarter. May be repeated for credit. Possible topics are history of land grants in the Southwest, drugs and the Chicano, and the Chicano movement. Staff (F, W, Sp)

179. Public Policy and the Chicano Community. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 70. The course will cover the growing complexities of contemporary social and public policy issues in the Chicano community. Areas to be examined include immigration; race relations, unemployment, education. We will explore these issues through existing policy models and alternative approaches in policy research. This alternative approach places policy issues in a societal or systemic context, and makes explicit the links to the logic of recent developments in the political economy and its impact on policy. (Sp)

190. Advanced Seminar in Chicano Studies. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: consent of instructor or ES 130 or CS 170; upper division standing. Advanced seminar in Chicano Studies with topics to be announced at the beginning of each quarter. May be repeated for credit. Possible topics are history of land grants in the Southwest, drugs and the Chicano, and the Chicano movement. Staff (F, W, Sp)

197. Field Work in Chicano Studies. (1-5) Meetings to be arranged. Prerequisite: upper division standing and consent of instructor. Supervised independent field experience in the community relevant to specific aspects of Chicano Studies. Regular meetings with faculty sponsor and written reports required. Staff (F, W, Sp)

198. Directed Group Study. (1-5) Meetings to be arranged. Prerequisites: upper division standing and consent of instructor. Supervised independent group study of an advanced level for farmers. Regular meetings with faculty sponsor and written reports to be arranged. Mr. Trujillo (W, Sc)

199. Supervised Independent Study and Research. (1-5) Meetings to be arranged. Prerequisite: upper division standing and consent of instructor. Supervised independent study or research in Chicano Studies for advanced students. Regular meetings with faculty sponsor and written reports required. Offered on a pass/fail/not passed basis only. Staff (F, W, Sp)

Native American Studies Program

Program Office, 3415 Dwinelle Hall

Associate Professor: Clara Sue Kidwell (Chippewa-Chippewa), Ph.D.
Assistant Professor: Marie Hennod (Cherokee), Terry Wilson (Potawatomi), Ph.D.

The Native American Studies Program exists to provide a point of academic focus and identity for Native American students and to broaden the understanding of other students and the public about the historical, cultural, and contemporary situations of Native Americans.

The curriculum has been structured to provide courses that deal with both historical and cultural analysis of Native American cultures and contemporary legal and social institutions that affect Native American life. The Program stresses not only sound academic preparation in the classroom but also allows students the flexibility to take part in community-oriented education through field work or studies directed toward community situations and problems.

The Major

The major program in Native American Studies leads to a B.A. degree. Admission to the program requires prior successful completion of Native American Studies 50 and an interview with the Academic Adviser who will help work out an appropriate program of study (all study plans must be approved by the Academic Adviser). The interview should be held no later than the first quarter of the junior year. Students will be required to outline their academic and professional goals.

Admission to the major program requires successful completion of NAS 10 and written approval from a major professor who will assist in working out an appropriate program of study. Faculty members in Native American Studies will serve as academic advisors. Because of the cross-disciplinary nature of the program and its specialized emphasis on Native American cultures and their historical and contemporary context, the faculty, who share a point of academic focus and identity for Native American students, should undertake a certain role in advising majors. Hence students will be expected to make choices in the courses for the major, the faculty will give guidance in making those choices.

Consultation with the advisor for admission into the major should be held no later than the first quarter of the junior year. The major requirements outline what is expected of the student so that they will be better prepared for academic and professional goals and will be assisted in choosing an appropriate Area of Emphasis, History and Culture, Law, Government and Community Development, and Social Institutions.

The Degree Program. The degree of Bachelor of Arts in Native American Studies will be granted on completion of the following requirements.

1. University Requirements: (A) 180 units, at least 40 of which must be in upper division courses; (B) Maintenance of a C average in all courses undertaken at the University and in all courses in the major program; (C) Completion of general University requirements as to senior residence, Subject A, and American History and Institutions.

2. Department Requirements: (A) Satisfactory completion of a minimum of 34 units, at least 9 of which must be in Native American Studies and outside Ethnic Studies—These 9 units may not be used to satisfy either the Breadth Requirements or the Area of Emphasis requirement; (B) Breadth Requirements: At least 12 of the following: 1. At least 6 units in English language, to be demonstrated by satisfactory completion of NAS 1A, 1B, Native American Studies Reading and Composition or substitution of a general recognized language course; 2. Upper Division Requirement: E.S. 20 or 21; (C) Satisfactory completion of four courses (minimum 12 units); outside area of emphasis, at least two courses of which 8 units must be outside Native American Studies and outside Ethnic Studies, including a minimum of one course chosen from the Natural Sciences (these units may not be used to satisfy the departmental requirement 2A); (C) Satisfactory completion of the major program.

3. Major Requirements: (A) Lower Division Requirements: (1) Satisfactory completion of NAS 71A, 71B, History of Native Americans in North America (5, 5); (2) Satisfactory completion of NAS 50, Native Americans in Contemporary Society (5); (B) Upper Division Requirements: (1) Completion of NAS 103, Native American Sovereignty (5); (2) Completion of an additional 25 units in Native American Studies (at least 20 of which must be taken at the University of California); 3. Satisfactory completion from an Area of Emphasis—the Areas of Emphasis are: History and Culture; Law, Government and Community Development; and Social Institutions, a. History and Culture: NAS 175, Native American Literature and Film (5), NAS 184A, 184B, 184C, Native American Studio Arts (3, 3, 3); b. Law, Government and Community Development: NAS 101, Survey of Native American Tribal Government and Policy (5), NAS 102, Native American Community Development (5), NAS 110, The Native Americans and the Reservation (5), NAS 113, The Native Americans in Urban America (6), Social Institutions: NAS 20, Native American Education (5), NAS 110B, Research in Native American Communities (5), NAS 112, Contemporary Native American Education (5), NAS 123, Innovation to Native American Education Case Studies (5), NAS 124, American Indians and the U.S. Public Health Service (5); (C) Completion of at least 15 units of upper division courses supportive of the Area of Emphasis. At least one of these courses must be selected from Outside Ethnic Studies Group Major course (5). At least two of the courses supportive of the Area of Emphasis (minimum 10 units) must be from outside Native American Studies and the Department of Ethnic Studies. A list of courses that satisfy this requirement will be available from the major adviser.

The Honors Program. A student must have junior standing; a 3.3 GPA overall; a 3.3 GPA in the major. To complete the degree with honors the student will be required to undertake a one unit research project or community project (depending upon Area of Emphasis) that will be specified as an honors project and will be graded according to standards determined by the faculty. The Honors Program is subject to approval by the faculty; three faculty members will establish criteria and grade the project.

The Minor Program. For students in other areas of the University who wish to develop a special proficiency in the area of Native American Studies in combination with their major area of concentration, Native American Studies will recognize a series of courses to constitute a minor in Native American Studies. The minor program will consist of the following courses: NAS 71A, 71B, NAS 50, NAS 103, and one upper division course appropriate to the student's major field of study.

Courses and Seminars. Courses and seminars are listed below. Instructor listings, quarter offerings, and schedule changes are available in 3415 Dwinelle Hall.

Letters and Science List: For regulations governing this list, see the Announcement of the College of Letters and Science.

Lower Division Courses

1A. Native American Studies Reading and Composition. Four and one-half hours of lecture per week. Prerequisite: satisfaction of Subject A requirement. Expository composition directed to the needs of Native American students. Staff (F, W)

1B. Native American Studies Reading and Composition. Four and one-half hours of lecture per week. Prerequisite: satisfaction of Subject A requirement course 1A or equivalent. Continued emphasis on the development of proficiency in expository composition with an increased attention being given to Native American literature. Staff (W)

1C. Ideology of Native American Studies. Two hours of seminar per week. Prerequisite: consent of instructor. A theoretical and philosophical course in course the meaning and content of the existence of Native American Studies within a university structure. This course is especially designed for prospective majors and must be taken on a pass/fail/not passed basis only. Staff (F)

20. Native American Education. (6) Formerly 85. Four and one-half hour of lecture per week. Prerequisite: lower division standing or consent of instructor. A study of the historical development of American Indian Education and proposed solutions to selected problems. Satisfies American Institutions requirement. An analysis of political issues and problems of Native American education is the key. Course topics to be discussed: the Bureau of Indian Affairs, the United States Public Health Service, the reservation system, the reservation system, discrimination, urban life, Indian

NOTE: For key to symbols, see page 36.
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organizations, stereotypes, the "New Indian." (F, W, Sp)

71A. History of Native Americans in North America. (5) Formerly 171. Four and one-half hours of lecture per week. Prerequisite: course 71A or consent of instructor. An introduction to the various Indian nations, and the historical phases from the colonial period to the development of the Reservation system and an analysis of discussion per week. Satisfies American History requirement. (F, W, Sp)

71B. History of Native Americans in North America. (5) Formerly 171. Four and one-half hours of lecture per week. Satisfies American History requirement.

- Prerequisite: course 71A or consent of instructor. This course will deal with the political, cultural, legal, and military relationships between the various American Indian tribes and the United States Government from 1776 to the present. (W)

Upper Division Courses

100. Introduction to Federal Indian Law. (5) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: course 101 or consent of instructor. An analysis of the development of tribal government and policy through examination of various American Indian nations. Topics to be considered will include an analysis of political institutions, the tribal society, intertribal alliances, and the effect of the European contact on tribal policies. (W)

102. Native American Community Development. (5) Formerly 111. Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: course 101 or consent of instructor. Investigation and analysis of the relationship between Native American and non-Indians in contemporary society with special emphasis on existing programs. Problems originating from these programs and possible solutions. (W)

103. Native American Sovereignty. (5) Formerly 130. Three hours of lecture and one and one-half hours of discussion per week. Satisfies American History requirement. Prerequisite: course 101A or B or consent of instructor. An analysis of the development of federal Indian policy and the political changes in various American Indian nations. Topics to be included will be the relationship to the non-Indians as a product of the history of Anglo-American economic, political, and social development. The course will examine property rights, political choices, and cultural integrity through theoretical and practical phases from the colonial period to the present. (Sp)

104A. Introduction to Research Problems of Native American Communities. (5) Formerly 110. Three hours of lecture and one and one-half hours of field work per week. Prerequisite: course 71A or consent of instructor. This course is designed to establish familiarity with the methods and logic of scientific inquiry through development of a research proposal on a given topic. Emphasis would be placed on problem solving and underlying assumptions in research. (W)

105B. Introduction to Research Problems of Native American Communities. (5) Formerly 110. Four and one-half hours of lecture per week. Prerequisite: course 71A or consent of instructor. This course is designed to emphasize defining topic or thesis in research; alternative approaches to the acquisition of knowledge. (Sp)

141. The Native American and the Reservation. (5) Four and one-half hours of seminar per week. Prerequisite: consent of instructor. A study of the historical development of the Reservation system and an analysis of what it means to be a "Reservation Indian" in modern America. (W)

142. The Native American In Urban America. (5) Four and one-half hours of seminar per week. Prerequisite: consent of instructor. A study of the historical development of Native American communities within urban areas and the process by which they have come to mean being an "Indian" in modern America. The course will explore the theoretical problems that urbanization and acculturative pressures, social, economic, educational, political, and cultural changes have had on the Native American artist. (Sp)

151. Native American Philosophy. (5) Four hours of lecture per week. Prerequisite: course 71A or consent of instructor; not open to students who have received credit for course 155 prior to Fall 1974. A study of the philosophical, ethical, and political thought of Native American world views, with emphasis on systems of knowledge, explanation of natural phenomena, and relations of human behavior to nature through ritual and ceremonial observances. (W)

152. Native American Literature. (5) Four hours of lecture per week. Prerequisite: although not required, course 151 is desirable. An analysis of the written and oral tradition of Native American literature. Emphasis will be placed on a multifaceted approach (aesthetic, linguistic, psychological, historical, and cultural) in examining American Indian literature. (W)

155. Medical Theories and Practices of Native American Cultures. (5) Four hours of lecture per week. Prerequisite: although not required, course 151 is recommended. Five hours of lecture per week. Prerequisite: course 71A or consent of instructor. An analysis of the theories of disease causation among Native American people and the medical practices that derive from those theories; precontact conditions will be compared to postcontact conditions. Herbal remedies will be discussed in the context of curing practices. Ms. Kidwell (W)

158. Native Americans and the Cinema. (5) Four hours of lecture per week. Prerequisite: course 50 or consent of instructor. An analysis of the cinema in the social, psychological, and literary aspects of Hollywood moviemakers' stereotyping of the American Indian through the years. The course will include representative Indian films, lectures, and guest speakers from the movie industry. (W)

159. Native American Women. (5) Four hours of lecture per week. Prerequisite: consent of instructor. An overview of the role of women in traditional Indian societies and in the modern world. Changes in Indian women's roles in contact with Europeans and how these changes have altered sex role definitions will be examined. (Sp)

163. Seminar in Child Development in Native American Communities. (5) Four hours of seminar per week. Prerequisite: course 71A or consent of instructor. Focuses on the psychological growth and development of children in Native American communities by investigating traditional childrearing patterns and the relationships of children and families and tribes, analysis of the effects of Western society on these developmental patterns. (W)

175. History of Native Americans in California. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: course 71A-71B or consent of instructor. A study of the Native American community. (Sp)

176. History in Child Development in Native American Communities. (5) Four hours of seminar per week. Prerequisite: course 71A or consent of instructor. This course is designed to be a seminar with the logic of scientific inquiry through development of a research proposal on a given topic. Emphasis would be placed on problem solving and underlying assumptions in research. (Sp)

190B. Mythic Tribal Literature. (5) Three and one-half hours of seminar per week. Prerequisite: consent of instructor. Advanced seminar in American Indian literature. This course will be announced at the beginning of each quarter. May be repeated for credit. (F, W, Sp)

190D. Supervised Group Study. (5) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: course 71A or consent of instructor. An analysis of the development of tribal government and policy through examination of various American Indian nations. Topics to be considered will include an analysis of political institutions, the tribal society, intertribal alliances, and the effect of the European contact on tribal policies. (F, W, Sp)

H195. Native American Studies Honors Course. (5) Prerequisite: student must have junior standing; a 3.3 GPA overall; a 3.3 GPA in Honors courses; not open to students who have received credit for course 155 prior to Fall 1974. A study of specific aspects of the Native American community in off-campus settings. Regular individual meetings with Faculty Adviser. (F, W, Sp)

The Staff (the Coordinator in charge) (F, W, Sp)

198. Supervised Group Study. (5 to 15) Individual conferences to be arranged. Prerequisite: consent of instructor and upper division standing preferred. Group discussion, research, and reporting on topics by students. The Staff (the Coordinator in charge) (F, W, Sp)

199. Supervised Independent Study and Research. (5 to 15) Individual conferences. Prerequisite: upper division standing and consent of instructor. The individual student, with consent and guidance of an instructor, may obtain credit for work not covered in the courses offered in the Program. Must be taken on a passed/not passed basis. The Staff (the Coordinator in charge) (F, W, Sp)

Field Studies Program

Field Studies courses involve up to twenty students each in a combination of weekly seminars with ongoing internships in community agencies and professional firms. Each course is offered as a two-quarter sequence, and students may register for each each to spend ten hours in the field as well as attend the three hour seminar in which they are awarded five units per quarter (ten units per course).

Courses currently offered include: Child Care and Society (IDS 196A–196B), Urban Dilemmas (IDS 196C–196D), Community Mental Health, (IDS 196E), Criminal Justice (IDS 196G–196H), The Global Economy (IDS 196I–196K), Public Advocacy (IDS 196M–196N), Women and Social Change (IDS 196O–196P), Media and Society (IDS 1980–198P), Art and Cultural Practice (IDS 198Q–198R). Students are placed as interns and staff members in organizations such as legal aid offices, child care centers, social service agencies, newspapers and radio stations, banks, multi-national corporations, and community organizations. Placements in these settings are developed by Field Studies teachers, and are selected to reflect the central themes of each course.
All Field Studies courses emphasize the integration of field participation and academic content. Students are encouraged to conceptualize from their direct experiences to observations to the relevant professional and/or academic literature, learn from their peers in both field and seminar, and explore off-campus settings as a context for subsequent career choices.

See Interdepartmental Studies for the complete description of DS 186 course offerings.

Health Arts and Sciences
Program Office, Room 216, Building T-7
(Administered by the Health and Medical Sciences Program and the Council for Special Curriculum)

Professors:
Helen L. Blum, M.D., M.P.H.
Carlo M. Cipolla, Laureus
Robert L. Diamond, M.D.
Philip R. Lee, M.D.
Sheldon Morgen, M.D.

Associate Professors:
Theodore E. Cohn, Ph.D.

Robert Pruger, D.S.W.

(Chairperson, Health Arts and Sciences Undergraduate Committee)

The Program
Health Arts and Sciences is an undergraduate program designed to teach students to identify and analyze critically contemporary health problems. The program is based on the assumption that students should have an understanding of how their fields affect health and how health problems are perceived by scholars or professional specialization. Courses emphasize that health problems are complex and that to be understood and solved they must be analyzed from the perspectives of many disciplines, in addition to the traditional biomedical sciences. Such disciplines include economics, law, political science, and sociology. Further, students learn how narrow the understanding of health issues and affect resulting health care policy decisions.

Health Arts and Sciences courses are open to students from all schools and colleges who are interested in contemporary health problems, in developing intellectual skills necessary to pursue health-related professions, and in effecting social change in the area of health. Students are given responsibility for establishing and accomplishing their own educational agendas. In this way, the program attempts to foster in its students an independent approach to work.

The Major
For students with an especially high interest in pursuing an individual investigation of a substantive health problem, Health Arts and Sciences offers an undergraduate major leading to the degree of Bachelor of Arts in Health Arts and Sciences. The major prepares those students who become health professionals, those who choose to pursue scholarly or professional specialization.

Courses are designed to help students to understand health problems and that to be understood and solved they must be analyzed from the perspectives of many disciplines, in addition to the traditional biomedical sciences. Such disciplines include economics, law, political science, and sociology. Further, students learn how narrow the understanding of health issues and affect resulting health care policy decisions.

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198. Directed Group Study for Undergraduates. (1-5) Meetings to be arranged. Prerequisite: consent of instructor. May be repeated for credit. 3-3) Formerly IDS 223C-223D-223E. Three hours per week. Instructors: Mr. Kessler, Ms. Tiktinsky, Mr. Rutter, Mr. Wanerman (W, Sp).

199. Supervised Independent Study. (1-3) Formerly IDS 228. (1-5) Prerequisite: consent of instructor. Must be taken on a passed/not passed basis. Enrollment limited by regulations listed on page 36. The Staff (F, W, Sp).

Health and Medical Sciences Graduate Program

Program Office, Room 106, Building T-7

The Graduate Program in Health and Medical Sciences is built on a network of relationships—on campus, with departments, professional schools, faculty, and administrative units and, in the community, with physicians, hospitals, and other health facilities—all combining their efforts to develop an experimental program for health career education and training not previously available on this campus. Four graduate options are offered in the Program for which different sets of prerequisites and curricula exist. All students are awarded the M.S. degree in Health and Medical Sciences upon satisfactory completion of the Berkeley phase of their studies. The Dual Degree option is for students currently enrolled (or who have already been accepted as candidates) of the Graduate Division of the University, but who wish to integrate their major disciplinary work with health concerns that cannot be satisfied by existing mechanisms (minimum of 50 units). The Genetic Counseling option offers the student preparation in human genetics, methods of counseling, and intensive field work experiences (two years). The UCB-UCSF Joint Medical Program is a five-year M.D. program focusing on medicine in its social context. The three-year program of the Berkeley phase of the curriculum and passing Part I of the National Board examinations, students will be awarded the M.S. degree in Health and Medical Sciences. The Master of Science in Health and Medical Sciences Graduate Program-Mental Health Option: others by consent of instructor. Basic theory of mental health and human behavior will be examined within a psychoanalytic framework. Unified overview will integrate theoretical conceptions of the psychoanalytic apparatus, of unconscious mental processes and the family. Emphasis is placed on field research, with research data and observations from biologic, anthropologic and other disciplines. The Staff (F, W, Sp).

Courses

203A–203B–203C. Concepts of Mental Dysfunction. (3-3-3) Formerly IDS 203A–203B–203C. Three hours per week lecture. Prerequisite: graduate standing in Health Sciences Program/Mental Health Option; others by consent of instructor. Basic theory of mental health and human behavior will be examined within a psychoanalytic framework. Unified overview will integrate theoretical conceptions of the psychoanalytic apparatus, of unconscious mental processes and the family. Emphasis is placed on field research, with research data and observations from biologic, anthropologic and other disciplines. The Staff (F, W, Sp).

204A–205A–205B. Physical Diagnosis. (2-2-2) Formerly IDS 204A–205A–205B. Three clinical hours per week lecture/lecture and one 1 1/2-hour laboratory per week. Prerequisite: graduate standing in the Mental Health Option of the Health and Medical Sciences Program or consent of instructor. A practicum approach to the study of human development. Participant observation in various settings illustrate normal and pathological development. Two-hour observation period including didactic presentation and interviewing followed by a one-hour discussion. After first quarter, students conduct their own interviews. Credit and grade to be awarded on completion of sequence. Mr. Jauregui (F, W, Sp).

205C–223D–223E. Mental Health Practicum. (3–3) Formerly IDS 223C–223D–223E. Three hours of lecture per week. Prerequisite: graduate standing in Health and Medical Sciences/Mental Health Option: others by consent of instructor. An introduction to the clinical process. Three clinical hours per week lecture and one 1 1/2-hour laboratory per week. Prerequisite: second year graduate standing in UC-M. Zion Hospital Mental Health Program or consent of instructor. A practicum approach to the study of human development. Participant observation in various settings illustrate normal and pathological development. Two-hour observation period including didactic presentation and interviewing followed by a one-hour discussion. After first quarter, students conduct their own interviews. Credit and grade to be awarded on completion of sequence. Mr. Ericson (W, Sp).

227A–227B Introduction to the Clinical Process. (3-3) Formerly IDS 227A–227B. One 1 1/2-hour lecture and one 1 1/2-hour laboratory per week. Prerequisite: graduate standing in the Health and Medical Sciences Program or consent of instructor. An introduction to the clinical process. Three clinical hours per week lecture and one 1 1/2-hour laboratory per week. Prerequisite: second year graduate standing in UC-M. Zion Hospital Mental Health Program or consent of instructor. A practicum approach to the study of human development. Participant observation in various settings illustrate normal and pathological development. Two-hour observation period including didactic presentation and interviewing followed by a one-hour discussion. After first quarter, students conduct their own interviews. Credit and grade to be awarded on completion of sequence.

228. Psychoanamnestic: An Integrative Approach. (3) Formerly IDS 228. Three hours of lecture per week. Prerequisite: graduate standing in Health and Medical Sciences/Mental Health Option: others by consent of instructor. A seminar exploring the clinical process of primary health care. Assessment and intervention will be discussed for its implications concerning the social, psychological, and personal dimensions of health and illness. Mr. Rutter (W, Sp).


247A–247B–247C. Health Politics, Policy and Policy Analysis. (4-4-4) Formerly IDS 247A–247B–247C. Four hours of lecture per week. Prerequisite: graduate standing in Health Sciences Program or consent of instructor. This seminar for future health practitioners presents multi-disciplinary perspectives of health politics, policy and policy analysis. Following an introduction to analytic models, institutions, and political forces affecting health, students will study policy questions and health problems and develop skills in policy research and in the analysis of policy and regulatory issues. Credit and grade awarded on completion of sequence. To be offered in fall, spring. The Staff (F, W, Sp).

250A–250B–250C. Interdisciplinary Seminar in Human Health. (1-1-1) Formerly IDS 250A–250B–250C. Two hours of lecture per week. Prerequisite: enrollment in Dual Degree Program of Health and Medical Sciences or consent of instructor. Seminar discussion of the implications of health considered as a holistic set of relations between the "health professions" and other professional disciplines that have increasing systematic interplay with the world of health care. Emphasis must be on a satisfactory/unsatisfactory basis.

251A–251B–251C. Human Growth and Development. (3–3–3) Formerly IDS 251A–251B–251C. Three hours of lecture per week. Prerequisite: IDS 206A–206B–206C. One 1 1/2-hour lecture per week. Prerequisite: graduate standing in the Health and Medical Sciences Program or consent of instructor. A three-quarter sequence emphasizing a developmental perspective and the inter-relationships among biological, psychological, and social factors which influence growth and development of human beings. Emphasis on areas relevant to clinical work in areas of human health and welfare. Lecture/discussion format.

259A–259B–259C. Seminar in Advanced Genetic Counseling. (3–3–3) Formerly IDS 259A–259B–259C. Three hours of lecture per week. Prerequisites: IDS 227A–227B–227C. Three hours of lecture per week. Prerequisite: graduate standing in Health and Medical Sciences Program/Mental Health Option: others by consent of instructor. A practicum approach to the study of human development. Participant observation in various settings illustrate normal and pathological development. Two-hour observation period including didactic presentation and interviewing followed by a one-hour discussion. After first quarter, students conduct their own interviews. Credit and grade to be awarded on completion of sequence.

290A–290B–290C. Seminar in Advanced Genetic Counseling. (3–3–3) Formerly IDS 290A–290B–290C. Three hours of lecture per week. Prerequisites: IDS 227A–227B–227C. Three hours of lecture per week. Prerequisite: graduate standing in Health and Medical Sciences Program or consent of sponsoring Health and Medical Sciences Program faculty member. A practicum approach to the study of human development. Participant observation in various settings illustrate normal and pathological development. Two-hour observation period including didactic presentation and interviewing followed by a one-hour discussion. After first quarter, students conduct their own interviews. Credit and grade to be awarded on completion of sequence.

298. Directed Group Study. (1-1-10) Formerly IDS 298. Three hours of lecture per week. Prerequisite: graduate standing in Health and Medical Sciences Program/Mental Health Option: others by consent of instructor. A practicum approach to the study of human development. Participant observation in various settings illustrate normal and pathological development. Two-hour observation period including didactic presentation and interviewing followed by a one-hour discussion. After first quarter, students conduct their own interviews. Credit and grade to be awarded on completion of sequence.

299A–299B–299C. Seminar in Advanced Genetic Counseling. (3–3–3) Formerly IDS 299A–299B–299C. Three hours of lecture per week. Prerequisites: IDS 227A–227B–227C. Three hours of lecture per week. Prerequisite: graduate standing in Health and Medical Sciences Program/Mental Health Option: others by consent of instructor. A practicum approach to the study of human development. Participant observation in various settings illustrate normal and pathological development. Two-hour observation period including didactic presentation and interviewing followed by a one-hour discussion. After first quarter, students conduct their own interviews. Credit and grade to be awarded on completion of sequence.

Interdepartmental Studies

Lower Division Courses

1. Technology and Society. (4) Three hours of lecture per week and an occasional field trip. Prerequisite: open without prerequisite to all students. Role of technology in the solution of social problems. Historical development of modern technology. Examples of technological systems and their impacts on society. Integration of physical, materials, energy generation. Introduction to issues of societal control, technology assessment, public policy related to technological developments. Electrical Engineering and Computer Science: Mr. Suskind; Political Science: Mr. LaPorte (W).

10A–10B–10C. Introduction to Environmental Studies. (3–3–3) Three hours of lecture and one 1 1/2-hour discussion per week. Prerequisite: one-half hour of discussion per week. 10A is not prerequisite to 10B. 10B is not prerequisite to 10C.

10A. Ecosystems, Their Maintenance and Disruption. CRS: The Staff (Ms. Carr in charge) (F).

10B. Global and Technological Systems. An examination of the economic development, population, energy, resources, technology and alternative systems. CRS: The Staff (Ms. Carr in charge) (W).

10C. The San Francisco Bay Ecosystem. Physical, biological, socioeconomic analysis of the San Francisco Bay area. Major emphasis on projects and field work. CRS: The Staff (Ms. Little in charge) (Sp).
101—10M—10N. Introduction to Environmental Issues—Special Projects. (2—2—2) One and a half hours of discussion per week. Prerequisite: consent of instructor. Discussion of environmental problems connected with people's encounters with social institutions in the United States. The language of ac- knowledgment, intelligence tests, bureaucracy and the legal process. Analysis of misunderstandings, indirect communication, deception, and bribery. Linguistics: Mr. Fillmore; Anthropology: Ms. Nader

171A—171B. Language and Social Institutions. (3—3) Three hours of lecture per week. Prerequisite: highly recommended introductory level college biology. Review of the basic biology of health, discussion of successful and unsuccessful methods for eliminating diseases(s), and learn how to engender successful application of these principles in the social sciences, policy science, policy science cost-benefit analysis, urban and national planning, world modeling, etc. Business Administration: Mr. Churchman (W)

180. Economic and Biological Feedback Systems. (3) Three hours of lecture per week. Prerequisite: Math 150A or equivalent. Systematic responses to exogenous changes, estimation, simulation, and prediction. Examples in government, economics, business, and biology. Biology: Mr. Kourt; Dynamics, state variables, statistical sig- nals, sampled data, stability, root locus, gradient meth- ods, and computer simulation algorithms. Electrical Engineering and Computer Sciences: Mr. Smith (W)

190A—190B—190C. Principles and Applications of Psychoanalysis. (3-3-3) Two hours of lecture, one and one-half hours of discussion per week. Prerequisite: consent of instructor. Survey of the forms and principles of oral literature through study of folktales, heroic songs, and ballads. Blake. Adventures to limit to twenty students majoring in English or History of Art. Admission by consent of the instruc- tors. English: Mr. Partridge (W)

191A. Introduction to Oral Literature. (4) Formerly Anthropology 173. Three hours of lecture and one hour of discussion per week. An introduction to the forms and principles of oral literature through study of folk- tales, heroic songs, and ballads. Blake. By-dierot's Neveu de Rameau and Rousseau's Devin du Village. Texts may be read in English. Music: Mr. Bress; Psychology: Mr. Rix (W); Forestry and Conservation: Mr. Wulcow; History: Ms. Clemens (Sp)

195. Introduction to Neurobiology. (3) Three hours of lecture per week. Prerequisite: Math 150A or equivalent. Development of the basic principles of neurobiol- ogy: membrane mechanisms for the initiation, propagation, and propagation of neural activity in neurons; integration of information in simple and complex systems. Neural specificity and plasticity. Transduction in sensory sys- stems and control of output. Electrical Engineering and Computer Sciences: Mr. Weinbl; Molecular Biology: Mr. Stent (F)

195A—195B. Senior Honors Thesis. (4—4) Open only to students with an individual major in the College of Letters and Science. Credit and grade will be assigned only upon completion of the full sequence. The thesis serves to integrate skills and understanding common to the courses comprising the major.

Adviser for the major in charge (F, W, Sp)

171A—171B. Language and Social Institutions. (3—3) Three hours of lecture per week. Prerequisite: highly recommended introductory level college biology. Review of the basic biology of health, discussion of successful and unsuccessful methods for eliminating diseases(s), and learn how to employ such health promoting strategies as relaxation, physical fitness, nutrition and assertiveness. Economics: Mr. Churchman (W)

180. Economic and Biological Feedback Systems. (3) Three hours of lecture per week. Prerequisite: Math- ematics or equivalent. Systematic responses to exogenous changes, estimation, simulation, and prediction. Examples in government, economics, business, and biology. Biology: Mr. Kourt; Dynamics, state variables, statistical sig- nals, sampled data, stability, root locus, gradient meth- ods, and computer simulation algorithms. Electrical Engineering and Computer Sciences: Mr. Smith (W)

190A—190B—190C. Principles and Applications of Psychoanalysis. (3-3-3) Two hours of lecture, one and one-half hours of discussion per week. Prerequisite: consent of instructor. Survey of the forms and principles of oral literature through study of folktales, heroic songs, and ballads. Blake. By-dierot's Neveu de Rameau and Rousseau's Devin du Village. Texts may be read in English. Music: Mr. Bress; Psychology: Mr. Rix (W); Forestry and Conservation: Mr. Wulcow; History: Ms. Clemens (Sp)

191A. Introduction to Oral Literature. (4) Formerly Anthropology 173. Three hours of lecture and one hour of discussion per week. An introduction to the forms and principles of oral literature through study of folk- tales, heroic songs, and ballads. Blake. By-dierot's Neveu de Rameau and Rousseau's Devin du Village. Texts may be read in English. Music: Mr. Bress; Psychology: Mr. Rix (W); Forestry and Conservation: Mr. Wulcow; History: Ms. Clemens (Sp)

195. Introduction to Neurobiology. (3) Three hours of lecture per week. Prerequisite: Math 150A or equivalent. Development of the basic principles of neurobiol- ogy: membrane mechanisms for the initiation, propagation, and propagation of neural activity in neurons; integration of information in simple and complex systems. Neural specificity and plasticity. Transduction in sensory sys- systems of Confucianism, Taoism, Moism, and Legal- ism. The main emphasis falls on an intensive analysis of the major problem and the major thinkers in the classical period.

Philosophy: Mr. Tu (Sp)

170. Lexical Semantics. (3) Three hours of lecture per week. Prerequisite: at least four quarter units in Linguistics, Anthropology, Philosophy, Psychology, or Computer Science, or consent of instructor. Problems in the analysis of linguistic meaning, the formal structure of meaning and the examination of its implications for the study of language and anthropology. The examination of particular vocabulary- forming rules; the formal representation of word mean- ing as composed of expressions containing 'phonological,' linguistic theory and (2) cognitive anthropology.

Linguistics: Mr. Fillmore; Anthropology: Ms. Nader

191A—171B. Language and Social Institutions. (3—3) Three hours of lecture per week. Prerequisite: highly recommended introductory level college biology. Review of the basic biology of health, discussion of successful and unsuccessful methods for eliminating diseases(s), and learn how to employ such health promoting strategies as relaxation, physical fitness, nutrition and assertiveness. Economics: Mr. Churchman (W)

180. Economic and Biological Feedback Systems. (3) Three hours of lecture per week. Prerequisite: Math- ematics or equivalent. Systematic responses to exogenous changes, estimation, simulation, and prediction. Examples in government, economics, business, and biology. Biology: Mr. Kourt; Dynamics, state variables, statistical sig- nals, sampled data, stability, root locus, gradient meth- ods, and computer simulation algorithms. Electrical Engineering and Computer Sciences: Mr. Smith (W)

190A—190B—190C. Principles and Applications of Psychoanalysis. (3-3-3) Two hours of lecture, one and one-half hours of discussion per week. Prerequisite: consent of instructor. Survey of the forms and principles of oral literature through study of folktales, heroic songs, and ballads. Blake. By-dierot's Neveu de Rameau and Rousseau's Devin du Village. Texts may be read in English. Music: Mr. Bress; Psychology: Mr. Rix (W); Forestry and Conservation: Mr. Wulcow; History: Ms. Clemens (Sp)

191A. Introduction to Oral Literature. (4) Formerly Anthropology 173. Three hours of lecture and one hour of discussion per week. An introduction to the forms and principles of oral literature through study of folk- tales, heroic songs, and ballads. Blake. By-dierot's Neveu de Rameau and Rousseau's Devin du Village. Texts may be read in English. Music: Mr. Bress; Psychology: Mr. Rix (W); Forestry and Conservation: Mr. Wulcow; History: Ms. Clemens (Sp)

195. Introduction to Neurobiology. (3) Three hours of lecture per week. Prerequisite: Math 150A or equivalent. Development of the basic principles of neurobiol- ogy: membrane mechanisms for the initiation, propagation, and propagation of neural activity in neurons; integration of information in simple and complex systems. Neural specificity and plasticity. Transduction in sensory sys- systems of Confucianism, Taoism, Moism, and Legal- ism. The main emphasis falls on an intensive analysis of the major problem and the major thinkers in the classical period.

Philosophy: Mr. Tu (Sp)

170. Lexical Semantics. (3) Three hours of lecture per week. Prerequisite: at least four quarter units in Linguistics, Anthropology, Philosophy, Psychology, or Computer Science, or consent of instructor. Problems in the analysis of linguistic meaning, the formal structure of meaning and the examination of its implications for the study of language and anthropology. The examination of particular vocabulary- forming rules; the formal representation of word mean- ing as composed of expressions containing 'phonological,' linguistic theory and (2) cognitive anthropology.

Linguistics: Mr. Fillmore; Anthropology: Ms. Nader

191A—171B. Language and Social Institutions. (3—3) Three hours of lecture per week. Prerequisite: highly recommended introductory level college biology. Review of the basic biology of health, discussion of successful and unsuccessful methods for eliminating diseases(s), and learn how to employ such health promoting strategies as relaxation, physical fitness, nutrition and assertiveness. Economics: Mr. Churchman (W)

180. Economic and Biological Feedback Systems. (3) Three hours of lecture per week. Prerequisite: Math- ematics or equivalent. Systematic responses to exogenous changes, estimation, simulation, and prediction. Examples in government, economics, business, and biology. Biology: Mr. Kourt; Dynamics, state variables, statistical sig- nals, sampled data, stability, root locus, gradient meth- ods, and computer simulation algorithms. Electrical Engineering and Computer Sciences: Mr. Smith (W)

190A—190B—190C. Principles and Applications of Psychoanalysis. (3-3-3) Two hours of lecture, one and one-half hours of discussion per week. Prerequisite: consent of instructor. Survey of the forms and principles of oral literature through study of folktales, heroic songs, and ballads. Blake. By-dierot's Neveu de Rameau and Rousseau's Devin du Village. Texts may be read in English. Music: Mr. Bress; Psychology: Mr. Rix (W); Forestry and Conservation: Mr. Wulcow; History: Ms. Clemens (Sp)

191A. Introduction to Oral Literature. (4) Formerly Anthropology 173. Three hours of lecture and one hour of discussion per week. An introduction to the forms and principles of oral literature through study of folk- tales, heroic songs, and ballads. Blake. By-dierot's Neveu de Rameau and Rousseau's Devin du Village. Texts may be read in English. Music: Mr. Bress; Psychology: Mr. Rix (W); Forestry and Conservation: Mr. Wulcow; History: Ms. Clemens (Sp)

195. Introduction to Neurobiology. (3) Three hours of lecture per week. Prerequisite: Math 150A or equivalent. Development of the basic principles of neurobiol- ogy: membrane mechanisms for the initiation, propagation, and propagation of neural activity in neurons; integration of information in simple and complex systems. Neural specificity and plasticity. Transduction in sensory sys-
Courses numbered 196A through 198 are Field Studies Program courses. For further information on these courses, consult the Program Director, U.C., 2536 Channing Way, Berkeley, CA 94720.

196A–196B. Child Care: Practices, Policies and Theories. (5-5) Two hours of seminar and twelve hours of fieldwork per week. Prerequisite: Two quarters of the sequence must be taken for credit with an "In-Progress" grading for 196A. It is required to 196B. Not open to students who have previously taken any other IDS 196 courses except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

196C–196D. Urban Dilemmas. (5-5) Formerly numbered 196E–196F. Two hours of seminar and twelve hours of fieldwork per week. Prerequisite: Two quarters of the sequence must be taken for credit with an "In-Progress" grading for 196C. It is required to 196D. Not open to students who have previously taken any other IDS 196 course except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

196E–196F. Community Mental Health. (5-5) Formerly numbered 196G–196H. Two hours of seminar and twelve hours of fieldwork per week. Prerequisite: Two quarters of the sequence must be taken for credit with an "In-Progress" grading for 196E. It is required to 196F. Not open to students who have previously taken any other IDS 196 course except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

196G–196H. Criminal Justice. (5-5) Formerly numbered 196I–196J. Two hours of seminar and twelve hours of fieldwork per week. Prerequisite: Two quarters of the sequence must be taken for credit with an "In-Progress" grading for 196G. It is required to 196H. Not open to students who have previously taken any other IDS 196 course except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

196I–196J. The Global Economy. (5-5) Three hours of seminar and 12 hours of fieldwork per week. Prerequisite: credit and grade to be awarded upon completion of the sequence. 196I is required to 196J. Not open to students who have previously taken any other IDS 196 courses except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

196K–196L. Public Advocacy. (5-5) Two hours of seminar and 12 hours of fieldwork per week. Prerequisite: Two quarters of the sequence must be taken for credit with an "In-Progress" grading for 196K. It is required to 196L. Not open to students who have previously taken any other IDS 196 course except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

196M–196N. Women and the Politics of Social Change. (5-5) Formerly numbered 196V–196W. Two hours of seminar and twelve hours of fieldwork per week. Prerequisite: Two quarters of the sequence must be taken for credit with an "In-Progress" grading for 196M. It is required to 196N. Not open to students who have previously taken any other IDS 196 course except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

196P. Integrative Neurobiology. (3) Three one-and-one-half hour lectures per week. Prerequisite: courses in biology and especially an understanding of membrane and synaptic operation. To be offered 1978/79, 1979/80, 1980/81 only.

196Q. Laboratory Course In Urban Ecology. (2) Two hours of seminar and 4 hours of fieldwork per week. Prerequisite: credit and grade to be awarded upon completion of the sequence. A two-quarter course designed to provide students with the opportunity to gain historical, theoretical and practical knowledge of the international monetary relations, foreign aid, technology transfer, and foreign investment — as well as examining some of the current problems in the global economy by way of case studies of multinational companies, environment, and employment, and the responses and possibilities posed by these problems. These seminar discussions will be based on field observations and experiences of students participating in international field placements. To be offered 1978/80 and 1980/81 only.

196R. Art and Cultural Practice. (5-5) Three hours of lecture and 12 hours of fieldwork per week. Prerequisite: credit and grade to be awarded upon completion of the sequence. It is required to 196R. Not open to students who have previously taken any other IDS 196 courses except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

196V. Stigma and Social Control. (5-5) One 3-hour seminar and 6 hours of field internship per week. Prerequisite: Sociology 1A, 107, or permission of instructor. This course focuses on the relationship between family and public institutions (government agencies, mental health and social service agencies, schools, etc.) in the rearing of young children. Historical, cross-cultural and contemporary institutional arrangements are examined. The present division of socialization responsibilities between family units and public institutions is examined in terms of cultural, social, and psychological dynamics. To be offered 1978/80 only.

196W. Writers in Society: The Development of Fiction. (5) Three 3-hour seminars and 9 hours of field internship per week. Prerequisite: 196Q is required to 196W. Not open to students who have previously taken any other IDS 196 course except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

196X. Laboratory Course In Urban Ecology. (2) Two hours of seminar and 4 hours of fieldwork per week. Prerequisite: credit and grade to be awarded upon completion of the sequence. A two-quarter course designed to provide students with the opportunity to gain historical, theoretical and practical knowledge of the international monetary relations, foreign aid, technology transfer, and foreign investment — as well as examining some of the current problems in the global economy by way of case studies of multinational companies, environment, and employment, and the responses and possibilities posed by these problems. These seminar discussions will be based on field observations and experiences of students participating in international field placements. To be offered 1978/80 and 1980/81 only. 

Graduate Courses

• 200L. Integrative Neurobiology. (3) Two 1-hour seminars and 12 hours of field internship per week. Prerequisite: credit and grade to be awarded upon completion of the sequence. It is required to 200L. Not open to students who have previously taken any other IDS 196 course except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

• 200L. Advanced Laboratory In Neuropharmacology. (5) Formerly Zoology 225L. Two 6-hour laboratory sessions per week. Prerequisite: credit and grade to be awarded upon completion of the sequence. It is required to 200L. Not open to students who have previously taken any other IDS 196 course except with special permission of Field Studies Director. Credit and grade to be awarded upon completion of the sequence. To be offered 1978/79, 1979/80, 1980/81 only.

• 201L. Cellular Mechanisms Underlying Nervous Activity. (4) Three one-and-one-half hour lectures per
211. Geological and Engineering Factors in Environmental Planning. (4) Three hours of lecture and discussion and one-half hour of field trips per week. Prerequisite: consent of instructor. Consideration of the influence of geology and site conditions on urban land use fields and discussions of processes for incorporating geologic and engineering considerations into planning to avoid problems such as landslides, flooding, or sinkholes. Study of the role of geology as a regulatory factor. Geology and Geophysics: Mr. Leopold (W); Civil Engineering: Mr. Herder; Land Management: Mr. Ackerman. 

214A-214B. Law and Society. (4-4) Two hours of lecture per week. Prerequisite: limited to law students and social science graduate students doing advanced graduate work in anthropology or sociology. Introduction to cross-disciplinary research on the role of law in society. Credit and grade to be awarded upon completion of the sequence in Law: __Law and Society.__ (F, W, Sp) 

215A-215B. Faunal Analysis in Archeology. (4-4) One hour of lecture, one 3-hour laboratory, and three hours of independent laboratory work per week. Prerequisite: a course in comparative anatomy or Paleontology 126, which may be taken concurrently. Introduction to faunal analysis in archeological contexts, principles and procedures in faunal analysis of archeological sites, and practical training in collecting and analyzing mammal remains. May be taken on a satisfactory/unsatisfactory basis. To be offered alternate years. Paleontology: Mr. Clemens, Mr. Madsen, Mr. Callin (W); Anthropology: Mr. Isaac (W, Sp). 

216. Pollen Analysis. (4) Two hours of lecture and three hours of laboratory per week. Prerequisite: consent of instructor. Introduction to the theory and techniques of pollen analysis in archaeological and paleo-ecological contexts. Advanced undergraduates may enroll with consent of instructor. Paleontology: __Mr. Byrne (Sp)__ 

222. Studies in the Music of the Ancient World. (4) Two 3-hour lecture classes per week. Prerequisite: open to graduate students in Music, Classics, Sanskrit, and Ancient Near Eastern Studies. The musical systems of the ancient civilizations, the Near Eastern, and their relationship to the development of the Western music system. Cross-listed as Music 250. 

224. Cooperative Research Workshop in Transportation Economics. (3) Prerequisite: Economics 201A-201B, plus consent of instructor. May be repeated for credit. Demand and supply in the transportation sector; behavior of transportation agencies; financing of transportation systems; and impact of transportation on migration and land use. 

225B. Experimental Design Project in Solid Waste Management. (4-4) Four hours of lecture per week. Prerequisite: graduate standing and consent of instructor. Field experience in research projects, including field experience for students from varied disciplines who desire to focus on current community needs for waste management. Fieldwork in natural and social sciences. Industrial Engineering and Operations Research: Mr. Glassy; Graduate School of Public Policy: Mr. McManus; Public Policy: Mr. Tindel; Mr. Lamirande; Mr. Carey; Mr. McCauley (W, Sp). 

228. Human Evolution, Prehistory and Paleo-environment. (2) Two hours of seminar per week. Prerequisite: consent of instructor. A seminar course devoted to considerations of human evolution in Paleolithic archeology and related subjects. To be taken on a satisfactory/unsatisfactory basis. 

233A-233B. Legislation, Administrative Regulation, and Land Planning. (4) Two 2-hour discussions per week. Prerequisite: consent of instructor. A study of regulatory law as it relates to land use planning as an illustration of the coexistence of theories and methods, and the legal and administrative contexts of planning and design decisions. Natural environmental and land use planning practices at local, regional, state and federal levels. Mr. Heyman, Mr. Twiss (W, Sp). 

234A-234B. Compliance: Public and Private Law in Environmental Planning. (4) Two 2-hour discussions per week. Prerequisite: consent of instructor. Comparative analysis of governmental and non-governmental mechanisms for influencing business conduct, and housing and consumer protection, basic and environmental protection. Prof. Bardach, Mr. Kagan (W, F). 

237A-237B. Perspectives and Problems in Cognitive Science. (1-1) Two 2-hour discussions per week. Prerequisite: graduate standing or consent of instructor. Examines issues in cognition from the perspectives of psychology, neurosciences, cognitive science, linguistics, philosophy, and cognitive anthropology. Some topics to be covered include: mental representation, linguistic analysis, socioeconomic analysis, etc. Given on a satisfactory/unsatisfactory basis only. Ms. Rosch, Mr. Wielens, Mr. Fiske, Mr. Magee, Mr. Wenzel, Mr. Moberg (W, Sp). 

238. Environmental Design, Stress and Health. (3) Three hours of lecture-discussion per week. Prerequisite: limited enrollment, consent of instructor. An interdisciplinary course to explore the influence of selected aspects of the physical and social environment on health. Among topics to be discussed are density and crowding, migration, urbanization, industrialization, and stress as they influence health and disease. Public Health; Mr. Syme (Sp); Anthropology; Mr. Lin (Sp). 

239. Cities and Religion. (4) One 3-hour seminar per week. Prerequisite: graduate standing or consent of instructor. Comparative and interdisciplinary approach to urban religious experiences in selected cultural and historical contexts. Focus will be upon the religious and cultural aspects of the physical and social environment on health. Among topics to be discussed are density and crowding, migration, urbanization, industrialization, and stress as they influence health and disease. Public Health; Mr. Syme (Sp); Anthropology; Mr. Lin (Sp). 

240. Nutrition of Population Groups. (3) Three 2-hour lecture per week. Prerequisite: consent of instructor. Consideration of nutrition in relation to development andpublic health. Emphasis will be given to developing understanding of nutrition needs of groups and programs to meet needs: nutritional status of developing nations, environmental factors, human nutrition, and health in developing countries. Nutritional Sciences: Mr. Crocker; Near Eastern Studies: Mrs. Kilmer (F). 

241. The Urban Environment. (3-4) Two 1 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: consent of the instructor. The components of the urban environment; economic, environmental, and social problems, attitudes, and criteria. Environmental survey, analysis, and interview techniques. Methods of assessing environmental quality. Environmental simulation. City and Regional Planning; Mr. Appleyard (Sp); Agriculture: Mr. Appleby (Sp); Architecture: Mr. Appleby (Sp); Mr. Appleyard, Mr. Dickert (Sp). 

252A. Stellar Structure and Evolution. (3) Three hours of lecture per week. Prerequisite: Physics 137A-137B or 140A-140B. Consideration of stellar structure, radiative transfer and convection, thermonuclear reactions and stellar energy generation; stellar nuclear processes; stellar evolution sequences; supernovae; neutron stars; black holes; nucleosynthesis. 

252B. Stellar Structure and Evolution. (3) Three hours of lecture per week. Prerequisite: Physics 137A-137B or 140A-140B. Advanced topics in stellar structure and evolution. Physics: Mr. Chiao; Astronomy: Mr. Arons (F). 

**NOTE:** For key to symbols, see page 36.
258A-258B. Seminar in Modern British History, Society and Literature. (5-5) Two 2-hour seminars per week plus consultation hours. Prerequisite: graduate standing or consent of instructors. The study of change and institutions in English society and the role of English historians and the principles, practices and issues of genetic counseling and the role of the health professional in the delivery of genetic services.

250A-250B. Methods of Survey Research. (4-4) Two hours of lecture and two hours of laboratory per week. Prerequisite: an undergraduate course in social research methods: statistics for social scientists, or equivalent. Credit grade and grade to be awarded after completion of sequence. An extensive, theoretically oriented introduction to the methods of survey research including problem formulation, theory construction, research design, instrument construction, sampling, and data collection, coding, processing, and analysis for graduate students outside the survey field.

281. Multivariate Causal Analysis of Quantitative Social Data. (4) Two hours of lecture and two hours of laboratory per week. Prerequisite: Statistics 131 or equivalent. An introduction to the statistical analysis of sequence in Survey Methods offered by the Department of Political Science and Sociology. It will serve as a methodological course in multivariate causal analysis for graduate students outside the survey field.

285. Theoretical Astrophysics Seminar. (2) Two hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. The study of theoretical astrophysics. Physics: Mr. McKee; Astronomy: Mr. Arons (Sp).

292A-292B. Psychology and Aesthetics. (5-5) Three hours of lecture and two hours of laboratory per week. Prerequisite: an undergraduate course in social research methods: statistics for social scientists, or equivalent. Credit grade and grade to be awarded after completion of sequence. An extensive, theoretically oriented introduction to the methods of survey research including problem formulation, theory construction, research design, instrument construction, sampling, and data collection, coding, processing, and analysis for graduate students outside the survey field.

295. Systems and Integrative Biology. (1) One 1-hour seminar plus half hour discussion per week. Prerequisite: consent of instructor. An introduction to molecular, cellular, tissue, and organ levels of biology, with emphasis on interdisciplinary communication and approaches. Mr. Mel and Staff

300. Techniques of Teaching for Teaching Assistants. (2) Two 1-hour seminars per week. Prerequisite: graduate standing or consent of T.A.'s. Must be teaching during quarter of enrollment. Two hours of seminar per week at which time a variety of methods of facilitating learning are investigated and evaluated, common classroom problems are discussed, and videotapes of each T.A.'s classroom teaching are analyzed. Miss Napell (F, W, Sp)

497A-497B-497C. First Year Field Placement for Genetic Counseling. (3-5-3, 5-3-5, 3-5-3) Prerequisite: limited to first-year Genetic Counseling option students. Concurrent enrollment in IDS 231 series required. One unit for each four hours per week scheduled at placement. Must be supervised by a professional or academic supervisor, approval of the student's major adviser and the Director of International Education, before leaving for the study abroad. Mr. McCormack

497A. Japan. Limited to participants in the Professional Studies Program: India. The Staff (F, W, Sp)

International Education

Department Office, 2538 Channing Way, Room 104, Building D

William A. McCormack, Ph.D. (Chairman and Director)

The Education Abroad Program for undergraduates and graduates is under the Office of International Education.

Division Courses

100. Cultural Traditions of India. (1-4) One to four hours of seminar per week, plus field trips. An interdisciplinary approach to the religious, historic, literary, artistic, and architectural achievements of Indian civilization. Activities will include: readings, lectures, slides, and discussions. Field trips to performance sites, museums, and historic sites will be included. Enrollment limited to participants in the Professional Studies Program: India. The Staff (F, W, Sp).

Graduate Courses

200. Cultural Traditions of India. (1-4) One to four hours of seminar per week, plus field trips. An interdisciplinary approach to the religious, historic, literary, artistic, and architectural achievements of Indian civilization. Activities will include: readings, lectures, slides, and discussions. Field trips to performance sites, museums, and historic sites will be included. Enrollment limited to participants in the Professional Studies Program: India. The Staff (F, W, Sp).

299. Supervised Independent Study and Research. (1-8) Prerequisite: open only to graduate students who are engaged in advanced studies. Credit earned only with specific arrangements with a Berkeley professor, approval of the student's major adviser and the Director of International Education, before leaving for the study abroad. Mr. McCormack

400. Modernization in Contemporary India. (1-4) One to four hours per week. The course will deal with problems of development and social change; the economics of modernization, the impact of industrialization, the role of agriculture, the impact of the Green Revolution, the arts. Prerequisite: limited to participants in the Professional Studies Program: India. The Staff (F, W, Sp).
**121. The Evolution of American Warfare: 1865-1945.** (3) Formerly Military Science 121. Three hours of lecture per week. History of World War I and II. Influence of modern technology on American military organizations. The development of a global military strategy. Imprint of the social fabric of the nation on the military as the United States evolved into a world power. Mr. Hatcher, Mr. Barnes (Sp)

**122. Evolution of Recent American Warfare: Korea and Vietnam.** (2) Formerly Military Science 171. Two-hour seminar discussion per week. Historical survey of Korean and Vietnamese warfare. The civil and guerrilla warfare aspect of these two conflicts is studied as a means of influencing political and social change. Emphasis is placed on historical theorists on revolutionary warfare in its contemporary form. Course covers the concept of limited war, SEATO alliance, U.S. involvement in Korea and Vietnam. Course starts with the WWII American involvement in Asia through the Stilwell mission to China and concludes with the U.S. evacuation of Saigon.

**144. Military Law.** (2) Formerly Military Science 144. One 2-hour discussion per week. Topics to be analyzed and discussed include the court-martial system, the punitive articles of the Uniform Code of Military Justice, fundamental rights of accused persons, rules of evidence, rules for search and seizure, non-judicial punishment, administrative boards and the Law of War. Mr. Baralt (F. W. Sp)

**145A–145B–145C. National Security Forces in Contemporary American Society.** (3–3–3) Formerly Aerospace Studies 145A–145B–145C. Two 1/2-hour lectures per week. Prerequisite: upper division standing. Formerly Military Science 170B. One 2-hour seminar discussion per week. Prerequisite: upper division standing, consent of instructor. Conceptually examines the Armed Forces as an integral element of American society via survey and seminar discussions on contemporary issues in civil-military relations and the national and international environment in which U.S. defense policy is formulated and implemented. Mr. Baralt (F, W, Sp)

**154. The History of Littoral Warfare.** (2) Formerly Military Science 154. Two 1 1/2-hour lectures per week. An analysis of the historical evolution and impact of man's attempts to project sea power ashore. The scope of the course includes an indepth examination of each of the major developments in littoral warfare from Greek classical antiquity to the modern age. Mr. Barnes (W)

**170A. Comparative Military Systems: The Third World.** (2) Formerly Military Science 170A. One-hour laboratory period per week. Prerequisite: consent of instructor. A comparative analysis of Military Systems of developing nations. Discussion of the role of militaries in the political development of the countries and the causes and consequences of military coups d'etats in the Middle East. Mr. Iverson (W)

**170C. Comparative Military Systems: Middle East.** (2) Formerly Military Science 170C. One 2-hour seminar per week. Prerequisite: consent of the instructor. A comparative analysis of the military systems of the Middle Eastern countries. Discussion of the role of militaries in the political development of the countries and the causes and consequences of military coups d'etats in the Middle East. Mr. Iverson (Sp)

**197. Field Study in Military Leadership.** (1–0) Formerly Military Science 197. One to five 1-hour lectures per week. Prerequisite: upper division standing, consent of instructor. Department chairman, and the off-campus military organization. Supervised experience relative to specific aspects of military leadership in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. The Staff (F, W, Sp)

**199. Supervised Independent Study and Research.** (1–0) Prerequisite: upper division standing, consent of instructor. Enrollment is restricted by regulations listed on page 36. Supervised independent study and research for undergraduate students who desire to pursue topics of their own selection. Staff (F, W, Sp)

### Aerospace Studies

#### Department Office, 10 Callaghan Hall

The Department of Aerospace Studies offers students in virtually all academic areas the opportunity to qualify for a commission in the United States Air Force while simultaneously completing University degree requirements. Two accredited AFROTC programs are available: entering freshmen may elect the General Military Course or, for those students who have at least two full academic years remaining in their degree program, the Department offers a two-year Professional Officer Course.

Students interested in the General Military Course are eligible to compete for four-year scholarships which cover the costs of tuition, books, and most fees; also, a $100 per month living allowance is paid to each student on the College Scholarship Program. Entering freshmen interested in competing for one of these four-year Scholarships should consult their high school counselors at the beginning of the senior year. A limited number of scholarships is also available to students already enrolled in their freshman college year.

Students who do not enroll in the General Military Course are still eligible for membership in the two-year Professional Officer Course. This Upper Division Program is open to students who have at least two full years of study remaining in their academic program; graduate and transfer students may also be considered for membership. Scholarships are available. Selection for the Professional Officer Course is based on such factors as aptitude, interest, college grades, and performance at a six-week field training camp. Students selected for the Professional Officer Course are provided uniforms, textbooks, and a $100 per month allowance while they are active in the program. Application for the Professional Officer Course should be made no later than March of the year preceding the student's last two years of University enrollment.

Both the two-year and the four-year AFROTC programs emphasize student participation and involvement. Classes are conducted as seminars which call for active student discussion. In addition, there is a weekly one-hour Leadership Laboratory that is mandatory for all AFROTC cadets. In this laboratory period, students become involved in the management of their own cadet corps. Students also participate in projects, field trips, and visits to Air Force bases. Those students who are designated to enter Air Force pilot training are provided civilian pilot instruction at a nearby airport during their senior year.

Completion of the program to earn an Air Force Commission requires enrollment during each quarter in a specified course in Aerospace Studies or Military Affairs. The normal sequence for the 4-year program is: AS 1, MA 1, AS 2, MA 2, AS 21B, AS 21C, AS 135A, AS 135B, AS 135C, and MA 145A, MA 145B, and MA 145C. Cadets in the 2-year program need take only the upper-division courses.

Aerospace Studies courses can also be taken through University Extension or through cross-enrollment arrangements with various local colleges and universities. For further information on enrollment requirements and procedures, contact the Department Staff at 10 Callaghan Hall, or phone (415) 642-3572.

### Lower Division Courses

**1. Introduction to Aerospace Studies.** (1) One hour lecture/discussion per week. An introduction to the Air Force ROTC program and survey of the United States Air Force. Prerequisites: the studies that comprise the four years of academic courses and military training that qualify AFROTC cadets for commissions in the U.S. Air Force. Mr. Iverson (W)

2. The U.S. Air Force Today. (1) Formerly 1B–1C. One hour lecture/discussion per week. An investigation of the structure and roles of the contemporary United States Air Force. The total force structure of the Air Force is related to the national organization of defense. Major commands are examined individually.

**121A–21B–21C. The Growth and Development of Air Power.** (1–1–1) One hour of lecture/discussion per week. This course traces the historical evolution of air power, concepts, doctrine, and application; it identifies technological and societal changes which affected

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**NOTE:** For key to symbols, see page 36.
Junior and Senior years.

Military Science

Department Office, 74 Harmon Gymnasium

The Department of Military Science offers a variety of courses of general interest and provides a program which can lead to a commission in the United States Army. Candidates for a commission complete a series of Military Science courses, leadership laboratories, and active duty experience. Applicable university courses from other departments may be taken concurrently.

Upper Division Courses

135A–139B–139C. Aerospace Management and Leadership. (3–3–3) Formerly 141A–141B–141C. Two 1 1/2-hour sessions per week. Prerequisite: Consent of instructor. Upper division standing and consent of instructor: A comparative study of contemporary and Air Force Management Leadership. Emphasis includes the study of group behavior, functions and theories of management, systematic decision making, the communication process, leadership, leadership management activities, personnel administration, and the organizational environment. (W, F, Sp)

442. Light Aircraft Operations. (3) Three hours of lecture per week. Prerequisite: Consent of instructor. Preparation for certification as a Federally Licensed Private Pilot. Studies cover Federal Aviation Regulations, basic meteorology for pilots, navigation by dead reckoning, and airplane, radio, and radio navigation, elementary aerodynamics and aircraft structures. (F, W, Sp)

Military Science courses are open to all students, male and female, with the permission of the instructor. Military Science courses can also be taken through University Extension or through cross-enrollment from East Bay community colleges.

For more information concerning ROTC or the Military Science program, call the Chairman of the Department—Phone: 642-3374.

Professional Courses

4301. Fundamentals of Terrain Representation and Analysis. (2) Two hours of lecture per week. Introduction to the use of topographic maps and aerial photographs. Emphasis on developing those skills necessary for air navigation, map, and chart reading, and navigation purposes. Topics include map coordinate systems, scale and distance relationships, intersection and respection, depiction of elevation, and relief, and basic photo interpretation. One field trip. (M, Morgan (F)

4332. Concepts of Military Operations. (2) Two hours of lecture per week. Introduction to basic military tactics. Emphasis will be on squad and platoon operations to include offensive and defensive operations, patrolling, and the use of resource planning techniques in both air and operations orders. (M, Morgan (W)

4333. The Combined Arms Concept. (2) Two hours of lecture per week. This course examines the relationships among the Army's various branches that are found within the division. Emphasis will be on how these branches work together on company and battalion level operations to establish battalion staff organizations and responsibilities, division organization and responsibilities, and various combined arms operations. (M, Morgan (Sp)

Naval Science

Department Office, 25 Callaghan Hall

The Department of Naval Science offers several programs of instruction for men and women leading to regular or reserve commissions in the U.S. Navy or U.S. Marine Corps. In addition the Naval Science courses are open to all University students or may be taken through University Extension.

Naval Science courses are offered in four-year, two-year, or special training cruises throughout the world. At sea they provide a time period for the midshipman battalion and provide a time period for the midshipman to develop leadership and command abilities. Ship handling, underway replenishment, and respection are taught during the training cruises. At sea the midshipman is assigned a leadership position to determine position fixing, dead reckoning, aids to navigation, and tides and current. Nautical techniques and skills are taught in classroom and practical settings.

For more information contact the Department of Naval Science, 25 Callaghan Hall.

Lower Division Courses

12A. Navigation. (4) Formerly course 112A Three hours of lecture and 1 hour of laboratory per week. Prerequisite: Principles of terrestrial navigation and piloting techniques. A study of the coordinate system, nautical charts and publications, position plotting utilizing lines of position, celestial navigation, and determining position fixing, dead reckoning, aids to navigation, and tides and current. Nautical rules of the road to prevent collisions at sea. (Staff (W)

12B. Navigation. (4) Formerly course 112B. Three hours of lecture and 1 hour of laboratory per week. Prerequisite: NS 12A. Principles of celestial navigation. A study of nautical astronomy, celestial coordinate systems and their application to the solution of the navigational triangle. The use and corrections of sextant sightings, the theory of astronomical navigation, celestial navigation, and special cases and star identification. The theory and systems of Electronic Navigation. (Staff (Sp)

Professional Courses

**401. Naval Ship's Systems (3) Three hours of lecture per week. Prerequisite: NA 10; Physics 5C or 6C taken concurrently. An introduction to the physical and operational aspects of the power generation system and propulsion system and application to the Navy's ships. The student will be able to explain operational aspects of the major shipboard systems. (W, F, Sp)

**402. Naval Operations (2) Two hours of lecture and 1 hour of laboratory per week. Prerequisite: courses 1, 401. A study of Naval Operations. Vector analysis and navigation. Students develop ability to navigate on Navigational Board. Shiphandling, underway replenishment, tactical maneuvering, and communication to include the use of radar, radio, telephone, and secure communications. (M, Ruhl (F)

Ranger and airborne training is also available to a limited number of cadets.

ROTC cadets receive financial assistance during their Junior and Senior years.

in their junior and senior years, and complete one summer training cruise after their third year. Upon graduation, the student will be commissioned as Ensign, U.S. Naval Reserve (2) and Second Lieutenant, U.S. Marine Corps Reserve. A three-year active duty obligation is incurred. Application should be made early in the fall quarter. Scholarships may be offered to highly qualified College Program students.

2. NROTC Two-Year Program: This program is designed for women and men who will be entering their junior year of undergraduate study. Applications are sought from U.C. Berkeley students as well as incoming junior college transfers. After a six-week summer training period at the Naval Science Institute, students are accepted to the NROTC Two-Year Program. They will incur a three-year active duty obligation and privileges as in the College Program described above. U.S. citizenship is required, and the age limit is 27 1/2 years at the time of graduation. Applicants should contact the Department of Naval Science no later than April 1st of their sophomore year of study.

3. Two-Year Scholarships: These programs are open to academically and physically qualified male students in their second year of undergraduate study, who have had some background in college physics and calculus. As with the Two-Year Program described above, candidates will attend a summer Naval Science Institute before their junior year. They will receive full tuition, book expenses, and $100 per month during their last two years. Upon graduation, they will receive Regular Navy commissions and enter nuclear power training or other Navy fields as Ensigns. Applications should be made by April 1st, usually in the sophomore year.

4. NROTC Scholarship Program: This is a nationwide competition open to physically qualified men and women between the ages of 17 and 21. U. S. citizenship is required. High school seniors and students enrolled in the NROTC College Program are eligible to apply. Successful applicants receive $100 per month for four years, plus full payment for tuition, fees, and book expenses. Three summer training cruises are required while in college. The student receives one regular or reserve commission in the Regular Navy or Marine Corps, with a four-year active duty obligation. November 15th is the application deadline.

For further information, direct inquiries to the Chairman of Naval Science, 25 Callaghan Hall.
Personalized System of Instruction

A number of self-paced courses, also known as Keller Plan or PSI (Personalized System of Instruction) courses, are currently offered at Berkeley. Students who do not need the motivation imposed by deadlines are most likely to profit from these courses. While each course is unique, they typically have the following characteristics:

1. Few lectures are given. Students learn the material through study guides, workbooks and textbooks. In some language courses, laboratory attendance may be required.

2. Students complete the work at their own pace within the limits of the ten-week quarter.

3. Students must demonstrate mastery of the material covered, usually through a quiz or an assignment, before proceeding to more advanced topics.

4. Students meet periodically with the instructors or tutors to ask questions or discuss problems.

5. In some courses, variable amounts of credit may be granted. For example, if a student completes half of the assignments required by a 4 unit course, 2 units of credit are assigned.

This method of instruction is most popular in introductory language and science courses. The following courses are currently taught through this format: Astronomy 105; Computer Science 1S, 3S, 103S; Engineering 17B; German 14A, 14B, 14C, 14D; Italian 14A, 14B, 14C, 14D; Landscape Architecture 112; Latin 14A, 14B, 14D; Mathematics PS, 15, 16S; Physics 5A1, 5B1, 5C1, 5D1, 6A1, 6B1, 6C1; Physiology 1; Spanish 14A, 14B, 14C.

Professional Development Program

Program Office, 230B Stephens Hall

The Professional Development Program (PDP) is a honors level program designed to increase the access of gifted minority and women students to higher education, particularly in the fields of science, mathematics, business and engineering, where they are particularly under-represented. PDP serves gifted secondary school minority and women students as well as UCB undergraduates and graduates. High school students with outstanding academic ability are brought to the Berkeley campus, given an intensive preparation for university study, and motivated to seek professional careers. Instruction is provided in diverse academic disciplines, counseling and advising are offered, and field trips, guest lectures, theatrical events, and workshops aid pre-college students in defining their career goals.

PDP offers UCB undergraduates special academic assistance and counseling and the opportunity to participate in faculty supervised laboratory research in a broad range of academic disciplines. The program for undergraduates maximizes access to the wealth of educational resources at Berkeley through: individual faculty advising and curriculum planning in the student's major; workshops, seminars, and tutorials which augment regular course offerings; laboratory and field project opportunities as training for research; peer teaching and research assistantships. Students who are about to begin graduate study are additionally provided with intensive instruction designed to familiarize them with the methodology of graduate work in their disciplines. PDP provides graduate students with individualized faculty orientation workshops, seminars and lectures by distinguished minority and women scholars. PDP helps students to locate jobs that will advance their professional careers. For further information, please contact the Program Office or call 642-5881.

University Research Expeditions Program

The University Research Expeditions Program (UREP) was recently established on the Berkeley campus to help provide funds for field research in the natural and social sciences while simultaneously offering students, staff and members of the general public the opportunity of joining domestic and foreign field research projects sponsored by the University. Through UREP, University scientists and field research projects that involve techniques that can be learned with minimal training are brought together with individuals interested in actively participating in field work. Participants become short-term members of a field research team and assist in wildlife habitat studies, botanical collecting expeditions, ethnographic field work, ecological surveys, fossil excavations, historical studies, and other types of field research.

UREP projects are open to students, staff and members of the general public. No previous academic or field experience is necessary to participate; instruction in field techniques is provided after participants arrive at their research site. Participants are selected for their interests, skills, experience and willingness to work and learn. A tax deductible donation to the University is required to help subsidize the research costs of the projects.

Past UREP projects have included animal behavior observations in Cameroon, Guatemala and St. Kitts; archeological excavations in Italy, California and Ghana; a museum collecting expedition to the Rendille, a nomadic tribe in Northern Kenya; an anthropological study of Carnival in Brazil; the preparation of an archeological map of the Valley of the Kings, Egypt; and marine studies in Hawaii, Jamaica and Honduras Bay; as well as plant collecting and/or insect studies in Costa Rica, Ecuador, Mexico, Mt. Kenya, New Caledonia and Surinam.

Some of the projects planned for 1979–80, each of approximately two-three weeks duration, are: (1) an archeological excavation of a neolithic site in Southern Italy; (2) a marine biology study in the Pacific Islands of Palau; (3) a tropical biology study of Caribbean lizards. Other projects in the fields of ecology, biology, marine biology and archaeology will be taking place in Baja California, Northern Canada, Hawaii, Greece and Jamaica.

For further information, please contact the University Research Expeditions Program, University of California, Berkeley, CA 94720; Telephone, 642-6586.

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Leo T. McCarthy Speaker of the Assembly
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George David Kieffer Vice President of the Alumni Association
David S. Saxon President of the University

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Benjamin Aaron (Effective September 1, 1979)

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Miss Marjorie J. Woolman Secretary of The Regents
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Archie Klingsinger Vice President—Academic and Staff Personnel Relations

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** Non-voting
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Dorothy E. Everett  
Assistant President—Coordination and Review

David A. Wilson  
Executive Assistant to the President

Lowell J. Paige  
Special Assistant to the President for Governmental Relations

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Murray Krieger  
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Josephine Miles  
Department of English, Berkeley

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Department of Chemistry, Berkeley

Neil Smesler  
Department of Sociology, Berkeley

Edward Teller  
Department of Physics, Berkeley

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Assistant Vice Chancellor—Employee Affairs

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Assistant Vice Chancellor—Legal Affairs

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Special Assistant to the Chancellor—Public Ceremonies

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Director, Office of Admissions and Records

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ASUC Executive Director

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Director of Career Planning Placement Center

Jane Moorman, Ph.D.  
Director of Counseling and Psychological Services

Jack E. Campbell, B.A.  
Administrator, Cowell Memorial Hospital

John L. Danielson, M.A.  
Director of Financial Aid

W. Sheridan Warrick, M.A.  
Director of Foreign Student Services and Executive Director of International House

(Joan)  
Director of Housing and Child Care Services

Ed B. Hendricks, M.S.  
Manager, Housing and Food Services

William A. McCormack, Ph.D.  
International Education Director

William G. Manning, M.A.  
Director, Intramural and Recreational Sports

Joseph A. Rosenthal (Acting), M.A., M.S.L.S.  
University Librarian

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Public Affairs Officer

Lynn R. Baranco, M.P.A.  
Director, Office of Relations with Schools

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Director of Student Activities and Programs

Austin C. Frank, Ph.D.  
Director of Student Affairs Research

James R. Brown, M.D.  
Director, Student Health

G. James Lemmon, A.B.  
Director of Student Information Center

Kurt Lauridsen, Ph.D.  
Director of Student Learning Center

John T. Wheeler, Ph.D.  
Summer Sessions Director

Milton R. Stern, M.A.  
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School of Public Health

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Graduate School of Public Policy

Harry Specht, Ph.D.  
School of Social Welfare
Correspondence Directory
University of California, Berkeley, CA 94720

Office of the President
714 University Hall
for University policy matters

Office of the Chancellor
200 California Hall
for campus policy matters

Admissions: Undergraduate
Office of Admissions and Records
120 Sproul Hall
School of Optometry
Office of the Dean
107 Minor Hall

Admissions: Graduate
Graduate Admissions
1 California Hall
(except School of Law)
School of Law
Office of Admissions
222 Boalt Hall

Admissions and Records, Office of
120 Sproul Hall
for undergraduate admissions, all academic records, registration fees and expenses, veterans (and dependents of veterans) education benefits, social security benefits, Railroad Retirement, Public Employees Retirement Systems, Civil Service Commission, State Teachers' Retirement System, and veteran's pensions (see pages 9 to 11)

ASUC
(Associated Students of UC)
211 Eshleman Hall
(seen page 32)

Career Planning and Placement Center
Building T-6 & 111 Wheeler Hall
for (a) careers in education, business, government, and other fields, and (b) for student employment (see page 25)

College or School, Office of the Dean
for academic matters (see Colleges and Schools section, pages 35 to 36)

Financial Aid, Office of
201 Sproul Hall
for grants, loans, scholarships, prizes, undergraduate scholarships and honors, work-study (see page 28)

Foreign Student Services
International House
2299 Piedmont Avenue
(seen page 29)

Graduate Division
1 California Hall
for graduate admission, fellowships and scholarships, graduate minority program, regulations and requirements governing the master's and doctor's degrees, petitions, and other matters pertaining to graduate students (see pages 17 to 27)

Housing and Child Care Services, Office of
2401 Bowditch Street
(see page 29)

International Education
Room 104A, Building D
2537 Channing Way
(see pages 24 and 34)

Relations with Schools, Office of
407 Eshleman Hall
for E.O.P. and general information
(see page 11)

Residence Matters, Attorney in
590 University Hall, for residence status
(see Appendix)

Student Activities and Programs, Office of
103 Sproul Hall
(see page 29)

Student Health Service
Cowell Memorial Hospital
(see page 27)

University Extension
2223 Fulton Street
(see pages 9 and 20)

Publications
General Catalog, Berkeley
Complete information about the academic programs on the Berkeley campus—admission requirements, curricula, course descriptions, degrees conferred, regulations and requirements for degrees, financial aids for students, the academic calendar, extracurricular student activities—and general campus information.
Office of Admissions and Records, 120 Sproul Hall. (No charge.)

Schedule of Classes
Lists time and place of meeting for specific classes, names of instructors, and units of credit awarded. Also contains a directory of departmental offices and offices of instruction.
Office of Admissions and Records, 120 Sproul Hall. (Price: 25c; 50c by mail.)

Summer Session Bulletin
Complete information about summer sessions instruction.
Office of the Summer Sessions, 22 Wheeler Hall. (No charge.)
Academic Calendar, 1979/80

Admission to Undergraduate Status:

Application packets are available one month prior to the date shown for the beginning of the application filing period. California high school and college students should obtain packets from their counselors; others, in person at or by writing to any University of California Office of Admissions and Records. Written requests may be made as early as six weeks in advance of the filing date in order to meet the release date for application packets. All applications filed during the first month of the filing period are accepted for consideration. After the first month the deadline will vary. Each college and school has enrollment quotas that limit the number of new freshmen and advanced standing students that may be admitted. Once quotas have been filled, additional applications cannot be accepted. The application may be redirected to another University campus where enrollments are still open.

These dates apply to applicants for regular, limited, or special status; a second bachelor's degree; or intercampus transfer.

In order to give time for necessary correspondence and for due notice to applicants who may be required to take examinations for admission, transcripts of records should be forwarded to the Office of Admissions and Records at the earliest possible date.

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<tbody>
<tr>
<td>Admission to Undergraduate Status:</td>
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<td>Admission to Graduate Status:</td>
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<td>Feb. 1, Thursday</td>
<td>Sept. 1, Saturday</td>
<td>Nov. 1, Thursday</td>
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<tr>
<td>Readmission* To Graduate Status:</td>
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<td>March 1, Thursday</td>
<td>Sept. 1, Saturday</td>
<td>Dec. 1, Saturday</td>
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<tr>
<td>Final dates for filing credentials and applications with the Dean of the Graduate Division for admission to graduate standing.</td>
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<td>Admission and Readmission to School of Law:</td>
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<td>Feb. 1, Thursday</td>
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<td>Readmission* to Undergraduate Status:</td>
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<tr>
<td>July 16, Monday</td>
<td>Nov. 1, Thursday</td>
<td>Feb. 1, Friday</td>
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<tr>
<td>Final date for filing applications with the Office of Admissions and Records for readmission to undergraduate status.</td>
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<tr>
<td>Registration by mail for graduate and undergraduate students.§</td>
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<td>July 2-Aug. 24, Monday-Friday</td>
<td>Nov. 5-27, Monday-Friday</td>
<td>Feb. 11-29, Monday-Friday</td>
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<td>School of Law, registration of students.</td>
<td>April 23-Aug. 3, Monday-Friday</td>
<td>Nov. 12-Dec. 7, Monday-Friday</td>
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<td>School of Law, term begins.</td>
<td>Aug. 20, Monday</td>
<td>Jan. 7, Monday</td>
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<tr>
<td>Academic and Administrative Holiday.</td>
<td>Sept. 3, Monday</td>
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<tr>
<td>School of Law, instruction begins.</td>
<td>Aug. 20, Monday</td>
<td>Jan. 7, Monday</td>
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<td>School of Law, study-list filing.</td>
<td>Aug. 21-Sept. 4, Monday-Tuesday</td>
<td>Jan. 8-22, Tuesday-Tuesday</td>
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<tr>
<td>School of Law, final date to register.</td>
<td>Sept. 4, Monday</td>
<td>Jan. 22, Tuesday</td>
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<tr>
<td>Final date for filing with the committee in charge of the final form of dissertations for all doctoral degrees to be conferred in 1979-80.</td>
<td>Sept. 7, Monday</td>
<td>March 28, Friday</td>
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<tr>
<td><em>Approved applications for readmission filed with the Office of Admissions and Records by July 16 for Fall Quarter, September 17 for Winter Quarter, and December 17 for Spring Quarter will enable you to register by mail.</em>*</td>
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§Except School of Law.

Registration forms may be obtained beginning May 14 for students registered in Spring Quarter who will continue in the same status for Fall Quarter. Students registered in Spring Term in the School of Law who will continue in the same status for Fall Term may pick up registration forms beginning April 23.

**Final dates are subject to change without notice; consult the Office of Financial Aid for further information.
<table>
<thead>
<tr>
<th><strong>Fall 1979</strong></th>
<th><strong>Winter 1980</strong></th>
<th><strong>Spring 1980</strong></th>
<th><strong>Fall 1979</strong></th>
<th><strong>Winter 1980</strong></th>
<th><strong>Spring 1980</strong></th>
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<tbody>
<tr>
<td><strong>Final date to register.</strong></td>
<td>Oct. 12, Friday</td>
<td>Jan. 25, Friday</td>
<td>April 18, Friday</td>
<td>April 24, Thursday</td>
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<tr>
<td><strong>Final date for filing applications of candidacy for all master's degrees to be conferred in 1979-80; Office of the Dean of the Graduate Division, 1 California Hall. All signatures required on these applications must be obtained in advance.</strong></td>
<td>Oct. 5, Friday</td>
<td>April 11, Friday</td>
<td>Oct. 26, Friday</td>
<td>Feb. 8, Friday</td>
<td>May 2, Friday</td>
</tr>
<tr>
<td><strong>Last date for filing without fee announcements of candidacy for any bachelor's degree or the Doctor of Optometry degree to be conferred 1979-80. Fee thereafter, $3.</strong></td>
<td>Oct. 8, Monday</td>
<td>Jan. 21, Monday</td>
<td>April 14, Monday</td>
<td>May 23, Friday</td>
<td>May 16, Friday</td>
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<tr>
<td><strong>Final date for filing announcements of candidacy for the bachelor's degree.</strong></td>
<td>Oct. 12, Friday</td>
<td>Jan. 25, Friday</td>
<td>April 18, Friday</td>
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<tr>
<td><strong>Final date for filing applications of candidacy for all doctoral degrees to be conferred in 1979-80; Office of the Dean of the Graduate Division, 1 California Hall. All signatures required on these applications must be obtained in advance.</strong></td>
<td>Oct. 12, Friday</td>
<td>April 18, Friday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Undergraduates not in the College of Letters and Science: final date to file petitions to add and/or drop courses and to make changes in the option of enrolling in courses on a passed/ not passed or letter-graded basis. Thereafter, special approval is required for undergraduates from the Dean of the College or School and for graduates from the Dean of the Graduate Division. For those who receive approval there is a $3.00 fee.</strong></td>
<td>Oct. 12, Friday</td>
<td>Jan. 25, Friday</td>
<td>April 18, Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Undergraduates enrolled in the College of Letters and Science: final date to file petitions to add courses; thereafter, special approval of the Dean is required. Final date to file petitions to drop courses without fee. Fee thereafter, $3. Final date to make changes in the option of enrolling in courses on a passed/not passed or letter-graded basis.</strong></td>
<td>Oct. 12, Friday</td>
<td>Jan. 25, Friday</td>
<td>April 18, Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Instruction ends.</strong></td>
<td>Dec. 1, Saturday</td>
<td>March 15, Saturday</td>
<td>June 7, Saturday</td>
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</tr>
<tr>
<td><strong>Final examinations in departments.</strong></td>
<td>Dec. 3-8, Mon.-Sat.</td>
<td>March 17-22, Mon.-Sat.</td>
<td>June 9-14, Mon.-Sat.</td>
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</tr>
<tr>
<td><strong>Final date for filing theses with the Dean of the Graduate Division for all master's degrees to be conferred in 1979-80.</strong></td>
<td>Dec. 7, Friday</td>
<td>June 13, Friday</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Quarter ends.</strong></td>
<td>Dec. 8, Saturday</td>
<td>March 22, Saturday</td>
<td>June 14, Saturday</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>School of Law, instruction ends.</strong></td>
<td>Dec. 4, Tuesday</td>
<td>April 28, Monday</td>
<td></td>
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</tr>
<tr>
<td><strong>Academic and Administrative Holiday.</strong></td>
<td>Dec. 24-25, Mon.-Tues.</td>
<td>March 24, Monday</td>
<td>May 26, Monday</td>
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</tr>
<tr>
<td><strong>Dec. 31-Jan. 1, Mon.-Tues.</strong></td>
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<tr>
<td><strong>School of Law, final examinations.</strong></td>
<td>Dec. 10-21, Mon.-Fri.</td>
<td>May 5-17, Mon.-Sat.</td>
<td></td>
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</tr>
<tr>
<td><strong>School of Law, term ends.</strong></td>
<td>Dec. 21, Friday</td>
<td>May 17, Saturday</td>
<td></td>
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</tr>
<tr>
<td><strong>Final date to file petition and complete work for course with incomplete grade received Spring Quarter, 1979.</strong></td>
<td>July 16, Wednesday</td>
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</table>
Appendix

Student Persistence and Degree Completion at U.C. Berkeley

The number of students at large public universities nationwide who begin bachelor degree programs and continue with them through graduation is uncertain. Estimates suggest that between 20% and 65% of all entering freshmen remain to earn degrees at the campuses at which they have initially enrolled, while close to 70% earn bachelor's degrees at one school or another.

U.C. Berkeley data indicate that up to 60% of each year's entering freshmen eventually complete a degree at the Berkeley campus, but not all do so in four years. Many undergraduates transfer to Berkeley after having begun college work elsewhere; of those entering at the junior level, up to 75% complete a degree at Berkeley, although some require three years of residence to do so. More students at Berkeley who complete bachelor's degrees continue to complete Ph.D.'s than students at any other college or university in the nation.

At the graduate level, where Berkeley offers more than 100 degree programs, over 70% of all entant students obtain at least one additional graduate degree before leaving campus. More Ph.D.'s are earned at Berkeley than at any other university in the country.

In the academic year 1977-78, Berkeley awarded 5033 bachelor's degrees, 2256 master's degrees and 827 doctorates. In total, 6522 degrees and certificates were awarded in the 1977-78 academic year out of a total enrollment of approximately 27,400 students.

Nondiscrimination Policy

The University of California in compliance with Titles VI and VIII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972 (45 CFR 86), and Sections 503 and 504 of the Rehabilitation Act of 1973, does not discriminate on the basis of race, color, national origin, religion, sex, or handicap in any of its policies, procedures, or practices; nor does the University, in compliance with the Age Discrimination in Employment Act of 1967 and Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, discriminate against any employees or applicants for employment on the basis of their age or because they are disabled veterans or veterans of the Vietnam era. This nondiscrimination policy covers admission, access, and treatment in University programs and activities, and application for and treatment in University employment.

In conformance with University policy and pursuant to Executive Orders 11246 and 11375, Section 503 of the Rehabilitation Act of 1973, and Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, the University of California is an affirmative action/equal opportunity employer.

Inquiries regarding the University's equal opportunity policies may be directed to the Office of the Chancellor, 200 California Hall, University of California, Berkeley, California 94720.

Access to Records

Each student is entitled by law and University policy to examine and challenge most of the records maintained by the University on that student. These records are confidential, and in most circumstances may be released to third parties only with the prior consent of the student. Such matters are detailed in the Berkeley Campus Policy Governing Disclosure of Information from Student Records, available in the Office of the Director of Student Activities, 103 Sproul Hall.

Refund Procedure

New Undergraduate Students: Prior to Day 1, Registration Fee paid is refunded except for the $50 Acceptance of Admission Fee, and other fees paid are refunded in full. Day 1 and after, the $50 Acceptance of Admission Fee is withheld from the Registration Fee, and the Schedule of Refunds is applied to the balance of fees assessed.

All Continuing and Readmitted Students and New Graduate Students: There is a service charge of $10.00 for cancellation of registration or withdrawal before the first day of instruction. After the first day of instruction the Schedule of Refunds is applied to the total of fees assessed.

Salary and Employment Information/University of California

<table>
<thead>
<tr>
<th>FIELD OF STUDY</th>
<th>AVERAGE MONTHLY SALARY OF GRADUATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree Level</td>
<td>Bachelor's</td>
</tr>
<tr>
<td>Accounting</td>
<td>$ 963-1,285</td>
</tr>
<tr>
<td>Bus. Adm. (General)</td>
<td>$ 715-1,257</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>$ 600-1,472</td>
</tr>
<tr>
<td>Computer Science</td>
<td>$1,083-1,449</td>
</tr>
<tr>
<td>Engineering</td>
<td>$1,242-1,556</td>
</tr>
<tr>
<td>Humanities</td>
<td>$ 587-1,155</td>
</tr>
<tr>
<td>Physical &amp; Earth Sciences</td>
<td>$ 952-1,526</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>$ 641-1,145</td>
</tr>
</tbody>
</table>

| *Source: A 1978 national survey of a representative group of colleges conducted by the College Placement Council representing the 80 percent range of offers throughout the country. It should be noted that a wide variation in starting salaries exists within each discipline based on job location, type of employer, personal qualifications of the individual, and employment conditions at the time of job entry. |

Schedule of Refunds

Tuition, Educational Fee, University Registration Fee, and Other Student Fees

<table>
<thead>
<tr>
<th>Period</th>
<th>Percentage Refund</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-14 days</td>
<td>80%</td>
</tr>
<tr>
<td>15-21 days</td>
<td>60%</td>
</tr>
<tr>
<td>22-28 days</td>
<td>40%</td>
</tr>
<tr>
<td>29-35 days</td>
<td>20%</td>
</tr>
<tr>
<td>36 days and over</td>
<td>0%</td>
</tr>
</tbody>
</table>

California Residency and the Nonresident Tuition Fee

Students who have not been residents of California for more than one year immediately prior to the residence determination date for each term in which they propose to attend the University are charged, along with other fees, a non-resident tuition fee of $800 for the quarter or $1200 for the semester. The residence determination date is the day instruction begins at the last of the University of California campuses to open for the quarter, and for schools on the semester system, the day instruction begins for the semester.

General

In order to be classified as a resident for tuition purposes, an adult student must have established his/her residence in California for more than one year immediately preceding the residence determination date for the term during which he/she proposes to attend the University and relinquished any prior residence. An adult student must couple his/her physical presence within this state for one year with objective evidence that such presence is consistent with his/her intent in making California his/her permanent home and, if these steps are delayed, the one-year period will be extended until BOTH presence and intent have been demonstrated for one full year. Indeed, physical presence within the state alone for educational purposes does NOT constitute the establishment of California residence under state law regardless of the length of his/her stay in California.

Relevant indicia which can be relied upon to demonstrate one's intent to make California his/her permanent residence include, but are not limited to, the following: registering and voting in California elections; designating California as his/her permanent address on all school and employment records, including military records if one is in the military service; obtaining a California driver's license or California Identification Card, if a non-driver; obtaining California vehicle registration; paying California income taxes as a resident, including income earned outside this state; establishing an abode where one's permanent belongings are kept within California; licensing for professional practice in California.
California; and the absence of these indicia in other states during any period for which residence in California is asserted. Documentary evidence may be required. No single factor is controlling or decisive. All relevant indicia will be considered in the classification determination. The student must petition to have his or her status changed at the Office of Admissions and Records at the campus attended, and documentation of residence (driver's license, voter registration receipt, etc.) may be requested at that time. All changes of status must be initiated prior to the late registration period for the quarter or semester for which the student intends to be reclassified.

Students who are within California for educational purposes only do not gain the status of resident regardless of the length of their stay in California.

The residence of the parent with whom an unmarried minor (under age 18) maintains his or her place of abode is the residence of the unmarried minor. When minors live with neither parent their residence is that of the parent with whom they maintained their last place of abode. Minors may establish their residence when both parents are deceased and a legal guardian has not been appointed. The residence of unmarried minors who have a parent living cannot be changed by their own act, by the appointment of a legal guardian, or by relinquishment of a parent's right of control.

A man or a woman established his or her residence. A woman's residence shall not be derivative from that of her husband, or vice versa.

Exceptions

1. Students who remain in this state after their parent, who was theretofore domiciled in California for at least one year prior to leaving and has, during the student's minority and within one year immediately prior to the residence determination date, established residence elsewhere, shall be entitled to resident classification until they have attained the age of majority and have resided in the state the minimum time necessary to become a resident so long as, once enrolled, they maintain continuous attendance at an institution.

2. Nonresident students who are minors or 18 years of age and can evidence that they have been self-supporting through employment and actually present within California for the entire year immediately prior to the residence determination date have evidenced the intent to make California their permanent home may be eligible for resident status.

3. Students shall be entitled to resident classification immediately prior to the residence determination date they have lived with and been under the continuous direct care and control of any adult or adults other than a parent for not less than two years, provided that the adult or adults having such control have been California residents during the year immediately prior to the residence determination date. This exception continues until the student has attained the age of 18 and has resided in the state the minimum time necessary to become a resident student, so long as continuous attendance is maintained at an institution.

4. Exemption from payment of the nonresident tuition fee is available to the natural or adopted child, stepchild, or spouse who is a dependent of a member of the United States military stationed in California on active duty. Such resident classification may be maintained until the student has resided in California the minimum time necessary to become a resident. If a student is enrolled in an institution and the member of the military is transferred on military orders to a place outside of the United States immediately after having been on active duty in California, the student is entitled to retain residence classification under conditions set forth above.

5. Students who are members of the United States military stationed in California on active duty, except members of the military assigned for educational purposes to a state-supported institution of higher education, shall be entitled to resident classification until they have resided in the state the minimum time necessary to become a resident.

6. Students who are adult aliens are entitled to resident classification if they have been lawfully admitted to the United States for permanent residence in accordance with all applicable provisions of the laws of the United States and have thereafter established and maintained residence in California for more than one year immediately prior to the residence determination date.

7. Students who are minor aliens shall be entitled to resident classification if the student is a refugee who has been granted parole, a conditional entrant or indefinite voluntary departure status in accordance with all applicable laws of the United States; provided that the student has lived in the state for one year immediately prior to the residence determination date. (Effective until June 30, 1980.)

8. Children of deceased public law enforcement or fire suppression employees, who were California residents, and who were killed in the course of law enforcement or fire suppression duties, may be entitled to resident classification.

Procedures

New and returning students are required to complete a Statement of Legal Residence. The student's status is determined by the Attorney in Residence Matters' Deputy who is located in the Office of Admissions and Records.

Students are cautioned that this summation is not a complete explanation of the law regarding residence. They should also note that changes may have been made in the rate of nonresident tuition and the residence requirements between the time this catalog statement is published and the relevant residence determination date. Regulations have been adopted by The Regents, a copy of which is available for inspection in the Office of Admissions and Records.

All students classified incorrectly as residents are subject to reclassification and to payment of all nonresident fees not paid. If incorrect classification results from false or concealed facts by the student, the student also is subject to University discipline. Resident students who become nonresidents must immediately notify the Attorney in Residence Matters' Deputy.

Inquiries from prospective students regarding residence requirements for tuition purposes should be directed to the Attorney in Residence Matters; University of California; 590 University Hall; Berkeley, California 94720. No other University personnel are authorized to supply information relative to residence requirements for tuition purposes. Any student, following a final decision on residence classification by the Residence Deputy, may make written appeal to the Attorney in Residence Matters at the above address within 120 days after notification of the final decision by the Residence Deputy.

Waivers of Non-Resident Tuition

To the extent funds are available, nonresident tuition waivers may be granted to spouses and dependent, unmarried children under age 21 of University faculty members who are qualified for membership in the Academic Senate; to the unmarried, dependent children under age 21 of a full-time University employee whose permanent assignment is outside California and who has been employed by the University for more than one year immediately prior to the opening of the term; and for certain foreign students. Inquiries regarding these waivers normally should be directed to the Dean of the Graduate Division of the campus the student proposes to attend.

In addition, certain student Teaching Assistants and Teaching Fellows, and certain graduate students designated as University Fellows and Distinguished Scholars may be eligible for non-resident tuition waivers or fellowships. Such students should contact the Graduate Division at their campus for further information.
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