841. Collective Bargaining in Public Employment
Spring, Summer. 4(3-0) EC 305 or approval of school.
History and current status of collective bargaining practices and governmental policies in the public sector.

854. Comparative Industrial Relations Systems
Winter. 4(3-0) EC 305.
Comparative analysis of industrial relations systems of countries in various stages of economic development.

857. Wage Theory
Fall. 3(3-0) EC 320, 334, or approval of department. Interdepartmental with and administered by the Department of Economics.
Advanced analysis of: theories of wage determination; labor market research; economic effects of collective bargaining upon the national wage structure; output, employment, distribution of national income, the price level, nature and effects of government wage policies.

858. Industrial Relations
Winter. 3(3-0) EC 305 and approval of department. Open to graduate students in economics and related fields such as labor and industrial relations, psychology, sociology, anthropology, political science, business, and history. Interdepartmental with the Department of Economics.
Problems and issues in the administration and negotiation of collective bargaining agreements; includes both economic and noneconomic aspects of industrial relations policies and practices.

863. Law of Labor-Management Relations
Winter. Spring. 4(1-0) Approval of school.
The National Labor Relations Act as amended: rights to organize and undertake concerted activity; legal framework of contract negotiations; representation of bargaining unit members; union member rights; proposed statutory changes.

865. Grievance Administration and Arbitration
Winter, Spring. 4(3-0) Approval of school.
Grievance procedure and arbitration as the terminal step in the grievance process. Analysis of industrial common law.

868. Equal Employment Opportunity and Occupational Safety and Health Policy
Spring. 4(4-0)
Major emphasis on government policies to promote equal employment opportunity, their scope and impact on collective bargaining. Attention also given to governmental policies to protect workers from substandard working conditions.

881. Advanced Seminar in Labor and Industrial Relations
Spring. 4(4-0) May re-enroll for a maximum of 8 credits. Twelve graduate credits or approval of school.
Integrative and synthesizing seminar for advanced students; intensive analysis of selected problems in labor and industrial relations.

895. Readings in Labor and Industrial Relations
Fall, Winter, Spring. Summer. Variable credit. May re-enroll for a maximum of 8 credits. Approval of school.

899. Research in Labor and Industrial Relations
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 9 credits. Approval of school.

901. Seminar in Trade Union Behavior
Fall. 4(4-0) 801 or approval of school.
Research and policy analysis of selected problems of trade union behavior.

911. Seminar in Manpower
Fall. 4(3-0) Approval of school.
Critical study of research and policy on selected manpower problems.

923. Seminar in Organizational Behavior
Spring. 4(4-0) Approval of school.
Research and policy on selected problems of organizational behavior in labor and industrial relations.

958. Seminar in Collective Bargaining
Spring. 4(3-0) EC 858 or approval of school.
Critical study of selected contemporary areas and issues in collective bargaining.

LANDSCAPE ARCHITECTURE
See Urban Planning and Landscape Architecture

LARGE ANIMAL SURGERY AND MEDICINE

412. Livestock Hygiene and Disease Control
Winter. 3(3-0) Juniors; Agriculture majors.
Fundamentals of health and disease in animals, relation of infections and parasitic diseases of animals to human health, disease prevention and role of veterinarian in preventive medicine.

1DC. The Impact of Animal Resource Management Upon the World's Developing Nations
For course description, see Interdisciplinary Courses.

601. Large Animal Clinics Clerkship
Fall, Winter, Spring, Summer. 8 credits.
Veterinary Medicine students in terms 9, 10, or 11 electing Small Animal or Non-Practice options and approval of department.
Introductory concepts and practices in large animal clinical medicine, emphasizing diagnosis, patient care, medicine, surgery, disease prevention and herd health in a rotation through clinical services.

602. Large Animal Clinics Clerkship
Fall, Winter, Spring, Summer. 4 to 16 credits. May re-enroll for a maximum of 32 credits. Veterinary Medicine students in terms 9, 10, or 11 electing the Large Animal or Mixed-Practice options and approval of department.
Concepts and practices in large animal clinical medicine—rotation through clinical services with assignment and care of clinical patients supervised by faculty and staff.

603. Preceptorial Clinic
Fall, Winter, Spring, Summer. 6(0-24) to 18(0-48). May re-enroll for a maximum of 16 credits. 602, and approval of department.
Applied large animal clinical science. Students participate in all activities in assigned private practices tutored by practitioners with adjunct faculty appointments.

621. Integrative Clinical Problems
Fall, Winter, Spring. Summer. 2(0-6) to 4(0-12). May re-enroll for a maximum of 12 credits. 602 and approval of department.
Comprehensive problem-solving explorations of selected clinical diseases, either systems or species oriented, in large animals.

640. Special Problems
Fall, Winter, Spring. Summer. 2(0-6) to 4(0-12). May re-enroll for a maximum of 8 credits. 602 and approval of department.
Exploration of problems in large animal specialities to meet specific goals of students.

809. Problems in Large Animal Surgery
Fall, Winter, Spring, Summer. Variable credit.

811. Problems in Large Animal Medicine
Fall, Winter, Spring, Summer. Variable credit.

813. Seminar
Fall, Winter, Spring. 1 credit.

823. Special Surgery
Spring. 3(1-6) May re-enroll for a maximum of 6 credits. Approval of department.
Surgical techniques and tissue reactions following surgery in large animals.

899. Research
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 18 credits. Approval of department.
Research on thesis problems.

LATIN
See Romance and Classical Languages

LINGUISTICS AND ORIENTAL AND AFRICAN LANGUAGES

College of Arts and Letters
Courses in CHINESE and JAPANESE on the 300 level or higher are normally conducted in the language.

Linguistics and Oriental and African Language Courses

299. Special Projects
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 18 credits. Approval of department.
Work in areas outside regular course offerings.
315. World Literature in English
Fall, 3(3-0) Interdepartmental with and administered by the English Department. Representative works, not from England or the United States, which were written originally in English, especially the English literature of present or former British Commonwealth nations, and nations from the Middle East and Africa.

316. World Literature in English Translation
Winter. 3(3-0) Interdepartmental with the English Department. Significant and characteristic works of the Orient, the Middle East, and Africa in English translation.

317. Genres and Themes in World Literature
Spring. 3(3-0) Interdepartmental with and administered by the English Department. Work will center each term around a single literary genre, type or theme. Typical examples: The Quest, Literature of Revolt, Satire, Literary manuals will be selected from several national literatures.

499. Special Projects
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 18 credits. Approval of department. Work in areas outside regular course offerings.

African Languages

AFR

101. African Languages-ELEMENTARY
Fall. 5(3-2) May re-enroll for 101-102-103 sequence in more than one African language. Comprehension and speaking taught by a linguist with native informants. Offerings include Bemba, Hausa, Edo, Fidjian, Swahili, Yoruba. These and other African languages are taught upon sufficient demand and availability of instructors.

102. African Languages-Elementary
Winter. 5(3-2) May re-enroll for 101-102-103 sequence in more than one African language. 101.

103. African Languages-Elementary
Spring. 3(3-2) May re-enroll for 101-102-103 sequence in more than one African language. 101.

200H. Honors Work
Fall, Winter, Spring. 1 to 16 credits. Approval of department.

201. African Languages-Intermediate
Fall. 4(5-0) May re-enroll for 201-202-203 sequence in more than one African language. 101 in appropriate language or approval of department. Continuation of AFR 101 for language available.

202. African Languages-Intermediate
Winter. 4(5-0) May re-enroll for 201-202-203 sequence in more than one African language. 201.

203. African Languages-Intermediate
Spring. 4(5-0) May re-enroll for 201-202-203 sequence in more than one African language. 201. Continuation of 201.

400H. Honors Work
Fall, Winter, Spring. Variable credit. Approval of department.

420. African Literature in Translation
Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 9 credits. Juniors or approval of department. Development and influence of the ideas, forms and motifs of African literatures in the literatures of the world.

450. African Languages-Advanced
Fall, Winter. Spring. Variable credit. May re-enroll for maximum of 18 credits. Approval of department. Advanced training or specialized research in particular African languages.

Chinese

CHS

101. Elementary Chinese
Fall. 5(3-5) Introduction to Mandarin, the official spoken language of China, with emphasis on pronunciation drill and conversation practice.

102. Elementary Chinese
Winter. 5(3-5) 101. Continued practice in conversation and aural comprehension; introduction to the reading and writing of Chinese characters.

103. Elementary Chinese
Spring. 5(3-5) 102. Continuation of 102 and grammatical analysis of basic Chinese sentence structure.

200H. Honors Work
Fall, Winter, Spring. 1 to 16 credits. Approval of department.

201. Second-Year Chinese
Fall. 3(3-0) 103. Conversation, reading, and writing at the intermediate level.

202. Second-Year Chinese
Winter. 3(3-0) 201. Reading of advanced texts, introducing Chinese radicals and practice in the use of a Chinese dictionary.

203. Second-Year Chinese
Spring. 3(3-0) 202. Continuation of 202; selected texts from Chinese newspapers, periodicals, and political journals.

221. Second-Year Conversation and Composition
Fall. 2(2-0) 103. Conversation and composition at the intermediate level to supplement 201.

222. Second-Year Conversation and Composition
Winter. 2(2-0) 201. Continuation of 221.

223. Second-Year Conversation and Composition
Spring. 2(2-0) 222. Continuation of 222.

250. Chinese Calligraphy
Spring. 2(2-0) One year in Chinese language or approval of department. The essential characteristics of and fundamental skills involved in writing Chinese characters, from the point of view of practical use.

301. Readings in Modern Chinese Literature
Fall. 3(3-0) 203. Selected short stories from authors of the twentieth century.

302. Readings in Modern Chinese Literature
Winter. 3(3-0) 301. Selected essays from authors of the twentieth century.

303. Readings in Classical Chinese Literature
Spring. 3(3-0) 302. Selections from the writings of the important philosophers, historians, and poets.

321. Conversation and Composition
Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 9 credits. 203. Directed topical conversation and practice in composition.

400H. Honors Work
Fall, Winter, Spring. Variable credit. Approval of department.

401. Survey of Chinese Literature
Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 9 credits. Oral command and reading knowledge of Chinese language. Survey of Chinese literature from earliest record to contemporary writings. Lectures and discussions conducted in Chinese. Most assigned readings in Chinese, some in English translation.

420. Oriental Literature in Translation
Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 9 credits. Juniors or approval of department. Development and influence of the ideas, forms and motifs of Far Eastern literatures in the literatures of the world.

431. Chinese Poetry
Fall. 3(3-0) Reading knowledge of Chinese. Rise and development of Chinese poetry with particular attention to poetry of the T'ang Dynasty.

432. Chinese Drama
Winter. 3(3-0) Reading knowledge of Chinese. Special emphasis on drama of the Yuan Dynasty.

Japanese

JAP

101. Elementary Japanese
Fall. 3(4-1) Spoken and written Japanese, emphasis on conversation and easy reading.
Descriptions — Linguistics and Oriental and African Languages

Courses

102. Elementary Japanese
   Winter. 5(4-1) 101.
   Continuation of 101.

103. Elementary Japanese
   Spring. 5(4-1) 102.
   Continuation of 102.

201. Second-Year Japanese
   Fall. 3(3-0) 103.
   A second-year course, stressing both oral and written Japanese.

202. Second-Year Japanese
   Winter. 3(3-0) 201.
   Continuation of 201.

203. Second-Year Japanese
   Spring. 3(3-0) 202.
   Continuation of 203.

221. Second-Year Composition
   Fall. 2(2-0) 103.
   Review grammar and composition to supplement 201.

222. Second-Year Composition
   Winter. 2(2-0) 221.
   Continuation of 221.

223. Second-Year Composition
   Spring. 2(2-0) 222.
   Continuation of 222.

400H. Honors Work
   Fall, Winter, Spring. Variable credit.
   Approval of department.

Linguistics LIN

200. Language and Linguistics
   Fall, Winter, Spring. 3(3-0)
   Especially for students in areas other than linguistics, this course consists of an introduction to language and linguistics, emphasizing the application of linguistics to various other disciplines.

401. Introduction to Linguistics
   Fall, Winter, Spring, Summer. 4(4-0)
   Juniors or approval of department. Not open to students with credit in 200.
   The scientific study of human languages. Basic goals, assumptions, terminology, and research results of modern theoretical and applied linguistics, with examples from a variety of languages.

402. Phonology
   Fall, Winter, Spring. 3(3-0) 401 or approval of department.
   Sounds and sound systems, emphasizing the four basic areas of articulatory phonetics, phonetic features and components, classical phonemics, and phonology in contemporary linguistic theories.

403. Morphology
   Fall, Winter, Spring. 3(3-0) 402 or concurrently.
   Structure of words, covering the identification and classification of morphemes, morphophonemics alternation, and morphology in contemporary linguistic theories.

410. Child Language Acquisition
   Fall. 3(3-0) 490 or 401 or approval of instructor.
   Linguistic issues, perspectives, and research on the acquisition of language, in spoken and written form, by children, phonology, morphology, syntax, semantics, and linguistic universals; implications for related disciplines.

421. Articulatory Phonetics
   Fall, Winter, Spring. 3(2-2) Approval of department.
   Development of phonetic skills for the learning and teaching of languages.

431. Introduction to Transformational Grammar
   Winter, Spring. 3(3-0) 401 or approval of department.
   Investigation of the origin and development of transformational theory of syntax; properties of deep structure, surface structure, and transformation; application of transformational concepts to native and foreign language learning.

441. Introductory Readings in Linguistics
   Fall, Winter, Spring. 3(3-0) 401.
   Critical reading of basic texts of modern linguistics.

811. History of Linguistics
   Fall. 3(3-0) Approval of department.
   The origin and development of linguistic studies from ancient India and Greece to the present. Provides a foundation for the understanding of contemporary issues in linguistics.

821. Phonological Analysis
   Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 9 credits. Approval of department.
   Advanced study of phonology, generally utilizing one of the following theories: stratificational, tagmemic, transformational.

831. Grammatical Analysis
   Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 9 credits. Approval of department.
   Advanced study of syntax and related topics, generally utilizing one of the following theories: stratificational, tagmemic, transformational.

835. Semantics of Natural Languages
   Spring. 3(3-0) 431 or approval of department.
   Selected topics on the study of meaning in human languages. History, issues, and theories of semantics.

102. Interdisciplinary Seminar on Africa
   For course description, see Interdisciplinary Courses.

511. African Linguistics
   Winter. 3(3-0) May re-enroll for a maximum of 9 credits. 403 or approval of department.
   Investigation of linguistic issues and phenomena in one or a group of African languages.

860. Special Projects
   Fall, Winter, Spring, Summer. Variable credit. Approval of instructor.
   Supervised study, reading, and research in specialized areas of linguistics.

865. Contrastive Analysis
   Spring. 3(3-0) 403.
   The essentials of contrastive analysis, with emphasis on methods of making such analysis. The usefulness of and controversies concerning contrastive analysis will also be discussed.

871. Comparative Indo-European Linguistics
   Spring of odd-numbered years. 3(3-0)
   Comparative linguistics as applied to the investigation of the development and historical relationships of the languages of the Indo-European family.

880. Seminar in Linguistics
   Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 18 credits in different topics. Approval of department.
   Advanced critical study of current topics in linguistics such as applications to other disciplines, aspects of linguistic theory, child language acquisition, contrastive analysis, structure of particular languages.

899. Research
   Fall, Winter, Spring, Summer. Variable credit. Approval of instructor.

980. Seminar in Linguistics
   Spring. 3(3-0) May re-enroll for a maximum of 9 credits in different areas. Approval of department.
   Special topics in linguistics for advanced graduate students.

999. Research
   Fall, Winter, Spring. Variable credit. Approval of instructor.

South Asian Languages SAL

101. South Asian Languages—Elementary
   Fall. 5(3-2) May re-enroll for 101-102-103 sequence in more than one South Asian Language.
   The spoken language. Emphasis on intensive pronunciation, comprehension drills, and developing sentence structure. Orthography introduced.

102. South Asian Languages—Elementary
   Winter. 5(3-2) May re-enroll for 101-102-103 sequence in more than one South Asian Language. 101.
   Continuation of 101.

103. South Asian Languages—Elementary
   Spring. 5(3-2) May re-enroll for 101-102-103 sequence in more than one South Asian Language. 102.
   Continuation of 102.
Continuation of 112.

Topics covered include polynomial, trigonometric, exponential, and logarithmic functions, their inverses and their properties; and analytic geometry with an emphasis on conics.

112. Calculus I
Fall, Winter, Spring. 5(5-0) 111 or MTH 109, 109, or 111. Not open to students with credit in MTH 111.

Topics covered include sequences and their limits, derivatives of rational power functions, techniques of differentiation, applications, numerical methods for evaluating polynomials and approximating square roots.

113. Calculus II
Fall, Winter, Spring. 5(5-0) 112 and 124. Not open to students with credit in MTH 112.

Continuation of 112. Topics covered are applications of the derivative, integration, logarithmic, and trigonometric functions, power series, and numerical methods for integrating, root finding, and series evaluation.

124. APL-Computer Programming for Scientists
Fall, Winter, Spring. 3(3-0) 113 or concurrently. Interdepartmental with the Computer Science Department.

APL programming, interactive programming techniques, arithmetic, logical, and extended APL operators; functions; applications to concurrent topics in mathematics; principles of operations of time-shared computers.

131. Third Culture Rhetoric I
Fall, Winter. 4(4-0)

Introduction and practice in expository writing. Paper and report topics drawn from readings which relate science and human values.

132. Third Culture Rhetoric II
Winter, Spring. 4(4-0) 131.

Continuation of 131 with emphasis upon investigatory papers. Selected students may meet course requirements through independent study.

*140. Biology I
Winter, Spring. 4(3-3) Not open to students with credit in B S 212.

The organisms and their environment. Organismal level of organization. Evolution and adaptation as forces for biological variance.

*141. Biology II
Fall, Spring. 4(3-3) 140; not open to students with credit in B S 210.

Cellular structure and function. Maintenance and multiplication of materials, energy, space and information at the cellular and tissue level of organization.

142. Biology IA
Winter, Spring. 1 to 2 credits. May re-enroll for a maximum of 4 credits. 140 or concurrently.

Selected problems such as analysis of biological data, statistical and intraspecific competition, microorganisms inhabiting leaf litter, spring flora, diversity, stability and evolution of natural communities.

143. Biology III
Fall, Spring. 2 to 4 credits. May re-enroll for a maximum of 4 credits. 141 or concurrently.

Selected biology problems considering such topics as genetics, bacterial culturing and staining techniques, photosynthesis and histological techniques.

150. Physics—Elementary Concepts
Winter. 1(2-0) 152 concurrently.

Elementary concepts of mechanics, electricity, magnetism and optics.

151. Introduction to Chemistry and Physics I
Fall. 1(4-3) MTH 108 or 109 or LBC 111 concurrently; high school physics or 150 concurrently.

Fundamental techniques of quantitative scientific investigation; gas laws, kinetic theory and thermodynamics.

152. Introduction to Chemistry and Physics II
Winter. 4(4-3) 151.

Topics in modern chemistry: photons, electrons, atoms and nuclei; radioactivity, nuclear reactions; Bohr theory of the hydrogen atom; special theory of relativity.

153. Introduction to Chemistry and Physics III
Spring. 4(4-3) 152.

Topics in modern chemistry; atomic structure, chemical bonding, molecular orbitals; stoichiometry, chemical dynamics and equilibria, fundamentals of organic chemistry.

216. Calculus III
(215) Fall, Winter, Spring. 5(5-0) 113.

Introduction to the calculus of several variables.

217. Calculus IV
(214) Fall, Winter, Spring. 5(5-0) 216.

Topics covered include infinite series, power series, and introduction to differential equations; first order, second order linear with constant coefficients, first order systems; numerical methods, power series solutions, and applications.

*For prerequisite purposes this introductory biology sequence may be used in place of Biological Science 210, 211, 212.

233. Special Topics in Third Culture Rhetoric
Fall, Winter, Spring. 1 to 2 credits. May re-enroll for a maximum of 6 credits. Guided study of relations between the humanities and sciences. Students submit written work.

*242. Biology III
Fall, Winter. 4(3-3) 141. Not open to students with credit in B S 211.

Organismal growth and development from molecular genetics through life cycles of selected plant and animal species.

251. Introduction to Chemistry and Physics IV
Fall. 4(4-3) 153.

Classical physics; kinematics and dynamics of particles and rigid bodies; electricity, magnetism, electromagnetism, wave motion and wave optics.

252. Introduction to Chemistry and Physics V
Winter. 4(4-3) 251.

Chemistry of non-metals, transitional elements and coordination compounds, organic chemistry.

253. Introduction to Chemistry and Physics VI
Spring. 4(4-3) 252.

Relativity; atomic, molecular, and solid-state physics, quantum-mechanical effects and devices, nuclear models and nuclear energy levels.

1DC. Energy Consumption and Environmental Quality
For course description, see Interdisciplinary Courses.

290. Directed Study
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 6 credits. Approval of college.

Faculty directed studies in curricular areas which are normally related to regular course offerings.

A. Directed Study—General
1 or 2 credits.

B. Directed Study—Biology
1 or 2 credits.

C. Directed Study—Chemistry/Physics
1 or 2 credits.

F. Directed Study—Computer Science
1 to 3 credits.

295. Independent Study
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 12 credits. Approval of college.

Student conceived individual courses of study in curricular areas. Preliminary faculty approval and continuing guidance.

A. Independent Study—General
B. Independent Study—Biology
C. Independent Study—Chemistry/Physics
D. Independent Study—Mathematics
E. Independent Study—Science Studies

331. Modern Fiction
Fall. 4(4-0) 132 or 131 with a 3.0 or better.

Recent fiction and its cultural backgrounds, particularly those of special value to students of science. Students may submit original fiction in partial fulfillment of course writing requirements.

*For prerequisite purposes, this introductory biology sequence may be used in place of Biological Science 210, 211, 212.