

covered throughout the course. Safety measures and education media materials are extensively used.

- 444-3 Historical Applications in Aircraft Design. (3-0)** This course presents the study of the evolution, concepts, and design aspects used in aircraft development with emphasis on aerodynamic efficiency and aircraft manufacture. Scale models from various historical periods will be constructed and studied.
- 411-3 Internship. (0-20)** Provides a closely supervised experience in Aviation Management in a fixed base operations, commuter airline operations or airport management operations setting. Management problems are stressed and resolution techniques are implemented. Customer service is an important phase of the management process. This course is open only to Aviation Science majors. Prerequisites: 12 hours of upper-level aviation courses, ASCI 304 and permission of instructor to enroll required. Field assignment fee \$75.
- 485-3 Seminar in Aviation. (3-0)** A survey of current issues in aviation. Readings are required from current aviation publications and other related periodicals. May be repeated for credit when topics vary. Prerequisite: Approval of department head.
- 486-v Aviation Problems. (Credit variable)** A directed study of selected problems in aviation. May be repeated with approval of the department head. Prerequisite: approval of department head.

BIOLOGY (BIOL)

- 120-4 General Biology. (3-2)** (TCCNS = BIOL 1411) Detailed study of a typical cell, cell phenomena, mitosis, meiosis, nucleic acids, protein synthesis, basic principles of genetics, photosynthesis, and respiration. A survey of the Plant Kingdom is covered. Much of laboratory is devoted to the anatomy and physiology of flowering plants, while representatives of the lower plant phyla are studied with emphasis on life histories. Substantial microscopic observation required. Lab fee \$10. Course fee \$10.
- 121-4 General Biology. (3-2)** (TCCNS = BIOL 1413) The major animal phyla and vertebrate systems are surveyed, with representative examples and dissection of the frog stressed in the laboratory. Substantial microscopic observation required. Lab fee \$10. Course fee \$10.
- 210-3 Essential Elements of Biology. (2-3)** The study of morphology, anatomy, growth, life cycles, ecology, behavior, classification, and uses of organisms. Human systems and tissues and mechanisms of heredity and metabolism will be introduced. The laboratory will give experience in the use of the microscope, dissecting procedures, and problem solving. Prerequisite: 8 hours laboratory science. Lab fee \$10.
- 219-4 Human Anatomy and Physiology. (3-2)** (TCCNS = BIOL 2401) Basic physiological principles and their applications in the study of the skeletal, muscular, and nervous systems are emphasized. Substantial microscopic observation required. Lab fee \$10.
- 220-4 Human Anatomy and Physiology. (3-2)** (TCCNS = BIOL 2402) A continuation of the integrated study of human anatomy and physiology. Emphasis is on the various organ systems not studied in BIOL 219. Substantial microscopic observation required. Prerequisite: BIOL 219 or approval by the department head. Lab fee \$10.
- 302-4 Histology. (3-3)** Introduction to cellular ultrastructure. Study of vertebrate tissues and their arrangement in various organs. Prerequisites: BIOL 121 or approval by the department head. Lab fee \$10.

- 303-4 Heredity. (3-3)** The fundamental principles of inheritance and their application to plants and animals including humans. Laboratory stresses genetic variables and manipulation of genetic traits. Prerequisite: 12 hours BIOL. Lab fee \$10.
- 306-4 Comparative Vertebrate Anatomy. (3-4)** The morphology, physiology, and phylogeny of the organ systems of vertebrates. Laboratory study of representative vertebrates. Prerequisite: 8 hours of biology. Lab fee \$10.
- 307-4 Microbiology. (3-4)** Study of micro-organisms; characteristics, physiology, genetics, and their interrelations with humans. Substantial microscopic observation required. Prerequisites: 2 semesters of biology and 1 semester of chemistry or approval by the department head. Lab fee \$15.
- 313-4 Molecular Biology. (3-4)** Fundamentals of gene expression, gene regulation, DNA metabolism and nucleic acid structure, recombinant DNA techniques and protein structure. Prerequisites: BIOL 303 and CHEM 201.
- 315-4 Plant Taxonomy. (3-3)** Principles of plant taxonomy. Field and laboratory studies of common Texas wild flowers and trees with emphasis on identification, collection, and preparation of herbarium specimens. Prerequisites: 7 hours of BIOL, junior classification, or department head approval. Lab fee \$10.
- 320-4 Plant Pathology. (3-3)** Study of the various types of plant diseases and specific examples of each type. Emphasis upon identification, host-parasite interactions, pathogen dissemination, and control methods. Prerequisites: BIOL 120, 307 or approval by department head. Lab fee \$10.
- 336-4 Plant Physiology. (3-3)** A study of physiology of green plants with emphasis on nitrogen metabolism, respiration, mineral nutrition, photosynthesis, and growth. Prerequisites: 1 semester of BIOL with plant emphasis and one semester of organic chemistry. Lab fee \$10.
- 340-3 Introduction to Marine Biology. (3-0)** General considerations of the marine environment including habitats, biota, zoogeography, and humans' impact. Prerequisites: BIOL 120, 121.
- 349-4 Invertebrate Zoology. (3-3)** The study of the morphology, taxonomy, biology, and phylogeny of the invertebrate animals, exclusive of the Insecta. Prerequisites: 12 hours of BIOL or approval by the department head. Lab fee \$10.
- 353-3 Ecology and Evolution. (3-0)** The objective of this course is to convey a basic understanding of how life evolves, how organisms interact with their environments, and how evolutionary and ecological principles can be applied to a wide range of questions. Emphasis will be placed on the writing process. Prerequisites: BIOL 120, 121.
- 385-4 Immunology. (3-3)** Emphasis on the basic concepts of humoral and cell-mediated immunity. Laboratory: current techniques in experimental immunology and serology. Prerequisites: BIOL 307 and one year of CHEM or approval by the department head. Lab fee \$10.
- 395-4 Pathogenic Microbiology. (3-3)** A study of the disease-producing capacities of various microorganisms with emphasis on the diagnostic procedure of isolation and identification. Prerequisite: BIOL 307 with minimum grade of "C" or approval by the department head. Lab fee \$10.
- 401-4 Ecology. (3-3)** Plants and animals in relation to their environment. Prerequisites: 2 semesters of BIOL or approval by the department head. Lab fee \$10.
- 430-4 Ornithology. (3-3)** A study of the basic biology of birds, including origins, systematics, ecology, biogeography, physiology, anatomy, and reproductive biology. Laboratory emphasizes identification of regional

avifauna and includes multiple field trips. Prerequisites: BIOL 120, 121. Lab fee \$10.

- 441-4 Limnology. (3-3)** A study of aquatic communities and the physiochemical factors affecting the productivity of ponds, reservoirs, and streams. Experience in hydrographic survey morphometry. Prerequisites: 1 year of CHEM and 12 hours of BIOL, including BIOL 120, 121. Lab fee \$10.
- 442-3 Marine Ecology. (3-0)** Study of marine ecosystems including physical, chemical, and biological factors which influence the distribution of marine organisms. Prerequisites: BIOL 120, 121, 401 or approval by the department head.
- 445-4 Parasitology. (3-3)** A survey of the various invertebrate parasites of medical importance with particular reference to epidemiology and the host-parasite relationship. Prerequisites: 12 hours of BIOL or approval by the department head. Lab fee \$10.
- 451-4 Mammalogy. (3-3)** A study of the evolution, anatomy, behavior, ecology, systematics, and basic biology of mammals. Laboratory work includes identification of regional mammals as well as techniques for the collection and preparation of mammalian specimens. Prerequisites: BIOL 120, 121. Lab fee \$10.
- 460-4/ Animal Physiology. (3-3)** Basic principles of life processes and how they apply to the integrated functions of organ systems. Functions of the various organ systems of animals are studied. Prerequisites: 12 hours of BIOL and one semester of organic chemistry with laboratory. Lab fee \$10 per course.
- 462-4 Ichthyology. (3-3)** A study of the anatomy, behavior, ecology, evolution, taxonomy, and zoogeography of fishes. Field and laboratory work provide students with practical experience in collecting, identifying, and studying fishes. Emphasis will be placed on local fauna. Prerequisites: BIOL 120, 121. Lab fee \$10.
- 470-3 Analysis of Biological Principles. (2-4)** The comparative study of the morphology, anatomy, genetics, metabolism, reproduction, and the phylogenetic and ecological relationships of organisms. Prerequisite: 8 hours advanced BIOL or approval of department head. Lab fee \$10.
- 474-3 Biochemistry I. (3-0)** An introduction to the basic principles of biological chemistry and to fundamental processes of plants, animals and microorganisms. Credit for both BIOL 474 and CHEM 474 will not be awarded. Prerequisite: 1 semester of organic chemistry (2 semesters recommended) and 8 hours of biological science or approval of department head.
- 475-3 Biochemistry II. (3-0)** A detailed survey of intermediary metabolism. The metabolism of carbohydrates, lipids, proteins and nucleic acids, and the regulation of metabolism are emphasized. Credit for both BIOL 475 and CHEM 475 will not be awarded. Prerequisites: BIOL/CHEM 474, or approval of department head.
- 478-3 Biochemistry Lab. (1-5)** Principles and applications of basic methodology for the isolation, purification, characterization, and quantitative determination of biologically important compounds. Credit for both BIOL 478 and CHEM 478 will not be awarded. Prerequisite: BIOL 474 or CHEM 474 or concurrent enrollment, or approval of department head. Lab fee, \$15.
- 485-v Seminar. (Credit variable)** Survey of biological literature, biological instrumentation, history of biology, and current trends in biological sciences. Grading in this course is satisfactory/unsatisfactory. Prerequisite: 12 hours BIOL and approval of department head.

- 486-v Biology Problems. (Credit variable)** A course open by invitation to capable juniors and seniors wishing to pursue a biological problem. Students are permitted and encouraged to work independently under the guidance of an instructor. May be repeated for credit, subject to the approval by the department head. Prerequisites: 2 years of BIOL, the ability to do independent work, and approval of department head. Lab fee \$10.
- 490-v Special Topics. (Credit variable)** Deals with selected topics in biology. May be repeated for credit when topics vary. Prerequisite: approval of department head.
- 502-3 Ecological Plant Physiology. (3-0)** The interrelations of plants and their environments with emphasis on those which are subject to manipulation. Critical processes such as dormancy, photosynthesis, nutrition, reproduction, and water relations and their interactions in survival and biomass production. Prerequisite: BIOL 336 or approval by the department head.
- 509-3 Cellular Biology. (3-0)** A study of cellular morphology and function at the ultrastructural and molecular level. Prerequisites: Organic chemistry and 18 hours of BIOL or approval by the department head.
- 510-3 Epidemiology of Zoonoses. (3-0)** The study of infections or infectious diseases transmissible under natural conditions between animals and humans. Prerequisites: BIOL 307, 445 or approval by the department head.
- 520-3 Environmental Biology. (3-0)** Study of humans' interactions with plants and animals within ecosystems to include environmental issues; conservation, utilization, and wise management of natural resources.
- 521-3 The Aquatic Environment. (3-0)** A study of the basic principles involved in the ecology of the aquatic community including biotic and abiotic relationships. Emphasis placed on the sources of water contamination to include the effects of the contamination upon the changes in water chemistry and their possible biological implication. Prerequisite: 18 hours of BIOL and 2 semesters of CHEM or approval by the department head.
- 530-3 Development of Modern Biological Concepts. (3-0)** A study of the development of biological concepts and their impact upon science and society. Biographical as well as contemporary readings will be involved. Prerequisite: Graduate classification or approval by the department head.
- 531-3 Conservation Biology. (3-0)** Principles of conservation biology. Study of how evolutionary change, dynamic ecology, and humans influence conservation of living organisms. Topics include population genetics, ecosystem conservation, habitat fragmentation, and practical applications of the sciences to conservation problems. Prerequisites: BIOL 303, 401 or approval of department head.
- 585-1 Seminar. (1-0)** A graduate seminar course providing the opportunity for students to lead discussions on a current topic in Biology. Topics vary according to interests of faculty and/or students. May be repeated for credit as topics vary. Prerequisite: 12 hours of biology.
- 586-v Biological Problems. (Credit variable.)** Independent research under the supervision of an instructor. A formal report will be submitted to the instructor. A student may not count more than 6 hours of biological problems toward a degree. Lab fee \$10.
- 588-3 Thesis. (3-0)** Scheduled when the student is ready to begin the thesis. No credit until thesis is completed. Prerequisite: BIOL 598 and consent of major professor.
- 590-3 Special Topics. (3-0)** Selected topics in an identified area of biology, biochemistry or biotechnology. May be repeated for credit as topics vary.

Prerequisites: 12 hours of biology and 8 hours of chemistry or approval of department head.

- 598-3 Research Design and Analysis. (3-0)** Statistical principles and techniques applicable to the procurement, analysis, and evaluation of quantitative data. Prerequisite: MATH 107 or approval by the department head.
- 599-3 Practicum, Field Problem, or Internship. (3-0)** Supervised practice in specialized laboratory or professional settings. Prerequisites: 12 hours of biology and 8 hours chemistry or approval of department head.

CHEMISTRY (CHEM)

- 101-3 Introductory Applied Chemistry. (3-2)** (TCCNS = CHEM 1405) A brief introduction to the basic principles of chemistry with emphasis on applications in our society: energy, pollution and the environment, food, health, and drugs. Designed for non-science majors. Lab fee \$10. Course fee \$5.
- 102-3 Essential Elements of Chemistry. (2-3)** An introduction to the science of chemistry with a broad overview of the essential elements of chemistry and real-life applications. Req PHYS 102 or consent of instructor. Enrollment in this course is restricted to Interdisciplinary Studies majors. Lab Fee \$10, Course Fee \$10
- 103-4 Fundamentals of Chemistry. (3-2)** (TCCNS = CHEM 1407) A beginning chemistry course for students in applied sciences who need only one semester of general chemistry. The course includes the structure, properties and changes in matter, quantitative relationships in reactions, solutions, equilibrium, pH, buffers and nuclear chemistry. Not recommended for science majors or pre-professional students in health related fields. Does not meet prerequisite for CHEM 108 or 201. Lab fee \$10. Course fee \$5.
- 105-4 College Chemistry I. (3-3)** (TCCNS = CHEM 1411) Topics to be covered include an introduction to fundamental chemical laws, atomic structure and its relationship to chemical bonding and the periodic properties of elements and compounds, stoichiometry, states of matter, and solutions. Suggested for science majors and pre-professional students who meet requirements for enrollment in MATH 107 or higher. Lab fee \$10. Course fee \$5.
- 108-4 College Chemistry II. (3-3)** (TCCNS = CHEM 1412) Topics to be covered include a study of the chemical and physical properties of selected families of elements, an introduction to energy changes in chemical reactions, chemical equilibria, electrochemistry, rates of chemical reactions, nuclear chemistry, and semi-micro qualitative analysis. This course is a prerequisite for CHEM 201. Prerequisite: CHEM 105. Lab fee \$10. Course fee \$5.
- 201-4 Organic Chemistry I. (3-4)** (TCCNS = CHEM 2423) The first semester of a year sequence in the chemistry of carbon compounds involving their synthesis, reaction mechanisms, nomenclature, physical and spectral properties. Includes compounds of theoretical, biological, agricultural, and industrial importance. Prerequisite: CHEM 108. Lab fee \$10. Course fee \$10.
- 202-4 Organic Chemistry II. (3-4)** (TCCNS = CHEM 2425) A continuation of CHEM 201. The laboratory includes an introduction to qualitative organic analysis. This course is a prerequisite to all organic chemistry courses at the junior or higher level. Prerequisite CHEM 201. Lab fee \$10. Course fee \$10.
- 307-4 Quantitative Analysis. (2-6)** A study of the experimental and theoretical principles concerning gravimetric and volumetric analysis. Topics include data treatment, equilibrium, precipitation, neutralization, oxidation, reduction, potentiometry, and introduction to spectroscopy. Prerequisites: A grade of C