

**HARDING UNIVERSITY  
DEPARTMENT OF BIOLOGY  
COURSE DESCRIPTIONS (BIOL)  
2006-2007**

**111. GENERAL BIOLOGY.** (3) Fall, Spring.

A lecture course in selected principles of biology for students not majoring in natural sciences. Topics will be chosen from the following: cellular chemistry, cell structure and function, human structure and function, human genetics, infectious diseases, molecular genetics, and ethical issues related to the discovery and use of modern genetic technology. Satisfies the Liberal Arts requirement in biology, but does not count toward a major or minor in biology.

**113. HUMAN STRUCTURE AND FUNCTION.** (3) Fall, Spring.

Structure and function of selected human organ systems and the cellular mechanisms and processes upon which they are based. Circulatory, digestive, nervous, musculoskeletal and respiratory systems. Designed for majors in communication disorders, dietetics, nursing, physical education, and others who need an introduction to human anatomy and physiology. Satisfies the Liberal Arts requirement in biology, but does not count toward a major or minor in biology.

**121. GENERAL ZOOLOGY.** (4) Fall, Spring.

The animal kingdom, with emphasis on taxonomy, morphology and life histories, to typical representatives of the animal phyla. 3 lectures and one 3-hour laboratory each week. Fee: See course fee schedule.

**122. GENERAL BOTANY.** (4) Fall, Spring.

The plant kingdom from prokaryotes to the flowering plants. Identification, classification, life histories and importance of plants. 3 hours of lecture and 3 hours of laboratory or field trips per week. Fee: See course fee schedule.

**140. FRESHMAN SEMINAR.** (0) Fall, Spring.

Students will be introduced to the biology faculty and departmental resources. Study strategies, future career opportunities, and strategies for maximizing preparedness for chosen careers will be presented. This course provides a forum for discussing the frustrations and joys of being a Christian who is a scientist and for facilitating communication between senior students and freshmen about the successes, joys and pitfalls of majoring in biology.

**249. ANATOMY AND PHYSIOLOGY I.** (4) Fall, Spring, Summer I.

First half of a two-semester sequence. Provides an overview of the molecular and cellular basis of life and covers the anatomy and physiology of the integumentary, skeletal, muscular and nervous systems. 3 lectures and 3 hours laboratory per week. Prerequisite: CHEM 215 with a minimum grade of "C." Fee: See course fee schedule.

**250. ENVIRONMENTAL SCIENCE.** (3) Spring.

Biological knowledge of the structure and function of ecosystems; human influence on the environment. 3 lectures and/or discussion groups per week.

**253. ANATOMY AND PHYSIOLOGY II.** (4) Fall, Spring, Summer II.

Second half of a two-semester sequence. Covers the anatomy and physiology of the endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary and reproductive systems. 3 lectures and 3 hours laboratory per week. Prerequisite: BIOL 249 with a minimum grade of "C." Fee: See course fee schedule.

**254. BIostatISTICS.** (3) Fall, Spring.

An introductory, computer-based course. Topics include populations and samples, variables, probability distributions, descriptive statistics, statistical inference and hypothesis testing using selected parametric and non-parametric tests. Choosing appropriate analyses and interpreting results are emphasized. 3 hours of lecture and 2 hours laboratory per week.

**259. CELL BIOLOGY.** (4) Fall, Spring.

Introduction to cell structure and function. Examination of organelle and membrane structure and the role of enzymes in their function; cell processes including respiration and photosynthesis; gene expression and protein synthesis; cellular reproduction; and cell proliferation, differentiation and senescence. 4 hours lecture/discussion per week. Prerequisite: CHEM 215 or 249 with a minimum grade of "C."

**261. VERTEBRATE MORPHOLOGY.** (4) Fall of even years.

Comparative structure and function of the vertebrates, including extinct forms. The laboratory provides an intensive dissection experience. 3 hours of lecture and 3 hours of laboratory per week.

**271. MICROBIOLOGY.** (4) Fall, Spring.

Biology of prokaryotes and certain microscopic eukaryotic organisms. Virus structure and pathogenicity. Control of microorganisms by physical and chemical means. Epidemiology. Introduction to disease processes, host resistance and immunity. Approved by NAACLS for immunology content. Techniques for studying, isolating, identifying and controlling microorganisms. 3 hours of lecture and 3 hours of laboratory per week. Prerequisites: A minimum grade of "C" in the following: BIOL 259 or CHEM 215 or 249.

**280. ANIMAL PHYSIOLOGY.** (4) Fall of odd years.

Functions of each of the organ systems of animals, including the nervous, musculoskeletal, cardiovascular, respiratory, excretory and endocrine systems and their relation to environmental variables. 3 hours lecture and 3 hours of recitation per week. Prerequisite: BIOL 259.

**310. MARINE BIOLOGY.** (3) Spring of even years.

Interactions of physical and chemical factors and habitat diversity with the biological components of the world's oceans. Environmental topics such as fisheries, mariculture, pollution and conservation. 2 hours lecture and 3 hours laboratory per week.

Prerequisite: BIOL 121.

**311. INVERTEBRATE ZOOLOGY.** (4) Spring of odd years.

Systematics, morphology, life history, physiology and ecology of marine, freshwater and terrestrial invertebrate phyla. 3 hours of lecture and 3 hours laboratory per week.

Prerequisite: BIOL 121. Fee: See course fee schedule.

**314/514. TOPICS IN BIOLOGY.** (1-6) Offered on demand.

Topics are determined by student needs and interests and instructor availability.

Prerequisite: junior standing and consent of the instructor.

**315/515. GENETICS.** (4) Fall, Spring.

Heredity, molecular genetics, microbial genetics, and variation and selection.

3 lecture/demonstrations and 3 hours laboratory per week.

Prerequisites: BIOL 259.

**345/545. FIELD STUDIES.** (1-6) Offered on sufficient demand during summer or school

recess. An extended field trip designed to acquaint biology majors with natural ecosystems. Biogeographical report on area to be visited is required prior to trip, and trip journal is required upon return. One week of field work required for each hour of credit. Prerequisites: BIOL 121, 122, junior standing, and consent of instructor. All trip expenses will be prorated among the participants.

**352/552. PLANT TAXONOMY.** (4) Offered on sufficient demand.

History and basic principles. Laboratory work stressing the structural characteristics of vascular plant families and the use of field manuals in identifying components of local flora. Three lectures and 3 hours of laboratory or field work per week. Prerequisite:

BIOL 122. Fee: See course fee schedule.

**357. CELL AND MOLECULAR BIOLOGY LABORATORY.** (2) Fall, Spring.

Principles and techniques of cell and molecular biological analysis. Extensive use of laboratory equipment to investigate, collect, analyze and display biological data is emphasized. Strongly recommended for students pursuing graduate work in cellular or molecular biology, including the medical field. 1 hour of lecture and 3 hours of laboratory per week. Prerequisites BIOL 254, 259, 315.

**367/567. COOPERATIVE EDUCATION.** (1-6) Offered on demand.

See Cooperative Education catalog section.

**371. ADVANCED GENETICS LABORATORY.** (2) Fall, Spring.

Course in transmission and molecular genetics. Classic papers are read and discussed to complement laboratory problem solving. Students are expected to pose problems, design experiments, analyze data, and communicate results to their peers. One hour lecture/discussion and 4 hours laboratory per week. Prerequisites: BIOL 315 and CHEM 215 or 249.

**406. ECOLOGY LABORATORY.** (2) Fall.

Laboratory and field work utilizing basic quantitative methods of ecological research at the individual, population and community levels. Prerequisites: BIOL 254 and 407. Fee: See course fee schedule.

**407/507. ECOLOGY.** (3) Fall, Spring.

The fundamental interactions between organisms and their environment which determine their distribution and abundance. Prerequisite: BIOL 121 or 122.

**408/508. SCIENCE FOR THE P-8 TEACHER.** (3) Fall, Spring.

A science concept and content course designed especially for the P-8 teacher. Science literacy in an evolving technological society. Science as an active, constructive, cooperating process. Science involving experimentation, investigation of scientific phenomena, analysis, inquiry and problem solving. Science that includes interdisciplinary content, connections and real-world applications. Corequisite: ELED 408. Fee: See course fee schedule.

**409/509. ANIMAL BEHAVIOR.** (3) Offered on demand.

The function, ecology, evolution and genetics of animal behavior. Two lectures and a 3-hour laboratory per week. Prerequisite: BIOL 121.

**416/516. HERPETOLOGY.** (4) Spring of even years.

The morphology, systematics, ecology, behavior and distribution of amphibians and reptiles. Three lectures and 3 hours of laboratory or field work per week. Prerequisite: BIOL 121. Fee: See course fee schedule.

**425/525. MOLECULAR AND CELLULAR BIOLOGY.** (3) Spring of even years. The biochemistry, energetics and physiology of cells. Current approaches used in molecular genetics; problem-solving approaches to understanding current research data. Designed for students preparing for careers in biology, medicine and related fields. 3 hours of lecture/discussion and 3 hours of recitation per week. Prerequisite: BIOL 259, 315 and CHEM 249.

**430/530. RESEARCH.** (1-4) Offered on sufficient demand.

A research participation course for advanced science students. Students should enroll for at least two successive semesters. A research paper is required. Prerequisites: junior standing with a GPA of 3.0 in the sciences, plus consent of the instructor.

**440. SEMINAR.** (0-2) Fall, Spring.

Invited speakers and senior students give oral presentations on current biological topics. Seminar also provides a forum for discussion of career opportunities, graduate school opportunities and use of biological literature. Three semesters of enrollment required. Students who have completed 45 hours are eligible for enrollment. Fee: See course fee schedule.

**471. IMMUNOLOGY.** (4) Spring of odd years.

An introductory study of the principles of the immune system. Major topics include immunohematology, the lymphoid system, immunogenetics, antibody and cell-mediated immune responses, immune ontogeny, as well as immunity against microorganisms and immune-mediated diseases. The laboratory includes exercises in both humoral and cell-mediated immunity with clinical applications. Prerequisites: BIOL 259 and 271.