

## **BIOLOGY COURSES (BIOL)**

**BIOL 101            BIOLOGICAL INQUIRY (4)** In this course, students will explore a topic in biology as impetus to learning about scientific discovery. The primary emphases in this course include scientific ways of knowing, causal and correlational relationships, reasoning, and interpreting data from either personal or published data.

**BIOL 113            EVOLUTION, ECOLOGY, AND ORGANISMS (3)** Three hours lecture. The emphasis of this course is on the fundamentals of the relationships among organisms and their environment. This course serves primarily as the first part of a two-semester introduction for those students planning to major in biology or biomedical sciences.

**BIOL 114            CELLS: GENETIC AND MOLECULAR PERSPECTIVES (3)** Three hours of lecture and three hours of laboratory. Understanding of organismal structure and function is based on knowledge of the underlying cellular and molecular structure and function. These in turn are controlled by the genetic mechanisms that determine cellular structure and behavior. The relationships among cells, molecules, and their genetic controls are the focus of this course. This course serves primarily as the second part of a two semester introduction for those students planning to major in biology or biomedical sciences.

**BIOL 205            PLANT BIOLOGY (4)** *Prerequisites: BIOL 113-114 or ENVS 101/101L-102/102L.* Three hours lecture and three hours laboratory. This course examines the evolution, structure, function, physiology, basic ecology, and life histories of organisms traditionally studied in the context of botany, including photosynthetic bacteria, protists, plants, and fungi. Labs complement lecture content, providing opportunities to gain skills in microscopy, morphology, ecology, and classification.

**BIOL 210            ANIMAL BIOLOGY (4)** *Prerequisites: BIOL 113-114 or ENVS 101/101L-102/102L.* Three hours lecture and three hours laboratory. Introduction to the structure, function, and ecology of the major groups of protozoans and animals within the context of a modern phylogenetic perspective. Special emphasis is placed on the modification of structure and function by natural selection within different animal groups as adaptations to specific physiological and ecological constraints.

**BIOL 214            HUMAN ANATOMY (3)** Three hours lecture. This course is a study of the structures of the body with emphasis on the organ systems involved in movement. Introductory material focuses on terminology, examining the hierarchical organization of the body and study of the four major tissues of the body. Subsequently, the interrelationships among the bones, joints, muscles, nerves, and blood supply of each body region are examined using a regional approach. This course is designed to meet the outcomes expected for pursuing upper-level courses in the HMSR majors.

**BIOL 214L           HUMAN ANATOMY LABORATORY (1)** *Corequisite or prerequisite: BIOL 214.* Three hours laboratory. The primary goal of the laboratory course is to provide a hands-on opportunity for students to apply the terminology and concepts covered during lecture. Accordingly, physical models, dissection, computer software, and Internet resources are used as part of a problem-solving pedagogy in which collaborative learning is emphasized.

**BIOL 215 HUMAN PHYSIOLOGY (3)** Three hours lecture. This course is a study of the function, integration, and interaction of various organ systems in the body. Introductory material focuses on an overview of organ systems, the concepts of homeostasis and negative feedback, and fundamental chemical, physical, and cellular concepts. Subsequently, the physiology of the systems involved in movement and exercise, particularly the nervous, endocrine, muscular, cardiovascular, pulmonary, digestive, and urinary systems are emphasized. This course is designed to meet the outcomes expected for pursuing upper-level HMSR major courses.

**BIOL 215L HUMAN PHYSIOLOGY LABORATORY (1)** *Corequisite or prerequisite: BIOL 215.* Three hours laboratory. The primary goal of the laboratory course is to provide a hands-on opportunity for students to apply the principles and concepts covered during lecture. Accordingly, physiological experiments, physical models, computer software, and Internet resources are used as part of inquiry-based, problem-solving pedagogies in which collaborative learning is emphasized.

**BIOL 220 CELLULAR DIVERSITY (4)** *Prerequisites: C- or better grade in BIOL 113-114, CHEM 111.* Three hours lecture and three hours lab. This course introduces the student to the connectivity between all cellular forms of life, with its primary focus being the kingdoms of fungi and protists and their evolution from and parallel to prokaryotic organisms (bacteria and archaea). Specific topics include systematics and evolution, endosymbiosis, evolution from single to multi-celled life, and molecular aspects of communication and cell structure. Students will integrate a cellular view into their understanding of biology. Laboratories focus on microscopy, histology, and basic culture, molecular and biochemical techniques for cells.

**BIOL 222 HUMAN ANATOMY AND PHYSIOLOGY I (3)** Three hours lecture. This course explores the fundamental structure and function of the human body, beginning at the cellular and molecular level of organization and progressing through integumentary, skeletal, nervous, and endocrine systems.

**BIOL 222L HUMAN ANATOMY AND PHYSIOLOGY LABORATORY I (1)** *Corequisite or prerequisite: BIOL 222.* Three-hour laboratory to accompany BIOL 222.

**BIOL 223 HUMAN ANATOMY AND PHYSIOLOGY II (3)** *Prerequisite: BIOL 222.* Three hours lecture. This course explores fundamental structure and function of muscular, cardiovascular, pulmonary, digestive, renal, and reproductive systems in human beings. Emphasis is placed on interrelatedness of organ systems and applications to allied health professions.

**BIOL 223L HUMAN ANATOMY AND PHYSIOLOGY LABORATORY II (1)** *Corequisite or prerequisite: BIOL 223.* Three-hour laboratory to accompany BIOL 223.

**BIOL 233 TROPICAL BIOLOGY (1-3)** *Prerequisites: BIOL 113-114, ENVS 101/101L-102/102L or equivalent.* This course examines extremely diverse ecosystems of the tropical forests which provide excellent opportunities to study several basic concepts of biological and environmental science. Students also study the unique fauna and flora of the tropical forest and learn how and why this ecosystem is threatened.

**BIOL 238 INTRODUCTION TO RESEARCH (1-3)** *Prerequisite: Consent of supervising instructor.* This course provides the beginning student the opportunity to conduct lab, field, or library research under the supervision of a faculty member. Credit is dependent upon the scope of the work.

**BIOL 305 PLANT ECOLOGY (4)** *Prerequisites: BIOL 205, MATH 103 and 222.* Three hours lecture and three hours laboratory. This course focuses on ecological constraints that plants experience by virtue of their predominantly sessile lifestyle. Populations dynamics, competition, plant-animal interactions, community structure, function, succession, and the influence of abiotic factors will be considered. Lab exercises emphasize problem-solving approaches to a series of field investigations.

**BIOL 309 ENVIRONMENTAL ENTOMOLOGY (4)** *Prerequisites: BIOL 113-114 or ENVS 101/101L-102/102L; BIOL 210 recommended.* Three hours lecture and three hours laboratory. An introduction to insect structure, function, adaptation, and ecology, with an emphasis on insect interactions with their natural environments and with humans. Students will be trained in insect, sampling, curation, and identification during labs, lectures, and field trips. The utility of insects in assessing the health of terrestrial and aquatic ecosystems (biomonitoring) will be a key component of the course.

**BIOL 310 ORNITHOLOGY (4)** *Prerequisites: BIOL 113-114 or ENVS 101/101L-102/102L; BIOL 210 recommended.* Three hours lecture and three hours laboratory. Introduction to avian biology with an emphasis on the evolution, classification, physiology, behavior, ecology, natural history, and conservation of birds. Laboratory focuses on anatomical adaptations and biodiversity, as well as on field identification of birds of the Mid-Atlantic States with field trips to local and regional areas.

**BIOL 313 MARINE BIOLOGY (4)** *Prerequisites: BIOL 113-114 or ENVS 101/101L-102/102L.* Three hours lecture and three hours laboratory. This introduction to the marine environment emphasizes the influence of oceanographic, evolutionary, and ecological principles on marine organisms and ecosystems. Discussion of the diversity of marine life focuses on the constraints of different marine ecosystems. Students gain experience in field identification of marine organisms during the laboratory. The laboratory is conducted at selected sites on the ocean and in the estuary. A small additional cost will be incurred for a field trip.

**BIOL 314 BIOLOGY OF WEST INDIAN CORAL REEF ORGANISMS (3) (Winter Term)** *Prerequisites: BIOL 113 or ENVS 101/101L.* This course covers the organisms inhabiting the coral reefs of the West Indies and will be taught on San Salvador Island in the Bahamas. Field work is intensive, and skin diving and optional scuba techniques are employed. Limited collections are made, and a paper on a topic of special interest is required. An additional fee will be charged to cover expenses.

**BIOL 321 GENERAL ECOLOGY (4)** *Prerequisite: BIOL 113-114, ENVS 101/101L-102/102L, and MATH 103 or 222.* Three hours lecture and three hours laboratory. This course is a survey of general ecological principles from the evolutionary perspective, incorporating multiple levels of analysis (e.g. population, community, etc.). Primary emphasis is placed on framing ecological theory in perspective with field models of ecological principles from historical and current research.

**BIOL 323 GENETICS (4)** *Prerequisites: BIOL 113-114, ENVS 101/101L-102/102L, or CHEM 111-112.* Three hours lecture and three hours laboratory. Basic concepts and principles of prokaryotic and eukaryotic genetics are discussed, including Mendelian inheritance, polygenic inheritance, linkage and mapping chromosome aberrations, population genetics, DNA structure and replication, gene expression, mutation, gene regulation, recombinant DNA technology, and the molecular basis of disease. Lab exercises utilize bacteria, plants, and animals as model systems.

**BIOL 332 VERTEBRATE ANATOMY (4)** *Prerequisites: BIOL 113-114; BIOL 210 recommended.* Three hours lecture and three hours laboratory. This course provides a comparative study of the development, structure, and relationships of different organ systems in various vertebrate groups. Recommended for pre-medical, pre-dental, and medical technology students.

**BIOL 333 VERTEBRATE PHYSIOLOGY (4)** *Prerequisites: BIOL 113-114, CHEM 111-112; BIOL 210 recommended.* Three hours lecture and three hours laboratory. This course is a study of the cellular and molecular bases of organ system function in vertebrates, primarily humans. Emphasis is placed on nervous and endocrine control systems and the coordination of body functions. Clinical examples are frequently used.

**BIOL 345 ANIMAL BEHAVIOR (4)** *Prerequisites: BIOL 113-114 or ENVS 101/101L-102/102L, and MATH 103 or 222.* Three hours lecture and three hours laboratory. This course includes a review of concepts of animal behavior and the methods employed to study behavior including an analysis of mechanistic and adaptive aspects of behavior in a variety of animal taxa. Emphasis is placed on analysis of current primary literature and development of critical tests of behavior.

**BIOL 356 NEUROBIOLOGY (4)** *Prerequisites: BIOL 113-114; BIOL 220 recommended.* Three hours lecture and three hours laboratory. This course serves primarily as a companion course to Physiological Psychology (PSYC 355) but can also serve as a stand-alone course for anyone interested in the biology of the human nervous system. Introductory material focuses on an overview of the organization of the nervous system and on cellular aspects of neural function. Subsequent emphasis is on reflexes, sensory function, motor function, and sensorimotor integration.

**BIOL 360 MOLECULAR CELL BIOLOGY (4)** *Prerequisites: BIOL 113-114; CHEM 111-112, 221; BIOL 220 recommended.* Three hours lecture and three hours laboratory. This course introduces the student to the complex events occurring in the nucleus of the cell, resulting in cell division and the continu-

ation of species. It also examines the molecular processes of cell differentiation, cell signaling, cancer, and events that cause DNA mutations.

**BIOL 397**            **INDEPENDENT STUDY IN BIOLOGY (1-3)** *Prerequisites: Approval of faculty sponsor and school dean; junior or senior standing.* This course provides students the opportunity to pursue individual study of topics not covered in other available courses. The area for investigation is developed in consultation with a faculty sponsor and credit is dependent on the nature of the work. May be repeated for no more than six credits.

**BIOL 398**            **SPECIAL TOPICS IN BIOLOGY (1-4) [credit depends on topic]** *Prerequisite: A background of work in the discipline.* This course will focus on an aspect of the discipline not otherwise covered by the regularly offered courses. The topic will vary according to professor and term; consequently, more than one may be taken by a student during his/her enrollment.

**BIOL 399**            **INTERNSHIP IN BIOLOGY (1-12)** *Prerequisites: Juniors or seniors with a 2.25 minimum QPA; approval of written proposal by internship coordinator, and supervising faculty prior to registration.* This course is offered to qualified students allowing them to gain personal and practical experience in various areas of the biological sciences. Internships include but are not limited to research projects with professionals, laboratory analysis and management, conservation management, statewide or regional conservation, fisheries, wildlife or botanical projects, and a variety of other possible on-site experiences. (See "Internships.")

**BIOL 405**            **EVOLUTION (3)** *Prerequisites: BIOL 113-114 or ENVS 101/101L-102/102L; CHEM 111-112; BIOL 323 recommended.* Evolutionary biology addresses fundamental questions whose answers influence all other levels of biological understanding, from molecular and cellular biology to ecological processes. This course will provide a survey of the basic concepts of evolutionary biology, address empirical methods in evolutionary biology, and examine the importance of an evolutionary understanding across other sub-disciplines.

**BIOL 424**            **MICROBIOLOGY (4)** *Prerequisites: BIOL 113-114, CHEM 111-112 with a C- or better in all; BIOL 220 recommended.* Three hours lecture and three hours laboratory. The ecological, genetic and molecular basis of the microscopic world is studied with an emphasis on the prokaryotes; the bacteria and archaea. Human microbial disease investigation includes virology, mycology (fungi), and bacterial infections as well as drug treatments, and case studies of infection and epidemiology. Labs concentrate on classic microbiological techniques, microscopy, biochemistry and genetics of prokaryotic organisms.

**BIOL 428**            **INDIVIDUAL RESEARCH IN BIOLOGY (1-6)** *Prerequisites: Junior or senior standing; consent of supervising instructor.* This independent opportunity to conduct a field, laboratory, or literary study project culminates in a formal paper and/or presentation as directed by the supervising instructor. Credit is dependent on the nature of the work but may not exceed three credit hours per semester.

**BIOL 480**            **CASE STUDIES IN BIOLOGY (3)** *Prerequisite: Senior standing.* Three hours lecture. This course is intended as a capstone course and is designed to allow students to study specific topics in biology in depth. It utilizes case studies in biology and draws upon previous coursework in the biology major. Emphasis is placed on critical thinking and problem solving skills.

**BIOL 490**            **BIOLOGY SEMINAR (1)** *Prerequisite: Senior standing.* This seminar is intended as a capstone course and provides an opportunity for students to study a range of biological questions presented by outside speakers. Additionally, students' communication skills are assessed through oral presentations on internships or individual research projects, as well as other topics.