

Biology

BIO 105 Elements of Anatomy and Physiology

This introductory-level course concentrates on the basic structure and function of select organ systems in the human body. The following organ systems will be addressed in this course: skeletal, muscular, nervous, endocrine, cardiovascular, lymphatic/immune, respiratory and digestive. This course is designed for the non-science major and does not satisfy requirements for a major or minor in biology or medical laboratory science. Enrollment is limited to students with a major in health or physical education. Additional fee applies. Two lectures and one lab per week. Credit will not be given for both BIO 105 and BIO 210. This course is only offered in the Spring Semester. 4 Semester Hours.

BIO 140N The Unity of Life

This course examines the common denominators of all life including biomolecules, cell structure and function, biological energetics, respiration, photosynthesis and genetics. This class is required of all majors and minors in biology and is a prerequisite for most biology courses. Laboratories will include inquiry-based experiences. Three lectures and one lab per week. 4 Semester Hours.

BIO 141N The Diversity of Life

This course examines the “Tree of Life” beginning with its evolutionary foundation followed by an examination of the resulting diversity of life. This class is required for all majors and minors in biology and is a prerequisite for most other biology courses. Laboratories will include inquiry-based experiences. Three lectures and one lab per week. 4 Semester Hours.

BIO 200 Foundations of Medical Microbiology

This course introduces the student to microorganisms including bacteria, fungi, parasites and viruses. Emphasis is placed on the structure and life processes of these microorganisms along with their role in causing human diseases. The host response to infectious disease is also integrated into this course. For the laboratory, students will examine the microscopic and macroscopic structure of microorganisms. Students will learn basic laboratory techniques including staining and microscopy, culturing, methods for quantifying microorganisms, and biochemical/immunological testing. Three lectures and one lab per week. Prerequisite: Admission to the Nursing Program. 4 Semester Hours.

BIO 210 Anatomy and Physiology I

This course is an integrated study of the structure and function of various organ systems of the human body such as the Integumentary, Skeletal, Muscular, and Nervous systems. An extensive presentation of the anatomy of these systems will be given at the macroscopic and microscopic levels. The functions of these systems will be addressed through the study of each system's homeostatic mechanisms as well as their response to homeostatic imbalances in the body. Two lectures and one lab per week. A lab fee is charged for the course. Additional fee applies. BIO 210 is a prerequisite for BIO 211. 4 Semester Hours.

BIO 211 Anatomy and Physiology II

This course is an integrated study of the structure and function of various organ systems of the human body such as the Endocrine, Cardiovascular, Lymphatic, Immune, Respiratory, Digestive, Urinary, and Reproductive systems. An extensive presentation of the anatomy of these systems will be given at the macroscopic and microscopic levels. The functions of these systems will be addressed through the study of each system's homeostatic mechanisms as well as their response to homeostatic imbalances in the body. Two lectures and one lab per week. A lab fee is charged for the course. Additional fee applies. Prerequisite: BIO 210. 4 Semester Hours.

BIO 215 Evolutionary Biology

This course introduces the major principles of evolutionary biology, beginning with a brief history of evolutionary thought and working through the fundamental concepts of evolutionary genetics, adaptation and natural selection, the origins of biological diversity and overall patterns of evolutionary change. The methods employed in evolutionary investigations and experiments and the kinds of reasoning by which those methods are used to develop, and test hypotheses are emphasized. Four class hours per week. Prerequisite: BIO 141. 4 Semester Hours.

BIO 220 Ecology

An introduction to the ecological factors affecting the distribution and abundance of the major groups of animals and plants. Emphasis is on the local fauna and flora, utilizing frequent field trips. Three lectures and one laboratory per week. Prerequisite: BIO 141. 4 Semester Hours.

BIO 230 Conservation Biology

This course is an introduction to conservation biology, a synthetic discipline within biology that addresses the loss of biological diversity throughout the world. The course is divided into three principal sections, (1) biological diversity: principles, threats and values, (2) practical applications, and (3) the human role and solutions. The course also will present some of the currently active research in conservation biology. 4 Semester Hours.

BIO 240 Genetics

A study of hereditary mechanisms and the experimental methods used in the analysis and manipulation of these mechanisms. Topics include classical transmission genetics, the nature of the gene and microbial and molecular genetics. The laboratory includes experiments in *Drosophila* genetics, bacterial and phage genetics and molecular genetics. Three lectures and one laboratory per week. Prerequisites: BIO 140 and BIO 141 or consent of instructor. 4 Semester Hours.

BIO 260 Plant Structure and Function

This course introduces the breadth of contemporary plant sciences so that students can develop a synthetic understanding of the field. The links between genes, plant structure and development and plant physiology will be demonstrated as well as how these factors interact in the environment. Three class hours with integrated laboratory per week. Prerequisites: BIO 140 or BIO 141. 4 Semester Hours.

BIO 270 Cell Biology

Modern cell biology is a unifying discipline that combines genetics, biochemistry and molecular biology with traditional morphological descriptions to study how cells function at the molecular level. This course will introduce students to the dynamic relationship between the structure of cellular organelles and the numerous biochemical reactions that are necessary for cell growth and survival with an emphasis on eukaryotic cells. Three lectures and one laboratory per week. Prerequisites: BIO 140 and CHE 120. 4 Semester Hours.

BIO 280 Biology of Marine Organisms

A study of selected groups of marine organisms. Emphasis is placed on ecological, reproductive and physiological adaptations to the marine environment. Where appropriate, biological and societal factors concerning the economic importance of marine organisms are included. Participation in an extended field trip either during or after completion of the campus portion of the course is required. A fee is charged for the field trip. Two three to four-hour classes/labs per week. Additional fee applies. Prerequisites: BIO 140 and BIO141. 4 Semester Hours.

BIO 285 Vertebrate Zoology

This course is an introduction to the biology of vertebrates. It will specifically focus on the evolution of vertebrates and the physiology, anatomy, behavior and ecology associated with each vertebrate class. Three lectures and one three-hour lab per week. Prerequisites: BIO 140 and BIO 141. 4 Semester Hours.

BIO 290 Pathophysiology

This course will examine basic physiology and the impact internal and external pathological events can have on the human body. Two 100-minute lectures per week. Prerequisites: Admission to the Nursing Program and successful completion of BIO 210 & BIO 211. 4 Semester Hours.

BIO 295 Developmental Biology

This course is an analysis of developmental processes that lead to the construction of an entire organism from a single cell. Study begins with gametogenesis, fertilization, and early developmental processes including cleavage, gastrulation, and axis specification. Later embryonic development will also be covered including the formation of tissues, organs, and limbs. Additional topics may include sex determination, environmental influence on development, and evo-devo. Two lectures and one 3 and half hour lab per week. Prerequisites: BIO 140 and BIO 141. 4 Semester Hours.

BIO 299 Special Topics

A course designed to offer special subjects appropriate to the biology department. Such offerings will take advantage of the expertise of a visiting professor, fill special needs of specific students, or serve as an initial experimental offering of a contemplated regular course. Prerequisite: sophomore standing. 1-4 Semester Hours.

BIO 300 Molecular Biology

A study of eukaryotic cell communication and response on a molecular level through the use of cell structures, chemical signals and gene expression. Emphasis will be placed on modern molecular science techniques and research, as well as disease models. Three lectures and one laboratory per week. Prerequisites: BIO 140 and CHE 120. 4 Semester Hours.

BIO 305 Microbiology

An introduction to bacteria, viruses, fungi and parasites of economic or pathogenic importance to humans. Microbial ecology, water and soil microbiology, industrial microbiology and medical microbiology are all briefly addressed in this course, providing a general overview of many aspects of the microbial world. Two lectures and two laboratories per week. Prerequisites: BIO 140 and CHE 120. 4 Semester Hours.

BIO 315 Physiological Ecology

An examination of how the structure and function of organisms allow them to exploit their specific environment and/or ecological niche. The course focuses on a variety of ecosystems, assesses the environmental stresses inherent in each, and looks at the physiological adaptations that selected organisms have evolved which allow them to be successful in that environment. Syntheses of many biological disciplines, problem solving, and experimental procedures/interpretations are involved. Three class hours and one three-hour laboratory per week. Prerequisites: BIO 140 and BIO 141. 4 Semester Hours.

BIO 321 Aquatic Ecology

A study of the ecology of freshwater ecosystems. Energetics, chemistry, movements of nutrients, and plankton and littoral communities will be presented with particular attention to north temperate ecosystems. Laboratories will emphasize field work. A fee is charged for a field trip to Lake Erie. Two 65 minute lectures and one 3 and half hour lab per week. Prerequisites: BIO 141 and BIO 220 or consent of instructor. 4 Semester Hours.

BIO 322 Ecotoxicology

A study of toxic effects of chemicals upon components of ecosystems. The course will begin by examining how human activities have provided pathways for pollutants into the environment. Students will then learn how those pollutants affect biochemical and physiological processes of organisms and thus may alter functions of ecosystem components. Two class hours per week. Prerequisites: BIO 141 and CHE 120 or consent of instructor. 2 Semester Hours.

BIO 340 Immunology

A study of the immune response mechanisms including innate, cell-mediated and humoral immunity. Hypersensitivities, autoimmune diseases and organ transplantation will also be discussed. Four class hours per week. Prerequisites: BIO140 and CHE 120. 4 Semester Hours. BIO 340 is non-lab.

BIO 360 Independent Study

An in-depth exploration of student-selected subject matter. Registration requires consent of the instructor. 1-4 Semester Hours.

BIO 380 Vertebrate Physiology

A study of the functions of vertebrate tissues and organs and how these functions interact to maintain homeostasis. Three class hours and one three-hour laboratory per week. Prerequisites: BIO 140 and BIO 141, or permission of the instructor. 4 Semester Hours.

BIO 399 Special Topics

A course designed to offer special subjects appropriate to the biology department. Such offerings will take advantage of the expertise of a visiting professor, fill special needs of specific students, or serve as an initial experimental offering of a contemplated regular course. Prerequisites: junior standing. 1-4 Semester Hours.

BIO 405 Research

This course involves the experimental investigation of a problem in biology under the supervision of a biology faculty member. Registration requires junior standing and consent of the instructor. 1-4 Semester Hours.

BIO 410 Seminar I

Discussion and critical evaluation of selected topics in biology. Students perform an extensive review of the primary literature on current biological topics. Each student prepares a detailed research proposal on a topic of interest related to biology and presents a seminar on the proposal. Prerequisite: junior standing. 2 Semester Hours.

BIO 411 Seminar II

Discussion and critical evaluation of selected topics in biology. This seminar may include student-led discussions, book reviews, journal article critiques, seminar presentations and other forms of critical analysis.. Prerequisites: BIO 410 and junior standing. 2 Semester Hours.

BIO 494 Honors Thesis/Project

See All-University 494 course description.

BIO 498 Internship in Environmental Education (Internal)

Students will gain experience in developing, implementing and evaluating environmental and outdoor education programs. Work will be done through the University's John T. Huston-Dr. John D. Brumbaugh Nature Center but may involve outreach activities to other agencies or groups in the area. Students will be required to participate in at least one state or regional meeting of environmental educators. The internship is designed for students who intend to be educators or who plan to work in the general area of outdoor education. Specific activities will be specified in a contract between the student and instructor. S/U grade option only. Prerequisite: Open only to juniors and seniors who are majoring or minoring in education, biology or environmental science. Credit variable, 1-4 Semester Hours.

BIO 499 Internship in Biology

An experience based course designed for juniors and seniors. Students are placed in appropriate laboratories of agencies where previous classroom learning may be integrated with a work or research experience. The exact location, program and method of evaluation are provided in a contract drawn between the student, the faculty sponsor, and the host internship supervisor. Registration by arrangement with the faculty sponsor and departmental chairperson. S/U grade option only. Specific restrictions may apply. Credit variable, 1-4 Semester Hours.