

BIOLOGY COURSES

BIO 130 General Biology

General Biology is an integrated service course in the biological sciences including botany and zoology. Topics include taxonomy, anatomy, physiology, genetics, and ecology. This course does not count for credit toward the biology major requirements. Science majors should take BIO 137; BIO 117L; BIO 138; BIO 118L.

BIO 110L General Biology Lab

General Biology Lab is an integrated hands-on service course in the biological sciences. Topics include lab safety, metric system, scientific method, study of chemical reactions, microscopy, study of cell structure and function, study of mitosis in animal and plant cells, taxonomy, genetics, and dissection of animal and plant specimens. This course runs concurrently with General Biology lecture BIO 130. This course does not count for credit toward biology major requirements. Two laboratory hours per week.

BIO 137 Principles of Biology I

This course is an introduction to the biology laboratory including laboratory safety, scientific methodology, measurement techniques and analysis, basic life chemistry, cell structure and function, fundamentals of heredity, taxonomy and the diversity of life. Weekly laboratory reports and a lab final are included. Three laboratory hours per week.

BIO 138 Principles of Biology II (DESIGNATED SERVICE-LEARNING COURSE)

A continuation of Principles of Biology I. Topics covered include prokaryotic and eukaryotic metabolic pathways, the anatomy and physiology of organ systems in plants and animals, and evolutionary patterns in the Metaphyta and Metazoa. Prerequisites: BIO 137; BIO 117L.

BIO 118L Principles of Biology II Laboratory

A continuation of BIO 117L. Topics include photosynthesis, nutrition, gas exchange, internal transport, neurons and neural control, chemical control and ecology. Weekly laboratory reports and a lab final are included. Prerequisite: BIO 1170L. Three laboratory hours per week.

BIO 212 Medical Terminology

This course is designed to increase students' knowledge and usage of medical and scientific terminology by examining stems, prefixes, and suffixes. One hour per week.

BIO 233 Human Anatomy and Physiology I

The structural and functional characteristics of the human ten-organ system are covered. Basic concepts of the human body are presented to non-science majors. Principal topics covered include levels of organization, support, movement, and integration. Three 1-hour lecture periods. This course does not count as a biology elective for biology major or minor requirements. Prerequisites: BIO 130; BIO 110L.

BIO 234 Human Anatomy and Physiology II

A continuation of Human Anatomy and Physiology I. Topics covered include coordination, processing, transportation, and reproduction. Three 1-hour lecture periods. This course does not count as a biology elective for biology majors or minors. Prerequisite: BIO 233 with a grade of "C" or better.

BIO 238 Genetics

An introduction to transmission and biochemical genetics is presented. Selected topics in population genetics are treated. Emphasis is placed on aspects of genetics which relate to human health and to current social issues. Prerequisite: BIO 138.

**BIO 218L Genetics Lab
(DESIGNATED SERVICE - LEARNING COURSE)**

This course provides hands-on laboratory experience in genetic probability, DNA extraction and agarose gel electrophoresis, human fingerprinting patterns, bacteria mutagenesis, genetic drift, and applied human genetics. Laboratory safety is reviewed. Submission of two formal laboratory reports is required for this course. Both classical and modern-day genetic techniques will be used. Prerequisite: BIO 118L. Three laboratory hours per week.

BIO 239 Botany

This course introduces the classification, relationships, structure, and function of plants. Topics include structure and function of plant cells, tissues, and organs such as roots, stems, leaves, and flowers, reproduction and development of seed and non-seed plants, levels of organization, form and function of systems. Upon completion, students should be able to demonstrate comprehension of plant form and function, including both seed and non-seed plants. Prerequisite: BIO 138.

BIO 219L Botany Lab

The laboratory will focus on the evolutionary relationships among different plant families, learning of key characteristics to aid in plant identification, and understanding the economic/medicinal/cultural/agricultural importance of specific plant groups. Lab will include plant growth regulation, plant hormones, plant embryos and seed plant body. Three laboratory hours per week. Prerequisite: BIO 118L

BIO 240 Biotechnology Lab/Lecture

This combined course will integrate hands-on biotechnology laboratory experience with a lecture component that will include research in the field. Topics covered include pharmaceutical development, medical treatments, agricultural advances, food processing, and diagnostic tests for diagnosing cancers and other diseases. Prerequisites: BIO 138; BIO 118L.

BIO 330 Evolution

This course is a study of the theory of evolution and of the processes involved. The development of the concept of evolution and its influence on other aspects of science are emphasized. Theories concerning the origin of life and the organisms found in geological periods are included. Basic concepts of population genetics will be introduced. Prerequisite: BIO 138.

BIO 331 Comparative Anatomy

The structural, functional, and phylogenetic relationships among chordates are presented using representative examples. Emphasis is focused on the taxonomy, integument, skeletal, muscular and nervous systems of vertebrates. Prerequisite: BIO 138. Three 1-hour lectures per week.

BIO 311L Comparative Anatomy Lab

The structural, functional, and phylogenetic relationships among chordates are presented using representative specimens, microscopy, models, and dissection. Emphasis is focused on the taxonomy, integument, skeletal, muscular and nervous systems of vertebrates. Three laboratory hours per week. Prerequisite: BIO 118L.

BIO 332 Invertebrate Zoology

This course presents a comparison of representatives of the major invertebrate animal phyla with emphasis on anatomy, physiology, lifestyle, and life histories. Prerequisite: BIO 138.

BIO 312L Invertebrate Zoology

This course consists of laboratory experiments conducted to learn collection techniques routinely used in population and taxonomic studies to acquire experience in utilizing taxonomic keys and to conduct field and laboratory studies. Prerequisite: BIO 118L. Three laboratory hours per week.

BIO 333 Ecology

The course studies the relationship between organisms and their environment with emphasis on climatic, edaphic, physiologic, and biotic principles. Applications to human welfare and environmental medicine are considered.

BIO 313L Ecology Lab

This course presents field and laboratory methods related to a variety of ecological measurements. Experimental results are integrated with ecological principles and the literature. One 3-hour laboratory period. Prerequisite: BIO 118L. Three laboratory hours per week.

BIO 334 Vertebrate Embryology

The processes of vertebrate development, emphasizing human development, are studied. Lecture and laboratory sessions cover gametogenesis, fertilization, cleavage, histogenesis, organogenesis, placentation, and delivery. Endocrine regulation of reproduction is stressed. Laboratories use frog, chick, and pig embryos. Relevant medical and social issues are analyzed. Prerequisite: BIO 138.

BIO 314L Vertebrate Embryology Lab

This laboratory complements the lecture with a comparison of frog, chick, and pig embryos. Histological, preserved, and selected living materials are studied to illustrate gametogenesis, fertilization, and development of the vertebrate embryo from zygote through the differentiation of organ systems in amphibian, avian and mammalian embryos. Prerequisite: BIO 118L. Three laboratory hours per week.

BIO 335 Principles of Human Anatomy and Physiology I

This course is the first semester of the two-semester course sequence, BIO 335 and emphasizes physiology of body tissues and systems and includes relevant aspects of anatomy and histology. The course is for majors and intended to be an alternative BIO 233. It covers the following topics and systems of the human organism: human structural and functional organization, basic chemistry, cell structure and function and transport, foundations of cell metabolism, histology, the integumentary system, the skeletal system, the muscular system, the nervous system, and special senses. The subject matter will be related to clinical and health-related issues. Prerequisites: BIO 138; CHEM 138.

BIO 315L Principles of Human Anatomy and Physiology I Lab

The first semester of a two-semester laboratory sequence, the laboratory is a hands-on experience designed to complement the lectures. Prerequisites: BIO 118L; CHEM 118L. Three laboratory hours per week.

BIO 336 Principles of Human Anatomy and Physiology II.

The second semester of the two-semester course sequence, BIO 336, this course applies essential concepts from BIO 335. It is for majors. It covers the following topics and systems of the human organism: endocrine system, cardiovascular system, lymphatic system and immunity, respiratory system, digestive system, urinary system, and reproduction and development system. The subject matter will be related to clinical and health-related issues. Prerequisite: BIO 335.

BIO 316L Principles of Human Anatomy and Physiology II Lab

The second semester of a two-semester laboratory sequence, the laboratory is a hands-on experience designed to complement the lectures. Prerequisite: BIO 315L. Three laboratory hours per week.

BIO 337 Nutrition

Nutrients and their physiological and biochemical utilization by the human body are studied. National and international perspectives are included in three 1-hour lecture periods. Prerequisite: BIO138.

BIO 339 Microbiology

Structural, cultural, and physiological characteristics of microorganisms and their role in health and nature are treated. The principles of immunology and virology are also discussed. Prerequisites: BIO 138; CHEM 138.

**BIO 319L Microbiology Lab
(DESIGNATED SERVICE-LEARNING COURSE)**

This course consists of laboratory experiments conducted to familiarize students with basic skills required to work with different bacterial strains. Subjects will include aseptic techniques, types of media, microscopy, pure culture isolation, and staining to identify bacteria. Students will isolate and grow pure culture of *E. coli* by using selective media. They will also identify and characterize bacteria by differential staining. Prerequisite: BIO 118L. Three laboratory hours per week.

BIO 340 Histology Lab/Lecture

The lab-based learning course in histology will include an integrated hands-on microscopic study of tissues and tissue organization of organs in relation to their function using light microscopy. Hands-on tissue preparation for microscopic study, histochemistry, staining and staining technology will be performed. This pedagogy of lab/lecture activities will be used in this course. Prerequisites: BIO 138; BIO 118L.

**BIO 421 Senior Research in Biology I
(DESIGNATED SERVICE-LEARNING COURSE)**

This is the first of two courses in the student research sequence. Students will develop a research project under the direction of a faculty member. This course will focus on a literature review, developing a research plan, laboratory research and interpreting results. Prerequisite: STEM 230 or SCI 230.

**BIO 422 Senior Research in Biology II
(DESIGNATED SERVICE-LEARNING COURSE)**

This is the second of two courses in the student research sequence. Students will continue to work on their research project under the direction of a faculty member from the previous semester. This will include completing their research project and formulating conclusions. A senior research paper using standard APA style writing format followed by an oral presentation to the faculty is required. Prerequisite: BIO 421.

BIO 432 Immunology

This course is designed to introduce the principles of immunology including: development of the immune system, innate immunity, immunoglobulin structure and genetics, antigen-antibody reactions, the major histocompatibility complex reactions and antigen presentation, T cell receptors (genetics, structure, selection), T cell activation and effector functions, energy and apoptosis, cytokines, phagocytic cell function, immune responses to infectious organisms and tumors, autoimmune diseases, autoimmunity, allergies, and immune deficiencies.

BIO 412L Immunology Lab

This laboratory course is designed to help students become familiar with and proficient in the performance of protocols in cellular immunology, immunochemistry and clinical serology. These experiments are designed to introduce the student to the fundamentals of laboratory work in the field of immunology. The laboratory experience is designed to closely reflect that of a modern immunology lab. Three laboratory hours per week. Prerequisite: BIO 118L.

BIO 434 Plant Physiology

The principal functions of the green plants, including photosynthesis, gas exchange, and water and environmental responses are presented. Prerequisites: BIO 138; CHEM 138.

BIO 414L Plant Physiology Lab credit

This lab is an introduction to basic principles of growth of plant systems designed to stimulate student learning of basic concepts and appreciation of the plant world upon which humans depend. Students will learn physical processes in plants, functions of plant tissues, metabolism, and growth and development. They will test nutrients found in plants such as in germinating seeds and flowers. Prerequisites: BIO 118L; CHEM 118L. Three laboratory hours per week.

BIO 435 Vertebrate Physiology

Basic functions of the vertebrate body are studied in terms of physical and chemical principles. The important functions of the circulatory, digestive, respiratory, glandular, muscular, nervous, and reproductive systems are discussed. Three 1-hour lecture periods. Prerequisites: BIO 138; CHEM 138.

BIO 415L Vertebrate Physiology Lab

Basic functions of the vertebrate body are studied in terms of physiological and chemical principles. The laboratory is a hands-on experience designed to complement the lectures. Experiments are conducted on the following: cellular events; muscular system; cardiovascular system; urinary system; digestive system; respiratory system; endocrine system; skeletal system; glandular system; nervous system; reproductive systems; cellular metabolism; immune system; and electrolyte balance. Three laboratory hours per week. Prerequisites: BIO 118L; CHEM 118L.

BIO 438 Cell and Molecular Biology

This course is a comprehensive study of the structure and function of cells, including biochemistry and molecular approaches. Topics to be covered include cellular organization, metabolism, nucleic acid structure and function, protein synthesis, gene expression, and regulation. Prerequisites: BIO 138; BIO 238; CHEM 238. An honors section is offered. Grade of "C" or above required.

**BIO 418L Cell and Molecular Biology Lab
(DESIGNATED SERVICE-LEARNING COURSE)**

This laboratory provides hands-on laboratory experience in differential ultracentrifugation, protein assays and linear least-squares analysis, anatomy and evolution of the genome, bacteria gene regulation, simulated DNA sequencing and DNA database analysis, and DNA manipulation. Laboratory safety is also reviewed. Submission of two formal laboratory reports is required for this course. Both classical and modern-day molecular biology techniques are used. Prerequisites: BIO 118L; BIO 218L; CHEM 218L. Three laboratory hours per week.

BIO 450 In-Service Training and Instrumentation

This course involves the study of the basic principles of microscopy (including histo-techniques, instrumentation theory, and application), as well as in-service training. Two-fifths of the course deals with theory and laboratory exercises; three-fifths of the course consists of on-the-job experience in a health agency or institution based on the student's career interests. Students spend the last weeks of the semester, for a total of 135 hours, on the job. Prerequisite: Senior standing.