

BIOLOGY (BIO)

BIO 110: Biology I for Science Majors (3 credits)

This course will examine in depth concepts of cellular biology, mitosis, meiosis, developmental biology, genetic variation and heredity, gene expression, recombinant DNA technology, and evolutionary mechanisms. This course is open to Science majors only.

BIO 110L: Biology I for Science Majors Lab (1 credits)

The BIO110 lecture will examine in depth concepts of cellular biology, mitosis, meiosis, developmental biology, genetic variation and heredity, gene expression, recombinant DNA technology, and evolutionary mechanisms. The BIO110 lab sessions will involve mitosis, embryology, heredity and recombinant DNA technology, and biochemical evolution. This course is open to Science majors only.

Lab fee: \$190

Corequisite: BIO 110

BIO 111: Biology I for Non-Science Majors (3 credits)

This course will examine basic concepts of cellular biology, developmental biology, genetic variation and heredity, and evolution. Laboratory sessions will involve mitosis, embryology, heredity and recombinant DNA technology, and biochemical evolution.

BIO 111L: Biology I for Non-Science Majors Lab (1 credits)

This course will examine basic concepts of cellular biology, developmental biology, genetic variation and heredity, and evolution. Laboratory sessions will involve mitosis, embryology, heredity and recombinant DNA technology, and biochemical evolution.

Lab fee: \$190

Corequisite: BIO 111

BIO 112: Biology II for Science Majors (3 credits)

This course will survey the types of organisms representing the diversity of life on the planet and explore the form and function of plants and animals as well as animal behavior.

Prerequisite: A grade of C or better in BIO 110

BIO 112L: Biology II for Science Majors Lab (1 credits)

Laboratory sessions will involve an investigation of the structure and development of plants, the body design and physiology of invertebrates and vertebrates, and selected field work in animal behavior.

Lab fee: \$190

Corequisite: BIO 112

BIO 150: Anatomy and Physiology I (3 credits)

This course provides an overview of tissue types and their identification and function, as well as the integument, skeletal and muscular human body systems.

Prerequisite: A grade of C or better in BIO 110

BIO 150L: Anatomy and Physiology I Lab (1 credits)

Laboratory topics include microscopic examination of histological slides of body tissues, gross skeletal morphology, and dissection of a mammal.

Lab fee: \$190

Corequisite: BIO 150

BIO 151: Anatomy and Physiology II (3 credits)

This course involves a study of the structural anatomy and physiological functioning of the respiratory, circulatory, endocrine, nervous, and urinary systems.

Prerequisite: A grade of C or better in BIO 110

BIO 151L: Anatomy and Physiology II Lab (1 credits)

Laboratory topics include the dissection of neurological organs to study gross and histological structure as well as the evaluation of selected physiological, clinical, and diagnostic tests.

Lab fee: \$190

Corequisite: BIO 151

BIO 210: Genetics (3 credits)

This course studies Mendelian inheritance, chromosome abnormalities, cytogenetics, sex determination, and linkage. Genetic recombination, molecular genetics, and biochemical and population genetics will be addressed, as well as the social impact of cloning and other genetic techniques.

Prerequisite: A grade of C or better in BIO 110 and BIO 112

BIO 210L: Genetics Lab (1 credits)

Laboratory sessions include recombination analysis in bacteria, viruses, and *Drosophila* as well as studying the effects of mutations.

Lab fee: \$300

Corequisite: BIO 210

BIO 240: Plants Rock (3 credits)

This course is an examination of the importance of plants with special attention to their roles in the natural world. Emphasis is placed on the historical and practical significance of plants as sources of food, medicine, and as a natural resource including the economic, social, and medicinal uses of plants and plant products as related to herbal medicine, invasive species, and other plant-derived resources.

BIO 240L: Plants Rock Lab (1 credits)

Laboratories will include hands-on experimentation, field work and identification of common flower and tree species located on campus and in the surrounding community.

Lab fee: \$305

Corequisite: BIO 240

BIO 260: Microbiology (3 credits)

This course investigates the taxonomy, morphology, pathogenicity, and growth requirements of representative viruses, bacteria, fungi, and protozoa.

Prerequisite: A grade of C or better in BIO 110 and BIO 112 or a grade of C or better in NEU 200

BIO 260L: Microbiology Lab (1 credits)

Laboratory sessions include aseptic technique, staining, isolation, culture, and identification of microbes as well as diagnostic biochemical reactions, identification of unknown organisms, and immunological techniques.

Lab fee: \$300

Corequisite: BIO 260

BIO 300: Biochemistry (3 credits)

This course provides a survey of structural and functional chemical properties of biologically-important molecules and macromolecules such as water, enzymes, vitamins, carbohydrates, proteins, lipids, and nucleic acids.

Prerequisite: A grade of C or better in CHE 220 and CHE 221

BIO 300L: Biochemistry Lab (1 credits)

Laboratory sessions will explore enzyme kinetics and the isolation and analysis of macromolecules.

Lab fee: \$325

Corequisite: BIO 300

BIO 314: Botany (3 credits)

This course provides an introduction to the classification, relationships, structure, and function and metabolism of plants. Topics include photosynthesis, reproduction and development of seed and non-seed plants, levels of organization, form and function of systems, and a survey of major taxa. Upon completion, students should be able to demonstrate comprehension of plant form and function, including selected taxa of both seed and non-seed plants. Laboratory exercises are coordinated with lecture topics and may include field exercises.

Prerequisite: A grade of C or better in BIO 110, CHE 120, and BIO 112 or NEU 200.

BIO 314L: Botany Lab (1 credits)

Laboratory exercises are coordinated with lecture topics and may include field exercises.

Lab fee: \$300

Corequisite: BIO 314

BIO 316: Musculoskeletal Anatomy (3 credits)

This course emphasizes the detailed form and function of the muscular, skeletal, and nervous systems. Pathology from an anatomical and physiological perspective is discussed. Origins, insertions, innervations, and actions of human muscles are studied in detail. Basic biomechanics are addressed.

Prerequisite: A grade of C or better in BIO 150 and BIO 151

BIO 316L: Musculoskeletal Anatomy Lab (1 credits)

Laboratory sessions involve regional dissection and study of a mammal.

Lab fee: \$165

Corequisite: BIO 316

BIO 320: Cell and Molecular Biology (3 credits)

A study of eukaryotic cell structure, function and regulation. DNA structure, replication, transcription, and translation will be stressed, as well as genetic engineering and recombinant DNA techniques.

Prerequisite: A grade of C or better in BIO 210

BIO 320L: Cell and Molecular Biology Lab (1 credits)

Laboratory sessions explore the isolation of DNA reactions, and restriction enzyme mapping.

Lab fee: \$300

Corequisite: BIO 320

BIO 351: Pathophysiology (3 credits)

Pathophysiology is designed to introduce students to the potential causes and outcomes associated with the disease process. Physiologic alterations involved in initiating disease and its progression will be discussed. Specific conditions related to the human body systems will be used to demonstrate these alterations. This is a comprehensive course designed to give students an in-depth understanding of the disease process. Included is an exploration, by body system, of the functional changes that occur due to pathological mechanisms. Mechanical and physical insult, as well as biochemical abnormalities, are discussed from a clinical viewpoint.

Prerequisite: A grade of C or better in BIO110 and BIO 112 or a grade of C or better in NEU 200. BIO 150 and BIO151 are recommended.

BIO 410: Evolution (3 credits)

This course examines in detail the processes of chemical and biological evolution and tracks the history of life on earth. Concepts will include microevolution, macroevolution, the origin of species, and the origin of major evolutionary innovations. Social Darwinism will be addressed, particularly in terms of how this theory is relevant to understanding the basics and development of sociology and the fundamental differences between society and organisms.

Prerequisite: A grade of C or better in BIO 110, BIO 112, and BIO 210 or a grade of C or better in BIO 210 and NEU 200

BIO 430: Immunology (3 credits)

This course involves a thorough examination of the immune response in animals. Topics include the structure, formation, and function of antibodies, antigen-antibody interactions, the complement system, and hypersensitive and autoallergic reactions, as well as immunosuppression.

Prerequisite: Junior status and a grade of C or better in BIO 210 and BIO 260

BIO 431: Comparative Vertebrate Anatomy (3 credits)

This course involves a detailed study of the morphology and phylogeny of the Vertebrata including its origins, adaptations, and evolutionary trends from fishes to mammals.

Prerequisite: A grade of C or better in BIO110 and BIO 112 or a grade of C or better in NEU 200. BIO 150 and BIO 151 are recommended.

BIO 431L: Comparative Vertebrate Anatomy Lab (1 credits)

Laboratory work will consist of a comparative examination of the osteology and gross and microscopic anatomy of representative vertebrates.

Corequisite: BIO 431

BIO 440: Mammalogy (3 credits)

This course investigates the phylogenetic relationships and evolution and comparative and functional morphology and biology of the different groups of mammals.

Prerequisite: A grade of C or better in BIO 110 and BIO 112 or a grade of C or better in NEU 200

BIO 440L: Mammalogy Lab (1 credits)

Laboratory sessions include the identification of mammal species from most mammalian orders from skulls, skins, and tracks, including native New England species.

Corequisite: BIO 440

BIO 445: Advanced Biochemistry (3 credits)

BIO445, 3 Credits This course focuses on selected metabolic pathways, the regulation of metabolism, post-translational modification of proteins, cell signaling, mechanisms, and the control of gene expression. The course is designed to blend lectures with class discussion and presentations by students.

Prerequisite: A grade of C or better in CHE 220, CHE 221, and BIO 300

BIO 461: Bioethics & Social Justice Advocacy (3 credits)

This course introduces students to the fundamental principles of bioethics and explores contemporary moral issues that arise in healthcare. Class activities will provide the foundation for critical appraisal of social justice practices relevant to bioethical principles. Selected topics will serve to promote moral reflection relating to human dignity and rights, allocation of healthcare resources, medical provider responsibilities to their patients, and end of life care.

Prerequisite: Junior or Senior status

BIO 498: Research Project in Biology (3 credits)

The Research Project is a 2-year Capstone research investigation conducted under the supervision of the department Research Coordinator and topic advisor if applicable. Students choose their project topic and are required to provide a project proposal, literary review, prospectus and final scholarly report.

Prerequisite: Junior Status and Approvals of Research Coordinator and Department Chair

BIO 499: Internship in Biology (3 credits)

The internship in biology is a supervised practical learning experience designed to give students the opportunity to explore career interests in biology to acquire valuable on-the-job experience, and to put into practice the knowledge and skills acquired through course work. This course is graded Pass/Fail.

Prerequisite: A minimum cgpa of 2.0, senior status, and approval of department chair