BIO - BIOLOGY (BIO)

BIO 101 - Essential Biology 4 Credits

Hours: 3R-3L-4C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: None

Surveys basic concepts in the biological sciences and describes how new advances related to these concepts affect contemporary society. Students who have completed BIO 110, BIO 120, or BIO 130 cannot subsequently take BIO 101. Additionally, BIO 101 may not be taken concurrently with BIO 110, BIO 120, or BIO 130.

BIO 101L - Essential Biology Lab 0 Credits

Hours: 0R-3L-0C
Graduate Studies Eligible: No
Prerequisites: None

BIO 107 - Introduction to Environmental Science 4 Credits

Hours: 4R-0L-4C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: None

This course examines major themes that cut across environmental topics (e.g. human influence) and uses a variety of specific environmental scenarios like food production, water resources, and energy systems to explore those themes. This course counts as a free elective, not a BIO elective, for BIO majors.

BIO 110 - Cell Structure and Function 4 Credits

Hours: 3R-3L-4C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: None

This course explores cellular and molecular biology structures, mechanisms, and laboratory techniques with respect to five core concepts: (1) evolution, (2) structure/function interdependence, (3) information flow, (4) bioenergetics and (5) systems perspective and interdependence.

BIO 110L - Cell Struct, Function Lab 0 Credits

Hours: 0R-3L-0C
Graduate Studies Eligible: No
Prerequisites: None

BIO 120 - Comparative Anatomy & Physiology 4 Credits

Hours: 3R-3L-4C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: None

This course surveys animal tissues and organ systems and laboratory techniques (including dissections and recordings from biological specimens/living tissues) with respect to five core concepts: (1) evolution, (2) structure/function interdependence, (3) information flow, (4) bioenergetics, and (5) systems perspective and interdependence.

BIO 120L - Comp Anatomy & Physiology Lab 0 Credits

Hours: 0R-3L-0C
Graduate Studies Eligible: No
Prerequisites: None

BIO 130 - Evolution & Diversity 4 Credits

Hours: 3R-3L-4C
Term Available: F
Graduate Studies Eligible: No
Prerequisites: None

This course explores ecological and evolutionary patterns and processes, including field and laboratory approaches to develop knowledge with respect to five core concepts: (1) evolution, (2) structure/function interdependence, (3) information flow, (4) bioenergetics, and (5) systems perspective and interdependence.

BIO 130L - Evolution & Diversity 0 Credits

Hours: 0R-3L-0C
Graduate Studies Eligible: No
Prerequisites: None

BIO 191 - Special Topics in Biology 1-4 Credits

Hours: (1 - 4)R-0L-(1 - 4)C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: None

Introduces structures, mechanisms, and laboratory techniques in cellular and molecular biology. Discusses biomolecules, bioenergetics, biosynthesis, enzymatic function, genetics, and cellular regulatory systems.

BIO 199 - Professional Experience 1 Credit

Hours: 1R-0L-1C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: None

The professional experiences course captures the practical work experiences related to the student's academic discipline. Students are required to submit a formal document of their reflections, which communicates how their employment opportunity reinforced and enhanced their academic studies.

BIO 210 - Mendelian & Molecular Genetics 4 Credits

Hours: 3R-3L-4C
Term Available: F
Graduate Studies Eligible: No
Prerequisites: BIO 110 or AB 110

A discussion of Mendelian genetics including the molecular mechanisms of nuclear and cytoplasmic inheritance. Information flow and control of gene expression are addressed at the molecular level. Basic genetic techniques are covered in both lecture and laboratory.

BIO 210L - Genetics Lab 0 Credits

Hours: 0R-3L-0C
Graduate Studies Eligible: No
Prerequisites: None

BIO 220 - Microbiology 4 Credits

Hours: 3R-3L-4C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: BIO 110 or AB 110

Discusses the essential properties of eubacteria and archea. Bacterial nutrition, growth, genetics and structural and metabolic diversity are discussed in detail. The basics of virology are also addressed. Fundamental laboratory methodologies are also covered.

BIO 220L - Microbiology Lab 0 Credits

Hours: 0R-3L-0C
Graduate Studies Eligible: No
Prerequisites: None

BIO 230 - Cell Biology 4 Credits

Hours: 3R-3L-4C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: BIO 110 or AB 110

Examines the structure and function of various eukaryotic cells. Biomembranes, organelles, the cytoskeleton, energetics, protein sorting, signal transduction and cell interactions are discussed in detail. Essential methods in cell biology are addressed in both lectures and laboratories.

BIO 310 - Plant Structure & Function 4 Credits

Hours: 3R-3L-4C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: BIO 130 or AB 130

Surveys the structure, physiology, diversity, evolution, and ecological importance of plants and related groups of organisms.

BIO 320 - Ecology 4 Credits

Hours: 3R-3L-4C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: BIO 130 or AB 130

Surveys adaptations of organisms, population dynamics, species interactions, and the structure and function of natural communities and ecosystems.

BIO 330 - Evolutionary Biology 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: BIO 130 or AB 130

Surveys three major themes of evolutionary biology: adaptation, diversity of life, and the shared characteristics of life. Mechanisms of evolution, speciation, phylogeny, and macroevolutionary processes are discussed.

BIO 399 - Practice of Science 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: (RH 330 or ENGL H290) and MA 223

This course focuses on skills required for implementing scientific research, including reading the primary literature, experimental design, scientific writing, oral presentations, research proposal writing, poster presentations, and investigation of research programs (through seminars or individual meetings). Each student chooses a project and research mentor by the end of the course.

BIO 410 - Infection & Immunity 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: BIO 110 or AB 110

Discussion of various pathogens, how they cause disease, and how they elicit the innate and adaptive immune responses employed to combat them. Cellular and molecular mechanisms of immunity are addressed, as is the epidemiology of various human diseases.

BIO 411 - Genetic Engineering 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: (BIO 210 or AB 210)

Discusses the basics of molecular biology and the genetic and molecular techniques used to engineer prokaryotic and eukaryotic cells, plants, and animals for the production of useful traits or compounds. The application of DNA technology to the diagnosis and treatment of disease is also addressed.

BIO 421 - Applied Microbiology 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: BIO 110 or AB 110

Discusses the fundamental biology of microprobes and the processes underlying their use in the production of chemicals, therapeutics and foods. The basics of microbial ecology and the environmental applications of microbial biotechnology are also discussed.

BIO 431 - Genomics & Proteomics 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: (BIO 210 or AB 210)

Exploration of the methodologies used to generate systems-level sets of genetic and protein data, and the tools used to access and analyze the prodigious amounts of data emerging from such projects. The application of these technologies to investigate biological questions and model complex biological systems is also discussed.

BIO 441 - Virology 4 Credits

Hours: 3R-3L-4C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: BIO 110 or AB 110

Virology focuses on the study of viruses as well as non-viral entities such as prions and viroids. In this course, students will learn about the structures, genomes, replication strategies, and pathogenic mechanisms of various viruses. Viruses causing diseases of medical and economic importance will be emphasized. In addition, the techniques used to study viruses and the uses of viruses in the treatment of disease will be addressed.

BIO 451 - Cancer Biology 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: (BIO 210 or AB 210)

This course focuses on cancer at the molecular and cellular level. Specific cellular molecules and the changes to these cellular molecules that contribute to transformational and immortalization of cells and tumor progression will be studied. The mechanisms behind these molecular changes, cancer promotion and initiation events, and cancer molecule-specific treatment options will be addressed. In addition, students will study a variety of specific cancer types.

BIO 461 - Evolutionary Medicine 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: BIO 130 and BIO 210

This course examines medicine and medical practice from the perspective of evolutionary constraints, challenges, and diversity. Topics include theoretical foundations of the field, cancer patterns, mental health, genetic disease, evolutionary health promotion, and others.

BIO 471 - Genetic & Molecular Analysis of Inherited Human Disease 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: (BIO 210 or AB 210)

Strategies and methods used to identify and understand the genetic and molecular bases of inherited human disease are addressed. Topics include, human population genetics, pedigrees, genetic and physical mapping of human genes, linkage analysis, and diagnostic testing. Primary literature is routinely utilized.

BIO 491 - Special Topics in Biology 0-8 Credits

Hours: (0 - 8)R-0L-(0 - 8)C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: None

BIO 492 - Directed Study in Biology 1-4 Credits

Hours: (1 - 4)R-(1 - 4)L-(1 - 4)C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: None

Covers biology material of mutual interest to the student and instructor which cannot be experienced in any other listed BIO course. A student may take between 1-4 credits in any given term, and a maximum of 8 credits of this course are permitted. Prior approval of the BBE department is required to use this course to fulfill BIO elective credit requirements.

BIO 496 - Senior Thesis Research I 2 Credits

Hours: 0R-6L-2C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: BIO 399 or AB 399

Initiation of senior thesis under the direction of an BBE faculty mentor. Major tasks include creation and submission of a research proposal and piloting procedures. Additional requirements for adequate progress determined by each faculty mentor.

BIO 497 - Senior Thesis Research II 4 Credits

Hours: 0R-12L-4C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: BIO 399 or AB 399

Continuation of research under the direction of an BBE faculty mentor. Major tasks include data acquisition and methodological refinement. Additional requirements for adequate progess determined by each faculty mentor.

BIO 498 - Senior Thesis Research III 4 Credits

Hours: 0R-12L-4C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: BIO 399 or AB 399

Continuation of research under the direction of an BBE faculty mentor. Major tasks include data acquisition and preliminary analysis. Additional requirements for adequate progress determined by each faculty mentor.

BIO 499 - Senior Thesis Research IV 2 Credits

Hours: 0R-6L-2C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: BIO 399 or AB 399

Completion of senior thesis under the direction of an BBE faculty mentor. Major tasks include final analysis, public presentation of results, and submission of the written thesis. Additional requirements for adequate progress determined by each faculty mentor.