

BSC: Biological Sciences Courses

Courses

BSC 1005 General Biology for Non-Majors

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

This course applies the scientific method to critically examine and explain the natural world including but not limited to cells, organisms, genetics, evolution, ecology, and behavior. Student Learning Outcomes: • Students will evaluate data regarding validity. • Students will read and interpret a variety of scientific data. • Students will describe the natural world. • Students will articulate and practice the scientific method. Meets General Education requirement in Natural Sciences.

BSC 1005L General Biology Laboratory for Non-Majors

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: BSC 1005*

Lab correlating with BSC 1005. Material and Supply Fee will be assessed.

BSC 1050 Fundamentals of Ecology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Intended for non-majors who have an interest in nature and how they interact with nature. Gives general overview of ecological principles and how these principles influence the outside world around us. Imbedded are several activities that are associated with each chapter. The activities were developed so that the student will gain a respect for ecology as well as show how ecological principles affect your daily life. Meets General Education requirement in Natural Sciences.

BSC 1085 Anatomy and Physiology I

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

This course is the first part of a two-semester sequence in which students examine human anatomy and physiology through a systems approach based on the interaction between form and function, from the microscopic components of cells and tissues to the organismal level. Emphasis is placed on histology and the integumentary, skeletal, muscular, and nervous systems. Student Learning Outcomes: • Students will identify cell structures and describe their functions. • Students will distinguish tissues by structure, location in the body, and contrast their normal physiology. • Students will demonstrate an understanding of anatomical structure, organization of the body, cavities, planes, and directional terms. • Students will identify and describe structures of integumentary, skeletal, muscular, and nervous systems. • Students will interpret the functions of the integumentary, skeletal, muscular, and nervous systems. • Students will explain how the components of the human body maintain homeostasis. • Students will analyze and interpret physiological data. Designed for students with little or no previous anatomy or physiology experience. Lab optional. Meets General Education requirement in Natural Sciences.

BSC 1085L Anatomy and Physiology I Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Optional lab associated with course. Anatomical dissection and experimental physiology exercises that enhance understanding of human form and function. Exercises parallel topics presented in the lecture series. Material and supply fee will be assessed.

BSC 1086 Anatomy and Physiology II

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BSC 1085/L

Continuation of Anatomy and Physiology I. Reviews basic anatomical/physiological attributes of endocrine, cardiopulmonary, digestive, reproductive and immune systems. Lab optional. Meets General Education requirement in Natural Sciences.

BSC 1086L Anatomy & Physiology II Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: BSC 1085/L

Optional lab associated with course. Anatomical dissections and experimental physiology exercises that enhance understanding of human form and function. Exercises parallel topics presented in the lecture series. Material and Supply Fee will be assessed.

BSC 1905 Directed Study

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

BSC 2010 Biology I

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Co-requisite: BSC 2010L

In this course students will apply the scientific method to critically examine and explain the natural world. This course will cover molecular biology, cellular biology, genetics, metabolism, and replication. Student Learning Outcomes: • Students will demonstrate scientific literacy by articulating and practicing the scientific method. • Students will evaluate data regarding validity. • Students will read and interpret a variety of scientific data. • Students will identify major macromolecules and state their importance to living organisms. • Students will explain metabolism. • Students will compare and contrast prokaryotic and eukaryotic structures and processes of cell division and replication. • Students will explain gene expression. • Students will solve problems in transmission genetics. Material and supply fee will be assessed for the corresponding lab. Meets General Education requirement in Natural Sciences.

BSC 2010L Biology I Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: BSC 2010*

Co-requisite: BSC 2010

Introduction to the science method, reading, and writing, microscopy, and science measurement. Cellular processes of prokaryotic and eukaryotic organisms, including subcellular structures, biochemical and genetic regulation of function and growth, reproduction, heredity, and evidence of evolution. Material and supply fee will be assessed for this lab.

BSC 2011 Biology II

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BSC 2010/L

Co-requisite: BSC 2011L

Explores the diversity of life including bacteria, protists, fungi, plants and animals at the introductory level designed for students starting a major in biology. The course will outline the tree of life in illustrating the evolutionary relationships among organisms. The course will also cover basic functional morphology and physiology at the organismal level, and provide an introduction to ecological interactions at the population and community level. Meets General Education requirement in Natural Sciences.

BSC 2011L Biology II Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: BSC 2010/L

Co-requisite: BSC 2011

Explores the diversity of life including bacteria, protists, fungi, plants and animals at the introductory level designed for students starting a major in biology. The course will outline the tree of life in illustrating the evolutionary relationships among organisms. The course will also cover basic functional morphology and physiology at the organismal level, and provide an introduction to ecological interactions at the population and community level.

BSC 2311 Introduction to Oceanography and Marine Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

An introduction to the chemical, physical and geological features of the world ocean and the major groups of living marine organisms that inhabit it. Physical chemical and biological interrelationships will be emphasized. Credit not granted toward a major in Biology. Meets General Education requirement in Natural Sciences.

BSC 2311L Introduction to Oceanography and Marine Biology Laboratory

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Lab correlating with BSC 2311. Credit not granted toward a major in Biology. Material and Supply Fee will be assessed.

BSC 2844 Biology Skills

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

A professional development course for students in the Biology and Pre-professional curriculum plan. It will introduce the students to necessary skills for upper division biology courses, including reading and interpretation of scientific publications, scientific writing styles, ethics, and critical thinking.

BSC 2905 Directed Study

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

BSC 3905 Directed Study

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

BSC 4303 Biogeography

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Relates the principles of taxonomy, ecology and evolution to the distribution of plants and animals. Codes of taxonomic nomenclature and the processes of describing species and ranges, species concepts and speciation, paradigms of constructing phylogenies, a review of the geologic ages of the earth, modern terrestrial and oceanic biodiversity and biogeographic provinces and human impact on species extinctions and introductions. Offered concurrently with BSC 5305; graduate students will be assigned additional work.

BSC 4401L Forensic Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: PCB 3063

This course is for upper level undergraduate students interested in learning and developing entry level skills required of a forensic serologist and DNA analyst. Information learned in this forensics course is applicable to students interested in collection, maintenance and analysis of crime scene evidence; DNA profile development and analysis; match probability statistics and interpretation; case file maintenance and reporting, and professional witness testimony.

BSC 4405L Advanced Biomedical Lab Techniques

College of Sci and Engineering, Department of Biology

1 sh (may not be repeated for credit)

Prerequisite: PCB 3103 OR BCH 3033

This advanced laboratory course will expose students to topics in biomedical research. The laboratory will teach students advanced lab skills used in biotechnology industries through the development of independent research projects. Course objectives will be met through formal written and verbal assessments.

BSC 4434 Bioinformatics and Data Science

College of Health, Department of Public Health

3 sh (may not be repeated for credit)

This course explores concepts and practical applications in bioinformatics. It covers essential topics such as data organization, representing and reasoning about sequence data, simple data mining strategies, and ethical protocols for data collection. Students will learn how to apply data science principles to biological and clinical problems to effectively work with large data sets, format data, and design applications to help visualize, analyze, interpret, and communicate the resulting insights in ways that advance science. Offered concurrently with BSC 5459; graduate students will be assigned additional work.

BSC 4854 Bioterrorism

College of Health, Department of Health Sciences & Admin

3 sh (may not be repeated for credit)

Biological weapons employed against man (emphasis), animals and plants will be discussed during the semester. The major biological agents targeted for use as weapons against humans will be dealt with in detail including the various clinical forms induced by exposure to the agents, prophylaxis and treatment for the resulting diseases and the primary routes of dissemination of the agents studied. The class will cover the potential for biowarfare/bioterrorist acts, how destruction is produced, and what countries / groups have access to sufficient bioagent or the capacity for producing large quantities of biological agents for use as a weapon. Wargames in which bioagents are employed, including casualty estimates and socioeconomic impact will be discussed and played out. Government preparedness to deal with biowarfare / bioterrorism will be addressed with emphasis on plans for surveillance and response. Offered concurrently with BSC 5856; graduate students will be assigned additional work.

BSC 4860 Conservation Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Prerequisite: BSC 2010L AND BSC 2011L AND PCB 3043

This course will introduce students to the field of conservation biology from the perspective of terrestrial, freshwater and marine habitats. Conservation biology is broadly concerned with maintaining and restoring biodiversity at all levels from genes to ecosystems, and by definition is interdisciplinary. Conservation biology broadly aims to develop the scientific and technical approach to protection, maintenance and restoration of biological diversity. We will consider the causes and consequences of biodiversity loss, established and emerging approaches to conservation, the interface with human dimensions, and the complexities of implementing science-based conservation policy and management. This course combines lectures, readings, in-class discussions, writing exercises and student presentations, with an emphasis on critical thinking, problem solving and global fluency. This class draws from all aspects of biology for those at the upper undergraduate or beginning graduate student level who are interested in conservation, whether from a biodiversity or ecosystem perspective. Often students are majors in Environmental Sciences or Biology, but they may also come from diverse backgrounds, including Environmental Studies, Law, Government, City and Regional Planning, Geography, and Anthropology. Offered concurrently with BSC 5865. Graduate students will be assigned additional work. A basic course in ecology is required, but seek the permission of the instructor if you have a special interest in conservation biology.

BSC 4905 Directed Study

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

BSC 4940 Biology Internship

College of Sci and Engineering, Department of Biology

1-3 sh (may be repeated for up to 3 sh of credit)

This course is for students who secure an internship to gain experience in their field of interest. Faculty and agency personnel will supervise as the student participates in the internship. Goals and objectives will be planned by the student, instructor, and/or agency supervisor. Reports will be required regularly with a final report. Students must already have been hired or awarded an internship to be permitted to take this course.

BSC 5305 Biogeography

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Relates the principles of taxonomy, ecology and evolution to the distribution of plants and animals. Codes of taxonomic nomenclature and the processes of describing species and ranges, species concepts and speciation, paradigms of constructing phylogenies, a review of the geologic ages of the earth, modern terrestrial and oceanic biodiversity and biogeographic provinces and human impact on species extinctions and introductions. Offered concurrently with BSC 4303; graduate students will be assigned additional work.

BSC 5406L Forensic Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

This course is for graduate students interested in learning and developing entry level skills required of a forensic serologist and DNA analyst. Information learned in this forensics course is applicable to students interested in collection, maintenance and analysis of crime scene evidence; DNA profile development and analysis; match probability statistics and interpretation; case file maintenance and reporting, and professional witness testimony.

BSC 5459 Bioinformatics and Data Science

College of Health, Department of Public Health

3 sh (may not be repeated for credit)

This project-based course explores concepts and practical applications in bioinformatics. It covers essential topics such as data organization, representing and reasoning about sequence data, simple data mining strategies, and ethical protocols for data collection. Students will learn how to apply data science principles to biological, clinical, and public health problems to effectively work with large data sets, format data, and design applications to help visualize, analyze, interpret, and communicate the resulting insights in ways that advance science. Students will further examine current events demonstrating how collaborative, cross-disciplinary teams use bioinformatic technologies and tools with big data analytics to support translational research. Open to students from any discipline.

BSC 5856 Bioterrorism

College of Health, Department of Public Health

3 sh (may not be repeated for credit)

Biological weapons employed against man (emphasis), animals, and plants will be discussed. The major biological agents targeted for use as weapons against humans will be dealt with in detail, including the various clinical forms induced by exposure to the agents, prophylaxis and treatment for the resulting diseases, and the primary routes of dissemination of the agents. The class will cover the potential for biowarfare and bioterrorist acts, how destruction is produced, what countries and groups have access to sufficient bioagents, and the capacity for producing large quantities of biological agents for use as a weapon. Wargames in which bioagents are employed, including casualty estimates and socioeconomic impact, will be discussed and played out. Government preparedness to deal with biowarfare and bioterrorism will be addressed with emphasis on plans for surveillance and response. Offered concurrently with BSC 4854; graduate students will be assigned additional work.

BSC 5865 Conservation Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

This course will introduce students to the field of conservation biology from the perspective of terrestrial, freshwater and marine habitats. Conservation biology is broadly concerned with maintaining and restoring biodiversity at all levels from genes to ecosystems, and by definition is interdisciplinary. Conservation biology broadly aims to develop the scientific and technical approach to protection, maintenance and restoration of biological diversity. We will consider the causes and consequences of biodiversity loss, established and emerging approaches to conservation, the interface with human dimensions, and the complexities of implementing science-based conservation policy and management. This course combines lectures, readings, in-class discussions, writing exercises and student presentations, with an emphasis on critical thinking, problem solving and global fluency. This class draws from all aspects of biology for those at the upper undergraduate or beginning graduate student level who are interested in conservation, whether from a biodiversity or ecosystem perspective. Often students are majors in Environmental Sciences or Biology, but they may also come from diverse backgrounds, including Environmental Studies, Law, Government, City and Regional Planning, Geography, and Anthropology. Offered concurrently with BSC 4860. Graduate students will be assigned additional work.

BSC 5873 Fundamentals of Pharmacology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

Pharmacology is the study of the interactions between the human body and drugs. While we will focus on medical pharmacology, the term drug encompasses endogenous molecules and natural and synthetic exogenous molecules that interact with the body. In this course, we will cover many aspects of pharmacology at the molecular and cellular levels. The course is based on learning concepts based on drug targets and understanding the cellular and molecular pathways engaged by various ligands. This course is designed for biology seniors and graduate students. The course will cover essential historical elements of pharmacology, general pharmacokinetics, quantitative aspects of drug-receptor interactions, receptor classes, and drug development. Offered concurrently with PCB 4028; graduate students will be assigned additional work.

BSC 5905 Directed Study

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

BSC 6002L Contemporary Laboratory Skills

College of Sci and Engineering, Department of Biology

4 sh (may not be repeated for credit)

A review of contemporary laboratory protocols and techniques necessary for the modern biologist to succeed in the professional, academic, or intellectual biology community. Provides students with a theoretical understanding of various techniques, their application, and the opportunity to master basic essential techniques in the laboratory. Topics include good laboratory practices, cell culture techniques, nucleic acid manipulation, macromolecular separation and detection, DNA analysis, chromatographic separations, spectrophotometry, microscopy, and radioisotope usage. Material and Supply Fee will be assessed.

BSC 6840 Professional Development in Biology

College of Sci and Engineering, Department of Biology

3 sh (may not be repeated for credit)

A review of contemporary protocols, techniques, and methods needed to succeed in the professional, academic, or intellectual biology community. Topics include 1) organization of the professional and academic biology environment, 2) reading, interpreting, organizing and publishing biological literature, 3) biological project development, presentation, and funding, 4) locating and securing positions in the biological sciences.

BSC 6905 Directed Study

College of Sci and Engineering, Department of Biology

1-12 sh (may be repeated indefinitely for credit)

BSC 6971 Thesis

College of Sci and Engineering, Department of Biology

1-6 sh (may be repeated for up to 12 sh of credit)

Graded on satisfactory / unsatisfactory basis only. Permission is required.

* This course may be taken prior to or during the same term.