

BIOLOGY (BIO)

BIO-1000 Ecology and the Environment (3 Credits)

An introduction to basic concepts in ecology and population dynamics, their relationships to resources, and pollution. This course is designed for non-science majors. Three lecture hours per week.

Fulfills General Education Requirement: NPW

Typically offered: All Sessions

BIO-1001 History of Science & Medicine In America (3 Credits)

Requisite(s): WRI-1100,AMS-1001 for students pursuing American Studies minor

This course surveys the major challenges and advancements in biology and medicine in America and the impacts of these advancements on American society. This course is designed for non-science majors. Three lecture hours per week.

Typically offered: All Sessions

BIO-1101 Introduction to Human Biology (3 Credits)

Introduces the student to the organization and function of the human body from cells to systems. Included are selected topics in the contemporary study of the human organism. This course is designed for non-science majors and fulfills one of the science prerequisites in the Childhood Education curriculum. Three lecture hours per week.

Fulfills General Education Requirement: NPW

Typically offered: All Sessions

BIO-1102 Special Topics in Biology and Psychology Marine Biology in Belize (3 Credits)

Requisite(s): BIO-2250,CHE-2102

Cross-listed with: BIO-4000, BIO-5401 and PSY-4014. This course satisfies non-major, honors non-majors and major requirements. It involves classroom as well as a week field experience that includes snorkeling in the Caribbean, additional charges will apply. The ecology of marine ecosystems (estuarine, temperature and tropical coral reef) will be explored. Honors and Bio majors have extra assignments. Students may take only one of the courses.[New Course]

Typically offered: As Needed

BIO-1103 Biotechnology and Bioethics (3 Credits)

Requisite(s): WRI-1100

This integrated lecture and laboratory course will focus on the controversies surrounding modern biotechnology. Topics include reproductive technology, genetic engineering and stem cell research. Students will explore the techniques of modern biology through hands on experimentation in the laboratory. This course is designed for non-science majors. Lab fee.

Typically offered: All Sessions

BIO-1107 Anatomy and Physiology I (4 Credits)

Requisite(s): BIO-1107L

Fundamental life processes as exemplified in the functioning of the human organism. Integration of structure and function in the light of homeostasis is emphasized. A systems approach is utilized with the focus on normal physiology and an introduction to pathology. Systems addressed in the first semester include cells, tissues, integument, skeletal, muscle, and nervous systems. Laboratory experiments and dissections are designed to achieve this objective. This course is designed to fulfill program requirements for non-majors, health promotion and the physical education major. Three lectures and three lab hours per week. Lab fee.

Fulfills General Education Requirement: NPW

Typically offered: Fall Only

BIO-1108 Anatomy and Physiology II (4 Credits)

Requisite(s): BIO-1107,BIO-1108L

A continuation of BIO 1107 with an emphasis on cardiovascular, respiratory, digestive, urinary, endocrine, and reproductive systems. Three lectures and three lab hours per week.

Fulfills General Education Requirement: NPW

Typically offered: Spring Only

BIO-1120 Contemporary Topics in Biology (3 Credits)

Introduction to biology issues in modern society. Studies of genetic issues, pollution and energy problems, ecology, effective drugs on the individual, and contemporary issues facing today's individual.

Typically offered: All Sessions

BIO-1140 Anatomy and Physiology for Nursing and Health Science I (4 Credits)

Requisite(s): BIO-1140L

This course is for nursing, occupational therapy, physical therapy, and physician assistant majors. Health Promotion majors may take this course or BIO-1107. Lecture topics include animal cell structure and function, tissues, and a survey of human physiological systems. Course emphasizes cells, tissues, genetics, integument, and the musco-skeletal and nervous systems. Three lectures and three lab hours per week.

Fulfills General Education Requirement: NPW

Typically offered: Fall Only

BIO-1141 Anatomy and Physiology for Health Science II (4 Credits)

Requisite(s): BIO-1140,BIO-1141L

Continuation of BIO-1140. Intended for nursing, occupational therapy, physical therapy, and physician assistant majors. Health Promotion majors may take this courses of BIO-1108. Topics include: cardiovascular physiology, respiratory system, lymphatic system, respiratory physiology, and the digestive, urinary, endocrine, and reproductive systems. Three lectures and three lab hours per week.

Fulfills General Education Requirement: NPW

Typically offered: Spring Only

BIO-1150 Forensic Biology (3 Credits)

This lecture/laboratory is open to all students, but especially geared to criminal justice majors. This course will focus on the biological evidence and techniques used in forensic science. Topics include the study of evidence found at crime scenes such as blood, hair, DNA, and debris such as soil and sand, microbes, plants, insects, and other cells and tissues. Students learn about the knowledge gained from performing an autopsy with a focus on change in tissues following trauma and the sequential changes that occur in a body after death. Integrated lecture and lab for three hours each week. Biology majors may not use this course toward their major.

Fulfills General Education Requirement: NPW

Typically offered: As Needed

BIO-1201 General Biology I (5 Credits)

Requisite(s): BIO-1201L,CHE-1201,MAT-1105

Introduction to biology for majors—covers basic principles in cellular and molecular biology, genetics, development, ecology, and evolution. The organization of plants and animals from cells to integrated systems is discussed and a comparison made between plant and animal phyla. Considerable class time is devoted to a study of the chemistry of living organisms, including the origin of life, the organic constituents of organisms, the chemistry of heredity, cellular respiration, and photosynthesis. CHE-1201 and MAT-1105 are recommended prerequisites.

Fulfills General Education Requirement: NPW

Typically offered: Fall Only

BIO-1202 General Biology II (5 Credits)

Requisite(s): BIO-1201,CHE-1202 is a recommended co-requisite.,BIO-1202L

Continuation of BIO 1201 with an emphasis on the organization of animals and integration of biological systems. Three lecture and three lab hours per week.

Typically offered: Spring Only

BIO-2200 Art & Ecology (3 Credits)

Requisite(s): Take WRI-1000

This course will focus on integrating visual art practice and scientific methods as a means of observing, understanding, interpreting and creatively responding to human driven disturbances and the restoration of nature, focusing on the urban environment and ecologies of New York City. Students will study modern and contemporary works of art responding to ecologies of undisturbed and urban environments. Readings, discussion and lab work will complement visiting speakers, and field trips. We will also consider artistic and scientific mapping of alternate ecologies such as institutional power structures. Students will be visualize their scientific observations and creative responses through drawing, graphing, 2D mixed media, mapping modelling and sculpture. Previous art experience not required.

Fulfills General Education Requirement: NPW, HCE

Typically offered: As Needed

BIO-2202 Comparative Anatomy (4 Credits)

Requisite(s): BIO-1202,BIO-2202L

A comparative lecture and laboratory study of the macroscopic anatomy of typical representatives of the classes of vertebrates. Three lectures and three lab hours per week.

Typically offered: Fall Only

BIO-2203 Invertebrate Zoology (4 Credits)

Requisite(s): BIO-1202,BIO-2203L

Major invertebrate phyla with emphasis on taxonomy, structure, physiology, and ecology; field trips to selected local areas for the collection and study of representative invertebrate forms. Laboratory dissection of representative types. Three lectures and three lab hours per week.

Typically offered: As Needed

BIO-2204 Ecology (4 Credits)

Requisite(s): BIO-1202,BIO-2204L

An introduction to ecological principles and their application to the environment, environmental problems, numerous field trips to representative systems. Three lectures and three lab hours per week.

Typically offered: As Needed

BIO-2206 Histology (4 Credits)

Requisite(s): BIO-1202,BIO-2206L

A study of the light and electron microscopic anatomy of the vertebrate animal. General study of cell morphology and basic tissues is followed by a systematic examination of the body's organs. Three lectures and three lab hours per week.

Typically offered: As Needed

BIO-2210 Developmental Biology (4 Credits)

Requisite(s): BIO-1202,BIO-2210L

A study of the process of development at the cellular molecular level as a description of the stages through which an organism attains increasing complexity. In addition to lecture, students become actively involved through discussion of primary literature and laboratory. The laboratory features vertebrate and invertebrate examples of developmental processes. Three lectures and three lab hours per week.

Typically offered: Spring Only

BIO-2250 Introduction to Cell Biology (4 Credits)

Requisite(s): Required pre-requisite: BIO-1202,Required co-requisite: BIO-2250L,Recommended co-requisite: CHE-2101

Nature of biological molecules, the structure of cells and organelles, principles of bioenergetics and their application to metabolism, and the cellular information transfer system. Laboratory work in cell biology, molecular biology, and biochemistry. Three lectures and three lab hours per week.

Typically offered: Fall Only

BIO-2280 Biological Evolution (4 Credits)

Requisite(s): BIO-1202,BIO-2280L

Introduction to the principles of organic and molecular evolution. Topics include genetic variation, natural selection, speciation, adaptation, diversification, biogeography, molecular evolution. Three lectures and three lab hours per week.

Typically offered: As Needed

BIO-3300 Microbiology (4 Credits)

Requisite(s): BIO-1141 or BIO-1202,BIO-3300L

A survey of the principal groups of microorganisms (bacteria, fungi, algae, protozoa, viruses, and rickettsiae) with emphasis on taxonomy, morphology, physiology, and their industrial and medical applications. Includes an intensive study of bacterial, rickettsial, chlamydial, algae, fungal, viral, and protozoan organisms of significance in the propagation of diseases. Three lectures and three lab hours per week.

Typically offered: Spring Only

BIO-3302 Botany (4 Credits)

Requisite(s): BIO-1202,BIO-3302L

A survey of the principal groups of plants from the standpoint of their structure and development with intensive studies on the morphology and physiology of the angiospermae. Three lectures and three lab hours per week.

Typically offered: As Needed

BIO-3303 Genetics (4 Credits)

Requisite(s): BIO-1202,BIO-3303L

An introduction to variation and heredity, the theory of the gene as developed in classical genetics, and biochemical and molecular genetics. Three lectures and three lab hours per week.

Typically offered: Spring Only

BIO-3310 Advanced Cell Biology (4 Credits)

Requisite(s): BIO-2250,BIO-3310L,CHE-2102

Biochemical and morphological evidence underlying current models of cell structure and function. Roles of membranes in cell compartmentation, organelle structure and biogenesis, vesicle transport, secretion, cytoskeleton, motility, signaling, mitosis, and cell cycle regulation. Distinctive characteristics of differentiated mammalian cells. Laboratory experiences introduce classical and contemporary methods of cell study. Three lectures and three lab hours per week.

Typically offered: Fall Only

BIO-3320 Molecular Biology (4 Credits)

Requisite(s): BIO-1202,BIO-3320L,CHE-2102

A survey of nucleic acid structure, function, and regulation in prokaryotic and eukaryotic organisms, emphasizing modern techniques and their uses in answering questions at the molecular level. Laboratory exercises allow students to gain experience in molecular biological research. Three lectures and three lab hours per week.

Typically offered: Spring Only

BIO-3350 Physiology (4 Credits)**Requisite(s):** BIO-1202,BIO-3350L,CHE-2102

A study of the functions of vertebrate organs and organ systems, and the homeostatic mechanisms that underlie them. Included are discussions of the cellular and physiochemical bases of homeostasis. Three lectures and three lab hours per week.

Typically offered: Fall Only**BIO-3360 Human Pathophysiology (4 Credits)****Requisite(s):** BIO-3310 Cell Biology

Pathophysiology is the study of the human body's reaction to adverse conditions. This course will elucidate the basic changes that occur in disease states such as cellular injury, inflammation and hemodynamic changes as well as the underlying mechanisms of genetic disease, environmental disease and cancer. Disease symptoms, treatment and diagnosis will also be introduced. Students will develop critical thinking skills through engagement in problem-based learning through the use of case studies.

Typically offered: Fall Only**BIO-4000 Special Topics in Biology: Marine Biology in Belize (3 Credits)****Requisite(s):** BIO-2250,CHE-2102

Cross-listed with: BIO-1102, BIO-5401 and PSY-4014. Discussion and analysis of problems in biology that are not covered in regular course work. The specific content of the course will remain flexible in response to student and departmental interest.

Typically offered: As Needed**BIO-4001 Marine Biology in Honduras (3 Credits)****Requisite(s):** Take BIO-2250 CHE-2102;

Marine Biology in Honduras. Course requires travel to Honduras.. Please contact Dr. Nolan, at KNolan@stfranciscollege.edu or (718) 489-5439 for additional information.

Typically offered: As Needed**BIO-4002 Special Topics in Biology: Biotechnology (3 Credits)****Requisite(s):** Take BIO-2250 CHE-2102;

Course will include topics such as Genomics, Proteomics, and Systems Biology.

Typically offered: As Needed**BIO-4003 Special Topics in Biology: Honoring the Parks (3 Credits)****Requisite(s):** Take BIO-2250 CHE-2102;

This 3 credit course will focus on the ecology, sustainability, and history of national and local parks in the NYC area. These parks include the Fire Island National Seashore, Jamaica Bay Wildlife Refuge, Ellis Island, the Tenement Museum, and the new Brooklyn Bridge Park. We will also go on a Oyster Schooner in LI. There is a fee of \$550 that will cover camping in Fire Island, ferries, LIRR, and admissions to such locales as the Tenement Museum and the Oyster Schooner. It will also cover food and dorm (including camping on June 5) from June 3-10. You will read and write a book report about diseases in early NYC immigrants and keep a journal. You must register for this course by filling out a sheet signed by Dr. Nolan. Please e-mail her if interested: knolan@sfc.edu

Typically offered: As Needed**BIO-4004 Seminar: Marine Mammal Cognition (3 Credits)**

This course is designed with two main components: A lecture component on campus at SFC and an experiential learning component that includes travel to Santa Cruz California. The course revolves around marine mammal cognition but general aspects of cognitive psychology. Topics covered will include basic experimental design, sensation/perception, intelligence and consciousness, logic, concept formation, language studies with marine mammal species, and ethics. Students will learn about and observe data collection sessions with captive, trained seals, sea lions, sea otters and dolphins. The ecology of sea lion habitat as well as marine mammal physiology will also be explored.

Typically offered: As Needed**BIO-4005 Topic: Parasitology (4 Credits)****Requisite(s):** BIO-4005L,BIO-2250 and CHE-2102

Parasitology is the study of how organisms can take over and harm another organism. Sometimes it can be lethal. We will study examples of protozoa, worms, and insects that parasitize both plants and animals. Lecture will focus on the mechanisms of how parasites infect hosts, and life cycles of these parasites. If there are treatments or drugs available we will learn how these work. Lab will focus on parasites of plants and animals, especially live parasites of dead fish. We will also study preserved slides and dissect whole preserved specimens, as well as conduct local field trips to a vet's office and research labs.

Typically offered: As Needed**BIO-4403 Endocrinology (3 Credits)****Requisite(s):** BIO-2250

A survey of the cells and organs of internal secretion and their products. The endocrine secretions and their interactions will be considered as will mechanism of target signaling. Three lecture hours per week.

Typically offered: As Needed**BIO-4405 Immunology (4 Credits)****Requisite(s):** BIO-2250,BIO-4405L

This course is a study of the cell biology, biochemistry, molecular biology, and histology of the human and mouse immune systems. Three lectures and three lab hours per week.

Typically offered: As Needed**BIO-4409 Neurobiology (4 Credits)****Requisite(s):** BIO-2250,BIO-4409L

A study of nervous system organization, function, and development. Major concepts in neurobiology including impulse conduction, synaptic transmissions, sensory processing, motor function, and memory. Three lectures and three lab hours per week.

Typically offered: As Needed**BIO-4420 Virology (4 Credits)****Requisite(s):** BIO-2250,BIO-4420L,CHE-2102

Provides an introduction to bacterial, animal, and plant virology. General methodology or virus research, virus structure, biochemistry of viral replication, and general features of virus-host cell interaction. Laboratory work includes basic experimental techniques applied to selected bacteriophages and animal viruses. Two lectures and three lab hours per week.

Typically offered: As Needed**BIO-4450 Pharmacology (3 Credits)****Requisite(s):** BIO-1202 or BIO-1141

A study of drugs and drug actions, including pharmacokinetics and pharmacodynamics. This course reviews the mechanism of action of various classes of drugs. Three lectures per week.

Typically offered: As Needed

BIO-4480 Bioinformatics (4 Credits)**Requisite(s):** BIO-2250, BIO-4480L, CHE-2102

An introduction to the theory, strategies, and practice of data management and analysis in molecular biology. including DNA and protein sequence analysis, biological databases, genomic mapping, analysis of gene expression. Three lectures and three lab hours per week.

Typically offered: As Needed**BIO-4990 Internship in Biology (1-4 Credits)**

Internship in Biological sciences based on student/mentor agreement. Internships must be approved by the department Chairperson.

Typically offered: As Needed**BIO-4995 Independent Study in Biology (1-4 Credits)**

Independent study under the direction of a faculty member. For Biology majors only.

Typically offered: All Sessions**BIO-4998 Biology Seminar (1 Credit)****Requisite(s):** Senior standing

Discussion of topics reflecting research and current problems in the biological sciences in a seminar format. Specific areas of discussion vary from semester to semester. Topics are announced in advance. A written paper and oral presentation are required. For Biology majors with senior standing only.

Typically offered: Fall Only**BIO-5101 History of Medicine in America (3 Credits)**

This course surveys the major challenges and advancements in biology and medicine in America from the early 17th century to present day and the impact of these advancements on American society. The roles of race, religion, socioeconomic class, gender and sexual orientation in determining access to health care and treatment protocols will be explored and analyzed.

Typically offered: All Sessions**BIO-5310 "Honors Seminar: Ethical, Legal & Social Implications of the Human Genome Project" (3 Credits)**

Cross-listed with: SOC-5402. The Human Genome was sequenced completely in 2002. This is a database that includes all of our genetic code. Not only did this research revolutionize science, it also inevitably impacted numerous spheres of our social life and continues to do so. In this course, we will learn about the human genome and the possibilities this knowledge generates for social consideration and social change. We will answer the following questions. Why do we want to study our genes? Who should have access to my genome? Who owns the genome? Should we be changing our genes? The areas of concern are: fairness in the use of genetic information; privacy and confidentiality; social consequences and stigmatization; reproductive issues; clinical issues uncertainties; ethical and legal concerns; conceptual and philosophical implications; health and environmental issues and the commercialization of gene products.

Fulfills General Education Requirement: NPW, SEH**Typically offered:** Fall Only**BIO-5401 Special Topics in Biology: Marine Biology in Belize (3 Credits)**

Cross-listed with: BIO-1102, BIO-4000 and PSY-4014. Discussion and analysis of problems in biology that are not covered in regular course work. The specific content of the course will remain flexible in response to student and departmental interest. Course requires travel. Contact Dr. Nolan, Chairperson-BIO at knolan@sfc.edu

Typically offered: As Needed**BIO-5402 Marine Biology in Honduras (3 Credits)****Requisite(s):** Take BIO-2250 CHE-2102;

Marine Biology in Honduras. Course requires travel to Honduras.. Please contact Dr. Nolan, at KNolan@stfranciscollege.edu or (718) 489-5439 for additional information.

Typically offered: As Needed**BIO-5403 Special Topics in Biology: Honoring the Parks (3 Credits)**

This course will focus on the ecology, sustainability, and history of national and local parks in the NYC area. Parks are at the core of what makes our area unique and exciting, providing natural oases as well as critical reflections on our past. This course will be hands-on and exploratory. We will visit parks and experience them for ourselves, while also digging into their deeper role in shaping our city and culture. The parks we visit and learn about may include Jamaica Bay Wildlife Refuge, Ellis Island, the American Museum of Natural History, the Tenement Museum, and Brooklyn Bridge Park, among others.

Typically offered: As Needed**BIO-5404 "Special Topics in Biology: Hunger- Biotechnology, Conservation" (3 Credits)**

Approximately 1 billion people around the world go hungry every day, with roughly an equal number of people lacking sufficient access to potable water. However, the problem is not insufficient world resources; the amount of food refuse produced yearly is roughly equivalent to the amount of food required to feed the hungry for one year. Called the world's greatest solvable problem," there are many potential solutions to hunger such as advancements in agricultural biotechnology as well as increased efforts towards the development of sustainable communities and environmental conservation. Each solution comes with its own benefits and limitations. This course will explore hunger both worldwide and within the US and includes a service learning as well as an immersion experience on a sustainable working farm to fortify concepts and build global citizenship.

Typically offered: As Needed**BIO-5405 "Special Topics in Biodesign Biotechnology, Conservation" (3 Credits)**

Everyday objects are designed for human use, yet many contribute to chemical and plastic pollution, carry a high carbon footprint, and may live in landfills for centuries after their use is completed. What if we could grow a house, or replace toxic processes with harmless ones? In considering how to minimize our impact on the planet, and what a grown"" future might look like, we will speculate, learn, and critique through the interdisciplinary practices of Biodesign. In this seminar, participants will take part in the Biodesign Challenge, which links students with a team of expert consultants, access to extensive resources, and participation in the biodesign community through webinars and other events throughout the semester. Through speculative and creative thinking, research and innovation, teams of students will envision, develop, and prototype a biodesign project addressing a real problem with an achievable design Together the honors class will analyze each team's proposal select one to represent SFC at the Biodesign Challenge summit in June 2022.

Typically offered: As Needed