

BIOLOGY

Phone: 718.489.5357

Mission of Biology Major

Biology is the study of living organisms at the molecular, microscopic, and systemic levels and deals with the interrelation of life forms and their environments. Students will learn classical biology and concepts in molecular and cellular biology and biotechnology that are current and cutting-edge areas of study in biology and medicine. Students will be prepared for graduate study, professional training in the medical sciences and allied health fields, teaching, or employment in industry concerned with the biological sciences.

Besides the traditional classroom experience, biology majors are encouraged to consider the diverse opportunities available through field placements, internships, or semesters at other academic institutions, both domestic and abroad. Taking full advantage of these opportunities requires careful planning, and students are urged to discuss their plans and interests with their academic advisors early. It is also our goal to acquaint non-science students with the issues presented by both human biology and the physical environment.

Program Student Learning Outcomes:

PLO 1: Design and perform experiments that demonstrate the scientific method, incorporate vocabulary and college and analyze data, and write a cogent lab report.

PLO 2: Make oral presentations that demonstrate the scientific method.

PLO 3: Demonstrate connections among population biology, ecology and evolution, molecular and cellular biology and organismal biology, and among biology, chemistry and physics.

PLO 4: Make qualitative and quantitative assessments of their own data as well as that in scientific literature.

PLO 5: Create and explain illustrations of biological phenomena.

Major in Biology

The Biology curriculum is a four-year program introducing students to the major in the biological sciences as well as offering practical, hands-on experience in the laboratory. It is taught as pure science for the intellectual good of the student and the inherent importance of the subject matter. Students are trained in reflective and analytical and critical thinking and sound judgment. The scientific method builds a foundation for graduate school and professional study, e.g., medical, dental, veterinary health fields, academic research, industrial research, and secondary school teaching. The program fosters and approaches significant contributions of biological scientists to humanity. Students also make ethical connections in their studies. Their science courses are integrated with the general education requirements.

During the first year, students take chemistry and general biology courses emphasizing energetics, cellular biology, molecular biology, genetics, and evolution. The second semester emphasizes an evolutionary, ecological, and organismal approach to biology. During the first year, the student is encouraged to take IT-1001 Computer Tools to gain the basic computer and analytical skills that are needed to analyze and present data. In addition, all students are required to take the math placement exam.

Those students who do not test into calculus should see the department for guidance.

In the second year, students study organic chemistry, basic cell biology, genetics, and other 2000- or 3000-level courses. Third-year students take physics, biochemistry, and cell and molecular biology. During the last year, students take senior seminar and finish biology electives. Students are also encouraged to undertake research early on in their education. All students are required to take a comprehensive exam in their senior year, the MFAT exam as part of a senior seminar course.

The courses required for the major are BIO-1201 General Biology 1- BIO-1202 General Biology 2; BIO-2250 Introduction to Cell Biology, recommended in the semester following the completion of BIO-1202 General Biology 2; BIO-3303 Genetics; BIO-4998 Biology Seminar (must be taken senior year); and CHE-3001 Biochemistry, which must be taken junior year. Students interested in going on to medical school are encouraged to take MAT-2203 Calculus II. Students must choose at least one course listed under each of the three areas of concentration for their advanced biology classes.

Programs

- Biology Minor (<https://catalog.sfc.edu/catalogue/programs/biology-health-promotion-health-care-management/biology-minor/>)
- Biology, B.S. (<https://catalog.sfc.edu/catalogue/programs/biology-health-promotion-health-care-management/biology-bs/>)

Courses Biology

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: As Needed**BIO-1140 Anatomy and Physiology 1 (3 Credits)****Requisite(s):** BIO-1140L

This course is for Nursing, Occupational Therapy, Physical Therapy, and physician assistant majors. Lecture topics include animal cell structure and function, tissues, and a survey of human physiological systems. Course emphasizes cells, tissues, genetics, integument, and the musculoskeletal and nervous systems.

Fulfills General Education Requirement: NPW**Typically offered:** Fall Only**BIO-1140L Anatomy and Physiology 1 Laboratory (1 Credit)****Requisite(s):** BIO-1140

This course is a corequisite laboratory experience to BIO-1140. Students will conduct experiments and examine samples to learn fundamental principles of Human Anatomy and Physiology. Topics include animal cell structure and function, tissues, and a survey of human physiological systems. Course emphasizes cells, tissues, genetics, integument, and the musculoskeletal and nervous systems. This a 3-hour lab.

Fulfills General Education Requirement: NPW**Typically offered:** Fall Only**BIO-1141 Anatomy and Physiology 2 (3 Credits)****Requisite(s):** BIO-1140,BIO-1140L,BIO-1141L

Continuation of BIO 1140. Intended for Nursing, Occupational Therapy, Physical Therapy, and physician assistant majors. Topics include: cardiovascular physiology, respiratory system, lymphatic system, respiratory physiology, and the digestive, urinary, endocrine, and reproductive systems.

Fulfills General Education Requirement: NPW**Typically offered:** Spring Only**BIO-1141L Anatomy and Physiology 2 Laboratory (1 Credit)****Requisite(s):** BIO-1140,BIO-1140L,BIO-1141

This course is a corequisite laboratory experience to BIO-1141. Students will conduct experiments and examine samples to learn fundamental principles of Human Anatomy and Physiology. Topics include: cardiovascular physiology, respiratory system, lymphatic system, respiratory physiology, and the digestive, urinary, endocrine, and reproductive systems. This is a 3-hour lab.

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:** Fall and Spring**BIO-1201 General Biology 1 (3 Credits)****Requisite(s):** BIO-1201L,MAT-1105 recommended co-requisite,CHE-1201 recommended Co-Req

An introduction to biological principles, emphasizing the chemical, biological, and evolutionary underpinnings of life. Topics introduced may include macromolecules, cell structure and function, mitosis and meiosis, the chromosomal basis of inheritance, natural selection, and evolution. There is a co-requisite laboratory (BIO-1201L) which reinforces these lecture concepts via interpretation of experimental results. CHE-1201 and MAT-1105 are recommended prerequisites.

Fulfills General Education Requirement: NPW**Typically offered:** All Sessions

BIO-1201L General Biology 1 Laboratory (2 Credits)**Requisite(s):** BIO-1201

This laboratory course will emphasize and reinforce concepts discussed in the co-requisite lecture (BIO-1201). Concepts covered will emphasize the scientific method, interpretation of data from experimental outcomes, teamwork and communication, and written and oral communication skills. This laboratory will develop skills and biological knowledge needed for future biology classes at St. Francis College. This is a 4-hour lab.

Fulfills General Education Requirement: NPW**Typically offered:** Fall Only**BIO-1202 General Biology 2 (3 Credits)****Requisite(s):** BIO-1201, BIO-1201L, BIO-1202L, CHE-1202 recommended co-req

This course overviews the biodiversity of life, from protists to people. Topics covered may include a march through the biodiversity of life on Earth, an introduction to the fundamentals of how bodies work, and basic tenants of ecology. A co-requisite laboratory (BIO-1202L) emphasizes these class concepts in several ways, including via a series of dissections.

Fulfills General Education Requirement: NPW**Typically offered:** All Sessions**BIO-1202L General Biology 2 Laboratory (2 Credits)****Requisite(s):** BIO-1201, BIO-1201L, BIO-1202

This laboratory course will emphasize and reinforce concepts discussed in the co-requisite lecture (BIO-1202). Phylogenetic patterns of organismal anatomy and basics of body systems will be emphasized in a series of dissections. Teamwork, and written and oral communication skills are emphasized. This laboratory will develop skills and biological knowledge needed for future biology classes at St. Francis College. This is a 4-hour lab.

Fulfills General Education Requirement: NPW**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: As Needed**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 (3 Credits)****Requisite(s):** BIO-1202, BIO-1202L, BIO-2204L

An introduction to how organisms, communities and populations interact with each other and the non-living world around them. Topics covered may include adaptations to life in different environments, population dynamics, behavioral ecology, organismal interactions, flow of material and energy through ecosystems, and conservation. There is a co-requisite Ecology laboratory (BIO-2204L) which relates to lecture concepts while emphasizing statistical and writing skills.

Typically offered: As Needed**BIO-2204L Ecology Laboratory (1 Credit)****Requisite(s):** BIO-1202, BIO-1202L, BIO-2204

Each laboratory activity will consist of an exercise designed to develop important concepts and skills related to being a practicing ecologist, and more generally, a biologist. These activities may involve multi-week investigations of various ecological problems, for which you will have input into the design of experiments and studies. Statistical and writing skills will be emphasized. This is a co-requisite to Ecology lecture (BIO-2204). This is a 3-hour lab.

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: As Needed**BIO-2250 Introduction to Cell Biology (3 Credits)****Requisite(s):** BIO-1202, BIO-1202L, BIO-2250L, CHE-2101 recommended Co-Req

To introduce the basic structure and function of the cell and its organelles and how components of the cell integrate to perform complex functions such as cell communication and growth.

Typically offered: Fall Only**BIO-2250L Introduction to Cell Biology Laboratory (1 Credit)****Requisite(s):** BIO-1202, BIO-1202L, BIO-2250

This is the lab component of BIO-2250 Cell Biology. The course will allow students to develop techniques such as protein assays, chromatography, and electrophoresis. This is a 3-hour lab.

Typically offered: Fall Only

BIO-2280 Evolution (3 Credits)**Requisite(s):** BIO-1202,BIO-1202L,BIO-2280L

Why can't whales breathe underwater? Well, they evolved from land mammals, which (unlike fish) must get their oxygen from air. The fact that whale bodies look a bit like a fish has to do with natural selection for the same environmental conditions. This course will serve as an introduction to the principles of evolution, whether through natural selection or other mechanisms that relate to random chance, such as genetic drift. We will examine the basic variation needed for evolution and how it is generated through mutations. Then we will use real-world examples to examine the complexities of this topic.

Typically offered: As Needed**BIO-2280L Evolution Laboratory (1 Credit)****Requisite(s):** bio-1202,BIO-1202L,BIO-2280

This course is a corequisite laboratory experience to BIO-2280. Students will conduct research and/or experiments that investigate evolutionary principles using real data. This is a 3-hour lab.

Typically offered: As Needed**BIO-3300 Microbiology (3 Credits)****Requisite(s):** BIO-1141 or BIO-1202,BIO-1141L or BIO-1202L,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 and intensive study of bacterial, rickettsial, chlamydial, algae, fungal, viral, and protozoan organisms of significance in the propagation of diseases.

Typically offered: Spring Only**BIO-3300L Microbiology Laboratory (1 Credit)****Requisite(s):** BIO-1141 or BIO-1202,BIO-1141L or BIO-1202L,BIO-3300

This course is a corequisite laboratory experience to BIO-3300. The course provides students with practical knowledge of the fundamental principles and applications of microbiology. Students will conduct experiments that investigate the structure and function of the principal groups of microorganisms (bacteria, fungi, algae, protozoa, viruses, and rickettsiae). This is a 3-hour lab.

Typically offered: Fall 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 (3 Credits)****Requisite(s):** BIO-1202,BIO-1202L,BIO-3303L

This course introduces fundamental concepts in classical and modern genetics. Topics covered in this course provide a broad overview of the field, and includes such topics as Mendelian Inheritance, viral and bacterial genetics, gene structures, gene regulation including epigenetics, cancer genetics, and introductory population and quantitative genetics.

Typically offered: Spring Only**BIO-3303L Genetics Laboratory (1 Credit)****Requisite(s):** BIO-1202,BIO-1202L,BIO-3303

This is the lab component of BIO-3303 Genetics. The course will supplement some of the important concepts learned through the lecture portion: Classic genetics established by Mendel and Morgan, probability calculations, gene expression, biotechnological techniques and bioinformatics. The course's practical activities aims to deepen your conceptual understanding in Genetics. This is a 3-hour lab.

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-3310L Advanced Cell Biology Lab (1 Credit)****Requisite(s):** BIO-2250,BIO-2250L,BIO-3310,CHE-2102,CHE-2102L

This is the lab component to accompany BIO-3310 Advanced Cell Biology. The course will provide practical application of the important concepts in Advanced Cell Biology. This is a 3-hour lab.

Typically offered: Fall Only**BIO-3320 Molecular Biology (3 Credits)****Requisite(s):** BIO-1202,BIO-1202L,BIO-3320L,CHE-2102,CHE-2102L

Since the discovery of DNA structure, the field of Molecular Biology has grown rapidly. Molecular Biology and related technologies have had a tremendous impact on the progress of other areas in biology in the past half century. In this course, we will learn the basic principles behind the central dogma; DNA to RNA to protein. We will also learn about the tools and technologies used in molecular biological approaches. The course is built on the board exam material to learn the clinical significance of each chapter. This course also aims to develop critical thinking skills through student-led discussions about real-life issues related to Molecular Biology.

Typically offered: Spring Only**BIO-3320L Molecular Biology Laboratory (1 Credit)****Requisite(s):** BIO-1202,BIO-1202L,BIO-3320,CHE-2102,CHE-2102L

This is the lab portion of BIO-3320 Molecular Biology. The lab component of this course consists of several hands-on activities that require sophisticated molecular and genetic approaches. Students will conduct experiments ranging from DNA-to-protein synthesis to gene knockdown. This is a 3-hour lab.

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 (3 Credits)****Requisite(s):** BIO-2250, BIO-2250L, BIO-4405L

This course is a study of the cell biology, biochemistry, molecular biology, and histology of the human and mouse immune systems.

Typically offered: Fall Only**BIO-4405L Immunology Laboratory (1 Credit)****Requisite(s):** BIO-2250, BIO-2250L, BIO-4405

This course is a corequisite laboratory experience to BIO-4405. Students will conduct experiments that explore a variety of immunoassays. This is a 3-hour lab.

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 (3 Credits)****Requisite(s):** BIO-2250, BIO-2250L, BIO-4420L, CHE-2102, CHE-2102L

This course provides an introduction to bacterial, animal and plant virology. Students will learn general methodologies in virus research. Topics include virus structure, the biochemistry of viral replication, and general features of virus-host cell interaction.

Typically offered: As Needed**BIO-4420L Virology Laboratory (1 Credit)****Requisite(s):** BIO-2250, BIO-2250L, BIO-4420, CHE-2102, CHE-2102L

This course is a corequisite laboratory experience to BIO-4420. Students will conduct experiments that explore the detection and analysis of various viruses. This is a 3-hour lab.

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.

Fulfills General Education Requirement: HON**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: HON, 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

Fulfills General Education Requirement: HON**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.

Fulfills General Education Requirement: HON**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.

Fulfills General Education Requirement: HON, NPW, SEH**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.

Fulfills General Education Requirement: HON**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.

Fulfills General Education Requirement: HON**Typically offered:** As Needed

BIO-5406 Food Diversity and Traditions of NYC Biotechnology, Conservation (3 Credits)

New York City is an eater's paradise. Food lovers travel far and wide for a birria taco truck in Queens, dim sum treats and dumplings in Manhattan, or the many delights of Brooklyn's Smorgasburg. This robust food culture arises largely from the outstanding diversity of human culture that underpins NYC's identity, and the large diversity of plants, animals, and other organisms that people import from around the world. In this course we will take both a cultural and scientific approach to explore the connection between our diets, our city, and the biodiversity that makes it possible. We will explore how foods have shifted over the city's history, and how this reflects global changes, human migration, local ecological shifts, outside influences, and sustainability. This course will involve eating a variety of foods and a lot of travel throughout NYC. Accordingly, students must be up for trying new foods and be able to walk for two or more miles.

Fulfills General Education Requirement: HON

Typically offered: As Needed

Faculty Chairperson

Dr. Kathleen Nolan

Professors

Burdowski

Corrigan

Lipson

Nolan

Assistant Professor

Dell

Herstoff

Kita

Serrano de Sousa Frias

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Sylvester

Wang