Natural Science Course Descriptions

Biology Course Descriptions

G-BI 101 Principles of Biology

4 hours
An introduction to the principles of biology, with an emphasis on the biology of humans. This course does not apply toward a major in biology. (Fall)

G-BI 106 Environmental Biology

4 hours
A one-semester introduction to the principles of biology, with an emphasis on biological interactions in the environment. This course does not apply toward a major in biology or biochemistry. Laboratory is included. (Fall, even years)

G-BI 111 College Biology I

4 hours
A rigorous introduction to the unity and diversity of life. This course focuses on the contributions of genetics, ecology and evolution to the biodiversity of the planet. The laboratory exercises are designed to provide a variety of practical experiences, as well as to illustrate the principles discussed in lecture. (Fall)

BI 112 College Biology II

4 hours
A continuation of G-BI 111 with a rigorous introduction to organismal structure and function. Explores the organization and processes of living systems at the levels of biomolecules, organelles, cells, organ systems, and organisms. Lab work includes studies of enzyme action, cellular respiration, organismal development and anatomy. Prerequisite: G-BI 111 with a grade of C or better. (Spring)

G-BI 201 Biodiversity

3-4 hours
A fundamental study of biological diversity as an assessment of life on earth. This will progress from the individual to the community, focusing on biodiversity and ecology from an evolutionary perspective and also on applied environmental research. The course includes laboratory work as an option for the 4th credit hour. (Spring, even years)

BI 207 Medical Terminology

2 hours
An introduction to the study of medical terms that brings to life the language of medicine. This course will help students develop an understanding of how to communicate fluently in a healthcare setting. This course will explain medical terms in the context of the anatomy and physiology of different body systems as well as how the body works in health and disease. (Spring, even years)

G-BI 210 Principles of Nutrition

3 hours
Physiology and chemistry of digestion, absorption, and metabolism of nutrients; nutrient functions; requirements; and effects of nutrient deficiencies and toxicities. Prerequisites: G-CH 101 or G-CH 111 with a grade of C or better or with consent of instructor (Interterm, odd years)

BI 225 Human Anatomy

4 hours
A lecture/laboratory course in the fundamentals of human anatomy, with emphasis on macroscopic structures at the tissue, organ and organ system levels of organization. Some attention will be given to the perspectives of histology and developmental biology. The course includes laboratory work, primarily dissection of a comparative mammal, the domestic cat. (Interterm, even years)

BI 234 Microbiology

4 hours
A study of microorganisms, with emphasis on the bacteria. A consideration of their structure, metabolism, classification, identification, and human and ecological relationships. Prerequisites: BI 112, CH 251 with grades of C or better or consent of instructor. (Spring, even years)

BI 283 Genetics

4 hours
Basic genetic concepts including classical Mendelian inheritance, cytogenetics, population genetics, and the molecular basis of gene action. Laboratory experiences coordinated with lecture topics. Pre-requisites: BI 112, with a grade of C or better. (Fall)

BI 310 Statistical Data Analysis (also cross-listed as CH 310 Statistical Data Analysis)

4 hours

A study of fundamental concepts including data types, distributions, and hypothesis testing; and of the applications of spreadsheets and other software for data manipulation and statistical analysis. Prerequisite: G-MA221 or consent of instructor. (Interterm)

BI 315 Human Physiology

4 hours

A rigorous introduction to the fundamentals of human neurophysiology, cardiac-physiology, muscular & circulatory physiology and excretory & respiratory physiology. Laboratory experiences include case studies of human physiological problems. Prerequisite: BI 112, with a grade of C or better. (Fall, even years)

BI 316 Ecology

4 hours

A study of relationships between organisms and their environments, including both physical and biotic environments. The course includes both laboratory and field work. Prerequisites: BI 112 with a grade of C or better. (Spring, every other even year)

BI 325 Human Ecology, Epidemiology, and Public Health

4 hours

A study of the relationships between humans and their environments, including both physical and biotic environments, with special emphasis on understanding the nature of healthy relationships in comparison to the disease state. Prerequisites: BI 112 with a grade of C or better. (Fall, odd years)

BI 334 Microbial Ecophysiology

5 hours

A study of the ecophysiology of microorganisms (with emphasis on Bacteria and Archaea), focusing on the diversity and utility of their metabolic pathways. This course includes both lecture and laboratory work. (Fall, even years)

BI 345 Plant Ecophysiology

4 hours

This course will explore the physiological processes that influence the growth, reproduction, survival, adaptation and evolution of plants. The physiological processes to be explored include water relations, mineral nutrition, solute transport, and energetics (photosynthesis and respiration). The influence of biotic and abiotic factors will be included to provide a context in which to discuss stress physiology and its ecological consequences. (Fall, even years)

BI 364 Cell and Molecular Biology

4 hours

The molecular organization, function and evolution of prokaryotic and eukaryotic cells. Lab work includes chromosome analysis, cellular fractionation, cell culture, and electrophoretic studies. Prerequisites: BI 112, CH 252 with grades of C or better. (Spring, odd years)

BI 370 Biochemistry (also cross-listed as cH 370 Biochemistry)

4 hours

A basic study of the chemistry and metabolism of carbohydrates, lipids, proteins, and nucleic acids. The course provides an understanding of the structural and functional relationships of chemical constituents of cells and the role that they play in the processes of life. Prerequisite: CH 252 or consent of instructor with concurrent enrollment. Laboratory is included (Fall, odd years)

BI 373 Cell Physiology (also cross-listed as CH 373 Biochemistry ii)

4 hours

A rigorous study of the fundamentals of cell physiology, concentrating on intermediary metabolism and its regulation. Lab work includes computational biology and shadowing physicians . Prerequisites: BI 112, CH252 and BI/CH 370 with grades of C or better or consent of instructor. (Spring, even years)

BI 384 Molecular Genetics

4 hours

This upper-level course will extend on topics presented in Genetics (B1283). The course will delve deeper into genetics with a specific focus on the molecular- scale processes responsible for producing our phenotype and their relationships to evolutionary change. The lab component focuses on various current lab techniques used in the field of genetics. (Spring, even years)

BI 391 Evolution (also cross-listed as G-PR391)

4 hours (Language Intensive)
A study of the history, philosophical underpinnings, and implications of Charles Darwin's Theory of Evolution by Natural Selection. Prerequisites: BI 112 with a grade of C or better. (Spring, odd years)

BI 393 Topics in Biology

1-4 hours
One specific topic will be covered each time this course is offered. Possible topics include (but are not limited to) molecular genetics, vertebrate zoology, functional morphology, quantitative biology, and advanced ecology. Prerequisite: BI 112 with a grade of C or better and consent of the instructor.

BI 404 Biomedical Ethics

2 hours
This seminar examines both the factual and ethical dimensions of decisions regarding healthcare. Students will use a case study approach to apply the ethical principles of autonomy, non-maleficence, beneficence, and justice to diverse situations. Alternative ethical systems and ethics in research are considered. (Spring, even years)

BI 445 Readings and Research in Biology

1-4 hours
Enrichment of a student's study in the discipline either by readings on a topic not covered in the above courses or by research done on or off campus. Prerequisites: 12 semester hours in the department or program with an average of C or better, and consent of the instructor. Open only to students majoring in the department or program.

BI 495 Field Experience in Biology

1-4 hours
A planned experience in one of the field-oriented or professionally related phases of biological science. The specific area and content must be agreed upon in advance by the student, faculty advisor, and Vice President for Academic Affairs. Specific examples that are offered periodically, especially during Interterm are Field Experience in Puerto Rico and observations of various health careers with practicing professionals.

Individualized Courses Available

295/495 Field Experience (1-4 hours)
299/499 Independent Study (1-4 hours)
388 Career Connections (1-12 hours)
445 Readings and Research (1-4 hours)

Chemistry Course Descriptions

G-CH 106 Environmental Chemistry

4 hours
A one-semester introduction to the principles of chemistry, with an emphasis on chemical interactions in the environment. This course does not apply toward a major in biology, biochemistry, or chemistry. Laboratory is included. (Fall, odd years)

G-CH 111 College Chemistry I

5 hours
A study of the principles, laws, and concepts of chemistry as they relate to the periodic table and systematic study of the properties of the elements. A study of modern atomic and molecular structure. Laboratory is included. (Fall)

CH 112 College Chemistry II

5 hours
A continuation of CH 111. Includes study of the chemistry of metals and nonmetals, chemistry of solutions, chemical equilibrium and qualitative analysis. Prerequisite: G-CH 111. Laboratory is included. (Spring)

CH 201 Quantitative Analysis

4 hours
A study of the principles and methods of analytical chemistry by the methods of volumetric and gravimetric analysis, precipitimetry, acidimetry and oxidation- reduction titrations. Prerequisite: CH 112, or consent of the instructor. (Fall, even years)

CH 251 Organic Chemistry I

5 hours
A study of the principles of organic chemistry, the physical and chemical properties of carbon compounds with emphasis on the mechanisms of

organic reactions, the nomenclature of the compounds, and methods of organic synthesis. The carbon compounds discussed include some of the common alkanes, alkenes, alkynes, cycloalkanes, alkylhalides, ethers and alcohols. Prerequisite: G-CH 111 or consent of instructor. Laboratory is included. (Spring)

CH 252 Organic Chemistry II

5 hours
A continuation of CH 251. Includes study of basic spectroscopy as a basic tool for structural analysis and the chemistry of aromatic compounds, aldehydes, ketones, amines, carboxylic acids and their functional derivatives. Prerequisite: CH 251. Laboratory is included. (Fall)

CH 310 Statistical Data Analysis (also cross-listed as BI 310 Statistical Data Analysis)

4 hours
A study of fundamental concepts including data types, distributions, and hypothesis testing; and of the applications of spreadsheets and other software for data manipulation and statistical analysis. Prerequisite: G-MA221 or consent of instructor. (Interterm)

CH 370 Biochemistry (also cross-listed as Bi 370 Biochemistry)

4 hours
A basic study of the chemistry and metabolism of carbohydrates, lipids, proteins and nucleic acids. The course provides an understanding of the structural and functional relationships of chemical constituents of cells and the role that they play in the processes of life. Prerequisite: CH 252 or consent of instructor with concurrent enrollment. Laboratory is included. (Fall, odd years)

CH 373 Biochemistry II (also cross-listed as Bi 373 cell Physiology)

4 hours
A rigorous study of the fundamentals of cell physiology, concentrating on intermediary metabolism and its regulation. Lab work includes computational biology and shadowing physicians . Prerequisites: BI 112, CH252 and BI/CH 370 with grades of C or better or consent of instructor. (Spring, even years)

CH 385 Advanced Inorganic Chemistry

4 hours
Further study of inorganic chemistry including structure and bonding, coordination chemistry, organometallic chemistry, the chemistry of transition metals and a more detailed systematic study of the families of the periodic table. Prerequisite: CH 112, CH 252. Laboratory is included. (Spring, even years)

CH 390 Instrumental Analysis

3 hours
Advanced work in quantitative analysis with emphasis on the principles and methods of electrochemical, spectroscopic and chromatographic analysis. Laboratory is included. Prerequisite: CH 201, PH 206 or PH216, or consent of the instructor. (Spring, odd years)

CH 400 General Physical Chemistry

5 hours
A study of the physical-chemical properties of matter. Topics covered include thermodynamics, the kinetic theory of gases, chemical kinetics, quantum mechanics, and statistical mechanics. Prerequisite: CH 252, G-MA 111, PH 206 (or concurrent enrollment). Laboratory is included. (on demand)

CH 445 Readings and Research in Chemistry

1-4 hours
Enrichment of a student's study in the discipline either by reading on the topic not covered in the above courses or by research done on or off campus. Prerequisite: 12 semester hours in the department or program with an average of C or better, and consent of instructor. Open only to students majoring in the department or program.

Individualized Courses Available

295/495 Field Experience (1-4 hours)
299/499 Independent Study (1-4 hours)
388 Career Connections (1-12 hours)
445 Readings and Research (1-4 hours)

Natural Science Course Descriptions

G-NS 100 Science in Society

3-4 hours (Language Intensive, if taken for 4 hours)

The goals of this course are to build scientific literacy and to increase awareness of what Science has to offer to individuals and to Society. Classes will include lectures, faculty-led discussions of assigned readings, student-led discussions of "Science in the News" topics, and student presentations of semester projects/term papers. (Spring, odd years)

G-NS 141 Environmental Science

4 hours
A study of the environmental issues that arise from the complex relationships between humans and the earth. Emphasis will be placed on a scientific understanding and a search for solutions to environmental problems. Laboratory is included. (Spring)

NS 245 Climatology

4 hours
This study of the Earth's climate system will emphasize the physical and biological processes that determine climate: e.g. radiative transfer, atmospheric and oceanic energy transfer, energy balance, the hydrologic cycle, and related geological, biological, and anthropogenic influences; and will consider their interactive effects on climate change. (Spring, even years)

NS 300 Research Methods

1 hour (Language Intensive)
Preparation for participation in an independent laboratory research project in the natural sciences. Topics covered include scientific literature searches, research design, data handling, research evaluation, scientific writing, and reporting. To be taken during the sophomore or junior year. (Fall)

NS 350 Stewardship Seminar

1 hour
A weekly discussion of the interrelationships among the current contents of the student's other courses, in light of their relationships to the goals of the Environmental Stewardship major.

NS 375 Junior Seminar

1 hour
Preparation for participation in an independent laboratory research project in the natural sciences. Topics covered include literature searches, research design, data handling, research evaluation, scientific writing and reporting, career exploration, and scientific ethics. (Spring)

NS 404 Environmental Ethics

2 hours
This seminar examines both the factual and ethical dimensions of our current and possible future environments. Students will use a case study approach to apply different ethical frameworks to choices that arise from human interaction with the natural order. (Spring, odd years)

NS 416 Ecological Economics

2 hours
This seminar will provide an historical overview of various schools of ecological and economic thought, and present the principles uniting ecology with economics. Students will use a case study approach to analyze economic policies constrained by ecological reality, including economic growth theory and policy as it pertains to issues of societal and ecological sustainability. (Fall)

NS 475 Senior Research

2 hours (Language Intensive)
Experience in the planning, conducting, and reporting of scientific research. The student research works in continual consultation with the research advisor. Selection of the research topic and consent of the advisor must be obtained in advance of enrollment. Prerequisite: NS 375 and consent of research advisor.

NS 495 Field experience in the natural Sciences

1-4 hours
A planned experience in a field-oriented aspect of both the biological and physical sciences.

Individualized Courses Available

295/495 Field Experience (1-4 hours)
299/499 Independent Study (1-4 hours)
388 Career Connections (1-12 hours)
445 Readings and Research (1-4 hours)

Physical Science Course Descriptions

G-PC 251 Geology

4 hours
An introductory course that focuses on the scientific study of the earth. The course emphasizes the study of earth materials, changes in the surface and interior of the earth, and the dynamic forces that cause those changes. (Interterm, odd years)

G-PC 275 Astronomy

4 hours
The structure and evolution of the universe, from nearby planets to distant quasars, are examined. Topics include recent discoveries concerning planets, stars, galaxies, pulsars, and black holes as well as their evolution, the structure of the universe today and how it will be in the future. The emphasis is descriptive rather than mathematical. (Interterm, even years)

PC 445 Readings and Research in Physical Science

1-4 hours
Enrichment of a student's study in the discipline either by reading on a topic not covered in the above courses or by research done on or off campus. Prerequisite: 12 semester hours in the department or program and the consent of the instructor. Open only to students majoring in the department or program.

Individualized Courses Available

295/495 Field Experience (1-4 hours)
299/499 Independent Study (1-4 hours)
388 Career Connections (1-12 hours)
445 Readings and Research (1-4 hours)

Physics Course Descriptions

PH 205 College Physics I

5 hours
A first course for chemistry and mathematics majors with a calculus background. Topics covered are mechanics, wave motion, and thermodynamics with emphasis placed on the use of mathematics to formulate problems and to explain physical phenomena. Prerequisite: G-MA 111. Laboratory is included. (Fall, odd years)

PH 206 College Physics II

5 hours
A continuation of PH 205. Topics covered are electricity, magnetism, and optics. Prerequisite: PH 205. Laboratory is included. (Spring, even years)

G-PH 215 General Physics I

4 hours
A first course for premed, biology, and other science majors with a college algebra background. Topics covered are mechanics, wave motion, and thermodynamics with emphasis placed on the understanding of physical concepts to formulate problems and to explain physical phenomena. Prerequisite: MA 105 College Algebra. Lab is included. (Fall)

PH 216 General Physics II

4 hours
A continuation of G-PH 215. Topics covered are electricity, magnetism, and optics. Prerequisite: PH 215. Lab is included. (Spring)

Individualized Courses Available

295/495 Field Experience (1-4 hours)
299/499 Independent Study (1-4 hours)
388 Career Connections (1-12 hours)
445 Readings and Research (1-4 hours)