

BIOLOGY

The biology major prepares students for future professional work in the life and health sciences or advanced education in numerous specializations across all fields of Biology. In addition to a high success rate in placing graduates in medical school, physician assistant programs, dental school and other health care professions, a significant number of our students also pursue graduate degrees (both Masters and PhD programs) in fields such as microbiology, physiology, cell biology and ecology. Many other students have been successful in careers in the pharmaceutical industry, and also, importantly, as teachers in primary and secondary education programs.

The department has three content goals, or learning outcomes, for students completing the major. These include understanding fundamental biological principles from the major areas of biology (cell and molecular biology, genetics, evolution, ecology, organismal, and population biology); applying and integrating fundamental biological principles from the major areas of biology; acquiring laboratory and field skills necessary to answer biological questions. As students accomplish these learning outcomes, they will also develop enhanced critical thinking skills and effective quantitative reasoning skills; communicate precisely and analytically in written and oral forms; engage independently and collaboratively in the scientific process.

Programs

- Biology Major
 - Concentration in Evolution, Ecology, and Biodiversity
 - Concentration in Health and Human Biology
 - Concentration in Marine Biology
 - Concentration in Molecular Biology
- Biology Minor

Courses

BIOL 1015 Fundamentals of Biology I 3 Credits

This course, an introductory study of biology for the non-science major, familiarizes students with the general biological principles that govern the activities of all living systems. Concepts include the biochemical origin of life, cellular morphology and physiology, and human genetics. Note: This course counts as a natural science core but does not satisfy requirements for the biology major or minor.

BIOL 1016 Fundamentals of Biology II 3 Credits

Students examine biological systems, such as the human organism, in detail, with an emphasis on pathophysiology, diversity of life, and evolution. Emphasis varies by instructor. Note: This course counts as a natural science core but does not satisfy requirements for the biology major or minor.

BIOL 1018 Human Biology: Form and Function 3 Credits

Attributes: EDCG Educational Studies Cognate, HSST Health Studies: Science and Technology

This course, which provides a basic introduction to human anatomy and physiology, examines the major organ systems of the body, focusing on how each system functions and how all systems interact with one another. Genetics, disease and prevention, nutrition, current issues in public health, and environmental health problems that human populations face are discussed. Note: This course counts as a natural science core but does not satisfy requirements for the biology major or minor.

BIOL 1020 Bioinspiration: Innovation Inspired by Nature 3 Credits

Attributes: MSID Magis Core: Interdisciplinary

This course introduces topics in Biology which have inspired developments in technology to the non-science major. Special emphasis is placed on ethical and social issues related to the knowledge and application of these technologies. Topics include biomimicry, antibiotics, gene editing, synthetic biology, and more. Through the semester, students will work together to design a bioengineering solution to an existing problem in nature. Note: This course counts as a natural science interdisciplinary core but does not satisfy requirements for the biology major or minor.

BIOL 1030 Animal Diversity: The Amazing World of Vertebrates 3 Credits

What's the difference between an alligator and a crocodile? How do sea turtles find their way back to their birthplace after 20 years at sea? Why do some frogs break their own bones? This course is designed for students interested in learning more about the incredible and sometimes weird world of vertebrate biology. Students will learn about the diversity, evolution, behavior, and current conservation issues of vertebrates. Students will gain a broad understanding of the process of science and an appreciation of the diversity of vertebrate life through lectures supplemented by live animal observations and examinations of preserved specimens.

BIOL 1071 Identity and the Human Genome 3 Credits

Attributes: BSCC Black Studies Component Course, BSCC Black Studies: Physical and Natural Sciences, DEIE Diversity, Equality, and Inclusion Elective, HSST Health Studies: Science and Technology, WSGF Women, Gender, and Sexuality Studies: Gender Focused

This course introduces human genetics to the non-science major. Topics of discussion include the structure and function of genes, modes of inheritance, gene editing, sex and gender, race, and human genetic diversity. Special emphasis is placed on ethical, legal and social issues related to the knowledge and application of genetic information. Note: This course counts as a natural science core but does not satisfy requirements for the biology major or minor.

BIOL 1074 Biology of Food 3 Credits

Attributes: EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective, MSID Magis Core: Interdisciplinary

This course will introduce non-science majors to the biological processes behind the food that we produce and harvest as well as the environmental consequences of our diet choices. This course will include material on: the rise of agriculture, plant and animal growth requirements and life cycles, evolution, and a description and discussion of food organisms in the modern North American diet, techniques of food production, and effects on the environment. Note: This course counts as a natural science core but does not satisfy requirements for the biology major or minor.

BIOL 1076 Environmental Science**3 Credits**

Attributes: EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective, MSID Magis Core: Interdisciplinary, PJST Peace and Justice Studies

The science of the environment is presented through examination of the interconnections among physical, chemical, and biological fields of inquiry. This course looks at how the global environment is altered by the human population, technology, and production of fuels and food. In this course, students will acquire a scientific understanding of current issues in environmental science and learn to evaluate claims about current environmental problems. Note: This course counts as a natural science core but does not satisfy requirements for the biology or chemistry major or minor. Crosslisted with CHEM 1076.

BIOL 1078 Introduction to Marine Science**3 Credits**

Attributes: EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective, MSID Magis Core: Interdisciplinary

This course introduces the non-science major to the field of oceanography. Topics dealing with the geological, physical, chemical, and biological aspects of science underscore the interdisciplinary nature of world ocean study. Note: This course counts as a natural science core but does not satisfy requirements for the biology major or minor.

BIOL 1088 Biomedical Science and Society**3 Credits**

Attributes: HSST Health Studies: Science and Technology, MSID Magis Core: Interdisciplinary

This core science course will engage students in inquiry-based scientific methodology through exploration of specific topics in biomedical science related to human health and disease. The course will explore four biomedical topics. Each topic will include approaches and contributions from chemistry and mathematics, so students appreciate the inherently interdisciplinary nature of science. The course will cover biomedical concepts, quantitative skills, the collection and analysis of data, and guided activities that utilize approaches from all three fields to address biomedical questions. The societal impact and implications of each topic will also be explored.

BIOL 1096 God and Modern Biology**3 Credits**

Attributes: CAOT Catholic Studies: Non-Religious Studies

This course introduces students to the dialogue between science and religion with a detailed consideration of recent advances in modern biological research that raise significant religious, theological, and ethical issues. The course emphasizes developing a practical understanding of the scientific method through interactive experiences and lecture material. Students consider how scientific breakthroughs and ideas can influence or be influenced by religious thought through assigned readings and in-class discussion groups and through the historically significant and most recent findings in the areas of evolution, biotechnology, and the neurosciences. Note: This course counts as a natural science core but does not satisfy requirements for the biology major or minor.

BIOL 1107 Human Anatomy and Physiology I**4 Credits**

Attributes: BPMB Biology Physiology Block, HSST Health Studies: Science and Technology

Corequisite: BIOL 1107L.

Homeostasis is the major theme of this course, with form and function covered together each semester. This course introduces the student to anatomical terminology, homeostasis and feedback control, membrane physiology, and tissues followed by the integumentary, skeletal, muscular, and nervous systems. A strong chemistry background is recommended. Open to nursing majors only.

BIOL 1107L Human Anatomy and Physiology I Lab**0 Credits**

Fee: \$120 Science Lab Fee

Corequisite: BIOL 1107.

Laboratory work closely follows the BIOL 1107 lecture and includes microscopic anatomy (histology), use of virtual cadaver (Anatome Table), anatomical models, human skeletons, and dissections for study of gross anatomy, and physiology experiments including muscle recruitment measurements, reflex tests and cranial nerve tests.

BIOL 1108 Human Anatomy and Physiology II**4 Credits**

Attributes: BPMB Biology Physiology Block, HSST Health Studies: Science and Technology

Corequisite: BIOL 1108L.

Prerequisite: BIOL 1107.

Homeostasis is the major theme of this course, with form and function covered together each semester. This course continues with the endocrine, cardiovascular, lymphatic, respiratory, urinary, digestive, and reproductive systems. A strong chemistry background is recommended. Open to nursing majors only.

BIOL 1108L Human Anatomy and Physiology II Lab**0 Credits**

Fee: \$120 Science Lab Fee

Corequisite: BIOL 1108.

Laboratory work closely follows the BIOL 1108 lecture and includes microscopic anatomy (histology), use of virtual cadaver (Anatome Table), anatomical models, and dissections for study of gross anatomy, and physiology experiments including blood pressure measurements, blood typing, lung function, and urinalysis.

BIOL 1151 Elements of Microbiology**4 Credits**

Prerequisites: BIOL 1107, CHEM 1184.

This microbiology course for nursing majors examines the structure and function of bacteria, viruses, yeasts, molds, antibiotics, and bacterial genetics as well as the mechanisms of microbial invasion and the body's immunological response. Open to nursing majors only.

BIOL 1151L Elements of Microbiology Lab**0 Credits**

Attributes: MWID Magis Core: Writing in the Discipline

Fee: \$120 Science Lab Fee

BIOL 1171 General Biology I**4 Credits**

Attributes: HSST Health Studies: Science and Technology

Corequisites: BIOL 1171L, BIOL 1171P.

This introductory course for biology majors covers the molecular and cellular basis of life, including cell structure and function, cell communication, inheritance, gene expression and regulation, and developmental genetics. Students receive hands-on experience with a broad range of topics and techniques in the accompanying laboratory.

BIOL 1171L General Biology I Lab**0 Credits**

Attributes: MWID Magis Core: Writing in the Discipline

Fee: \$120 Science Lab Fee

BIOL 1171P General Biology I PLG**0 Credits****BIOL 1171S General Biology I****4 Credits**

Attributes: HSST Health Studies: Science and Technology, MWID Magis Core: Writing in the Discipline

Corequisite: BIOL 1171L.

This introductory course for biology majors, offered during summer sessions, covers the molecular and cellular basis of life, including cell structure and function, cell communication, inheritance, gene expression and regulation, and developmental genetics. Students receive hands-on experience with a broad range of topics and techniques in the accompanying laboratory.

BIOL 1172 General Biology II	4 Credits	BIOL 2260 Ecology	4 Credits
Attributes: HSST Health Studies: Science and Technology		Attributes: BEEE Biology Ecology Block, EDCG Educational Studies	
Corequisites: BIOL 1172L, BIOL 1172P.		Cognate, EVME Environmental Studies Major Elective, EVNS	
This introductory course for biology majors covers biochemistry, energy utilization, anatomy and physiology, and the structure and function of plants and animals. Students receive hands-on experience with a broad range of topics and techniques in the accompanying laboratory.		Environmental Studies: Natural Science, EVPE Environmental Studies Elective	
BIOL 1172L General Biology II Lab	0 Credits	Corequisite: BIOL 2260L.	
Attributes: MWID Magis Core: Writing in the Discipline		Prerequisites: BIOL 1171, BIOL 1172, BIOL 1173, CHEM 1172.	
Fee: \$120 Science Lab Fee		This course is designed as an overview of the science of ecology: the study of interactions between organisms and their environment. The course uses a hierarchical approach to describe organisms, populations, communities, and ecosystems. We discuss the types of questions ecologists ask, and the methods ecologists use to answer questions.	
BIOL 1172P General Biology II PLG	0 Credits	BIOL 2260L Ecology Lab	0 Credits
BIOL 1172S General Biology II	4 Credits	Fee: \$120 Science Lab Fee	
Attributes: HSST Health Studies: Science and Technology		BIOL 2261 Genetics	4 Credits
Corequisites: BIOL 1172L.		Attributes: BMCD Biology Molecular Block, EDCG Educational Studies	
This introductory course for biology majors, offered during the summer, covers biochemistry, energy utilization, anatomy and physiology, and the structure and function of plants and animals. Students receive hands-on experience with a broad range of topics and techniques in the accompanying laboratory.		Cognate	
BIOL 1173 General Biology III	4 Credits	Corequisite: BIOL 2261L.	
Corequisite: BIOL 1173L.		Prerequisites: BIOL 1171, BIOL 1172, BIOL 1173.	
This introductory course for biology majors covers organismal biology with an emphasis on evolution, biological diversity, ecology, and environmental science. Students receive hands-on experience with a broad range of topics and techniques in the accompanying laboratory.		This course offers a comprehensive study of the fundamental principles of classical and molecular genetics. Major topics include transmission (Mendelian) genetics, gene linkage and mapping, fundamentals of molecular biology, molecular approaches to genetic analysis, genetic engineering and recombinant DNA technology, microbial genetics, regulation of gene expression, and genomics.	
BIOL 1173L General Biology III Lab	0 Credits	BIOL 2261L Genetics Lab	0 Credits
Attributes: MWID Magis Core: Writing in the Discipline		Attributes: MWID Magis Core: Writing in the Discipline	
Fee: \$120 Science Lab Fee		Fee: \$120 Science Lab Fee	
BIOL 2218 Vertebrate Zoology	3 Credits	BIOL 2262 Human Physiology	4 Credits
Attributes: BEEE Biology Ecology Block, EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective		Attributes: BPMB Biology Physiology Block, MWID Magis Core: Writing in the Discipline	
Prerequisites: BIOL 1171, BIOL 1172, BIOL 1173.		Corequisite: BIOL 2262L.	
Fish, frogs, flamingos, and ferrets. What unites them? A backbone. This course addresses how these very diverse groups of animals actually relate and differ, in physiology, morphology and behavior. Students will discuss the advantages and disadvantages of being a member of each group, and compare across groups the things that set these groups apart from each other. The course will consist of group discussions based on the required reading in the text, supplemented extensively by direct examples (preserved and live specimens, tissues and samples) showing how the diversity of vertebrates makes them an incredibly interesting group.		Prerequisites: BIOL 1171, BIOL 1172; BIOL 1173 or PSYC 1610; CHEM 2271.	
BIOL 2218L Vertebrate Zoology Lab	1 Credit	This course considers homeostasis in humans by means of a comprehensive survey of the morphology and physiology of human organ systems. Special emphasis is given to organ systems associated with water and electrolyte balance, respiration, digestion, movement, and neurological control.	
Attributes: BEEE Biology Ecology Block		BIOL 2262L Human Physiology Lab	0 Credits
Fee: \$120 Science Lab Fee		Attributes: MWID Magis Core: Writing in the Discipline	
Corequisite: BIOL 2218.		Fee: \$120 Science Lab Fee	
This lab focuses on the development of a vertebrate research project at the Connecticut's Beardsley Zoo, which currently houses over 130 species of animals, a number of which are currently listed as endangered. As a participant in the Species Survival Plan (SSP) program, the zoo's mission is to promote the preservation of such endangered species as well as provide the best possible enclosures for many of the zoo's other residents. You will be engaged in the design, execution, analysis and presentation of research, which will ultimately be used by the Connecticut's Beardsley Zoo to enhance their care and protection of vertebrates.		BIOL 2264 Tropical Marine Biology	3 Credits
		This course will introduce students to a variety of tropical marine ecosystems surrounding South Bimini, Bahamas. Students will receive in-class instruction regarding each ecosystem and the field methods used to study and quantify species in each location. Students will participate in field trips to each ecosystem and use the field methods. Ecosystems include, but are not limited to, seagrass meadows, mangroves, coral reef, open ocean. An open water snorkel with sharks or a dolphin dive is possible. Students must be able to swim and to get in and out of boats without assistance; snorkeling experience is preferred. Maximum 14 students.	

BIOL 2951 Biology Teaching Practicum I**1 Credit**

Prerequisite: Successful completion of the assigned course and laboratory.

This series of courses represents opportunities (up to six semesters) for Biology majors to gain experience in teaching practices in the laboratory as classroom setting. Students will be paired with an instructor, and assist in instruction, grading and overall successful running of a laboratory section. Strong prior performance in the laboratory to which the student will be assigned is required. Selection will be made by the biology department, after a general call is put out to all students who may be interested in the opportunity. Enrollment by permission only.

BIOL 2952 Biology Teaching Practicum II**1 Credit**

Prerequisite: Successful completion of the assigned course and laboratory.

This series of courses represents opportunities (up to six semesters) for Biology majors to gain experience in teaching practices in the laboratory as classroom setting. Students will be paired with an instructor, and assist in instruction, grading and overall successful running of a laboratory section. Strong prior performance in the laboratory to which the student will be assigned is required. Selection will be made by the biology department, after a general call is put out to all students who may be interested in the opportunity. Enrollment by permission only.

BIOL 2953 Biology Teaching Practicum III**1 Credit**

Prerequisite: Successful completion of the assigned course and laboratory.

This series of courses represents opportunities (up to six semesters) for Biology majors to gain experience in teaching practices in the laboratory as classroom setting. Students will be paired with an instructor, and assist in instruction, grading and overall successful running of a laboratory section. Strong prior performance in the laboratory to which the student will be assigned is required. Selection will be made by the biology department, after a general call is put out to all students who may be interested in the opportunity. Enrollment by permission only.

BIOL 2954 Biology Teaching Practicum IV**1 Credit**

Prerequisite: Successful completion of the assigned course and laboratory.

This series of courses represents opportunities (up to six semesters) for Biology majors to gain experience in teaching practices in the laboratory as classroom setting. Students will be paired with an instructor, and assist in instruction, grading and overall successful running of a laboratory section. Strong prior performance in the laboratory to which the student will be assigned is required. Selection will be made by the biology department, after a general call is put out to all students who may be interested in the opportunity. Enrollment by permission only.

BIOL 2955 Biology Teaching Practicum V**1 Credit**

Prerequisite: Successful completion of the assigned course and laboratory.

This series of courses represents opportunities (up to six semesters) for Biology majors to gain experience in teaching practices in the laboratory as classroom setting. Students will be paired with an instructor, and assist in instruction, grading and overall successful running of a laboratory section. Strong prior performance in the laboratory to which the student will be assigned is required. Selection will be made by the biology department, after a general call is put out to all students who may be interested in the opportunity. Enrollment by permission only.

BIOL 2956 Biology Teaching Practicum VI**1 Credit**

Prerequisite: Successful completion of the assigned course and laboratory.

This series of courses represents opportunities (up to six semesters) for Biology majors to gain experience in teaching practices in the laboratory as classroom setting. Students will be paired with an instructor, and assist in instruction, grading and overall successful running of a laboratory section. Strong prior performance in the laboratory to which the student will be assigned is required. Selection will be made by the biology department, after a general call is put out to all students who may be interested in the opportunity. Enrollment by permission only.

BIOL 3312 Fundamentals of Neurobiology**3 Credits**

Prerequisites: BIOL 1171, 1172, 1173 or CHEM 1171, PSYC 1610.

This course is designed to enrich your comprehension of neurobiology, exploring how these principles interconnect with and complement topics in psychology, behavioral neuroscience, and the field of mental health care. Geared towards upper-level students, particularly juniors and seniors, the course aims to furnish a holistic grasp of brain anatomy and physiology at both the cellular and behavioral levels. Covered topics encompass the structural and functional attributes of neurons, brain plasticity, neurophysiology, neuropharmacology, systems neuroscience, as well as the biological underpinnings of neurodegenerative disorders and select psychiatric illnesses such as anxiety, depression, and schizophrenia. By the course's conclusion, students will have acquired an integrated understanding of neurobiology and its intersections with various health science domains.

BIOL 3314 Endocrinology**3 Credits**

Attributes: BPMB Biology Physiology Block

Prerequisites: BIOL 1171, BIOL 1172, BIOL 1173, CHEM 2272.

This course examines the glands of internal secretion and their location, anatomy, and function, including the mechanisms of their secretions and cell signaling importance in the regulation of body functions.

BIOL 3315 Anatomy: Form and Function**3 Credits**

Attributes: BPMB Biology Physiology Block

Prerequisite: BIOL 1171, BIOL 1172, CHEM 2271.

This course examines the anatomy of animals emphasizing the functional and evolutionary diversity of vertebrates. The course will consist of lectures focused on morphological variation and evolution, readings of the primary literature and anatomical dissections of comparative structures.

BIOL 3323L Biochemistry Lab**1 Credit**

Fee: \$120 Science Lab Fee

Corequisite: BIOL 3324 or BIOL 3325.

This course will investigate classic and most current methodology used in biochemistry. A semester project will be used to introduce techniques used in biochemistry to investigate the structure and function of a protein. In characterizing this protein, the analysis of DNA, lipids and carbohydrates will also be covered. Crosslisted with CHEM 3323L.

BIOL 3324 Biochemistry I**3 Credits**

Attributes: BPMB Biology Physiology Block

Prerequisite: CHEM 2272.

This course will investigate the fundamentals of life: chemistry. The structures and functions of biomolecules, including proteins, DNA, RNA, lipids, and carbohydrates will be covered in depth. The concepts behind biological processes will be discussed, including enzyme kinetics and regulatory strategies, membrane functions, signal transduction, and an overview of metabolism. Crosslisted with CHEM 3324.

BIOL 3325 Biochemistry II**3 Credits****Attributes:** BPMB Biology Physiology Block**Prerequisite:** CHEM 2272 and CHEM 3324 or BIOL 3324.

This course focuses on the regulation of metabolic pathways involved in the synthesis, breakdown, and interconversion of biochemical intermediates that are fundamental to all life. Basic principles of biological thermodynamics will be highlighted in order to understand the processes by which living cells obtain and utilize energy. Students will develop an understanding of basic biomedical principles in the context of overall cell function. This course cannot be taken as a biology block elective if BIOL 3330 has been taken previously. Crosslisted with CHEM 3325.

BIOL 3327 Cell Biology**4 Credits****Attributes:** BMCD Biology Molecular Block, EDCG Educational Studies Cognate**Corequisite:** BIOL 3327L.**Prerequisites:** BIOL 1171, BIOL 1172, BIOL 1173, CHEM 2271.

This course focuses on the structure and function of eukaryotic cells. Students explore the relationship between gene expression and protein synthesis, and discuss how different proteins coordinate a complex array of important biological tasks in the cell. The course covers the biochemical interactions that occur within and between cells that sustain viability and mediate cell communication. Topics include gene expression and protein production, enzyme structure/function, protein to protein interactions, cytoskeleton and extracellular matrix, mechanisms of transport, signal transduction, cell cycle, and apoptosis. Laboratories include analysis of cell morphology, RNA and protein expression, and assays to study the growth, differentiation, and death of eukaryotic cells in response to their environment.

BIOL 3327L Cell Biology Lab**0 Credits****Fee:** \$120 Science Lab Fee**BIOL 3342 Developmental Biology****4 Credits****Attributes:** BMCD Biology Molecular Block, EDCG Educational Studies Cognate**Corequisite:** BIOL 3342L.**Prerequisite:** BIOL 1171, BIOL 1172, BIOL 1173.

This course explores how the transition from a single-celled, fertilized egg to a multicellular animal is accomplished, emphasizing the dynamic interactions that occur on the molecular level to tightly control developmental processes. Topics include mechanisms of cell fate and differentiation, the molecular basis of differential gene expression, analysis of the molecular cues regulating body axis formation, and the development of various specific structures in different experimental organisms. The laboratory for the course consists of experiments that focus on the influence of gene function on development. We will do experiments that allow us to observe expression patterns of important genes in development and we will study the effects of perturbing gene function during development.

BIOL 3342L Developmental Biology Lab**0 Credits****Fee:** \$120 Science Lab Fee**BIOL 3352 Fundamentals of Microbiology****4 Credits****Attributes:** BMCD Biology Molecular Block, EDCG Educational Studies Cognate**Corequisite:** BIOL 3352L.**Prerequisites:** BIOL 1171, BIOL 1172, BIOL 1173, one course from the Molecular Block, CHEM 2272.

This comprehensive introduction to microbiology includes microbial cell structure, physiology, genetics, evolution and taxonomy, diversity, ecology, and applied microbiology. Lab sessions introduce microbiological techniques (aseptic technique, microscopy, bacterial staining, culture techniques), and other research methods. Students use skills acquired in the lab to design and conduct independent investigations.

BIOL 3352L Fundamentals of Microbiology Lab**0 Credits****Fee:** \$120 Science Lab Fee**BIOL 3354 Molecular Biology****3 Credits****Attributes:** BMCD Biology Molecular Block**Prerequisites:** BIOL 1171, BIOL 1172, CHEM 2272.

This introduction to molecular biology examines protein structure, DNA structure, RNA structure, the roles of DNA and RNA in protein synthesis, and the replication and repair of DNA and RNA in eukaryotic and prokaryotic cells. Relates the effects of mutations to DNA, RNA, and proteins.

BIOL 3356 Immunology**3 Credits****Attributes:** BPMB Biology Physiology Block**Prerequisites:** BIOL 1171, BIOL 1172, CHEM 2272.

This introduction to immunology covers the humoral and cellular basis of immune response, emphasizing antigens, the structure and function of immunoglobulins, antibody formation, and living/experimental manifestations of the immune response.

BIOL 3357 General Virology**3 Credits****Attributes:** BMCD Biology Molecular Block**Prerequisite:** BIOL 1171, BIOL 1172, CHEM 2272.

This introductory course covers the field of virology, with a special emphasis on human (animal) viruses. Coverage centers on the physiological, biochemical, genetic and molecular aspects of animal viruses. Discussion stresses viral morphology; replication and assembly; pathogenesis of viral infections; and the epidemiology, prevention, and control of viral diseases. The societal implications surrounding the responses to several major human viruses will also be addressed.

BIOL 3362 Marine Invertebrate Zoology**4 Credits****Attributes:** BEEE Biology Ecology Block, EDCG Educational Studies Cognate**Corequisite:** BIOL 3362L.**Prerequisite:** BIOL 1171, BIOL 1172, BIOL 1173.

Students study the phylogeny, ecology, morphology, and physiology of the major marine invertebrate groups with emphasis on local fauna. The laboratory component includes field trips to various habitats in Long Island Sound to collect specimens for identification and study.

BIOL 3362L Marine Invertebrate Zoology Lab**0 Credits****Fee:** \$120 Science Lab Fee

BIOL 3364 Freshwater Ecology**4 Credits**

Attributes: BEEE Biology Ecology Block, EDCG Educational Studies Cognate, EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective

Corequisite: BIOL 3364L.

Prerequisite: BIOL 1171, BIOL 1172, BIOL 1173, CHEM 1172.

Students learn the applied and theoretical concepts of the field of ecology using examples from freshwater aquatic systems. In the laboratory, students learn the major groups of organisms present in aquatic systems and conduct experiments involving ecological concepts such as predation and competition.

BIOL 3364L Freshwater Ecology Lab**0 Credits**

Fee: \$120 Science Lab Fee

BIOL 3365 Evolutionary Biology**4 Credits**

Attributes: BEEE Biology Ecology Block, EDCG Educational Studies Cognate

Corequisite: BIOL 3365L.

Prerequisite: BIOL 1171, BIOL 1172, BIOL 1173.

The course begins with an examination of the intellectual origins of biological thought and includes a study of the historical factors that contributed to Charles Darwin's development of the theory of evolution. Topics include the evidence for evolution, the forces affecting evolution (e.g., mutation, migration, genetic drift, and selection), and natural selection as the basis of adaptation, as well as the philosophical and practical aspects of defining species and reconstructing phylogenetic relationships. Students critique (individually and in groups) current papers in evolutionary biology on topics such as punctuated equilibrium theory, Darwinian medicine, human origins, co-evolutionary arms races, systematics and biodiversity, and the evolution of sex.

BIOL 3365L Evolutionary Biology Lab**0 Credits**

Fee: \$120 Science Lab Fee

BIOL 3366 Ornithology**4 Credits**

Attributes: BEEE Biology Ecology Block, EDCG Educational Studies Cognate, EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective

Corequisite: BIOL 3366L.

Prerequisite: BIOL 1171, BIOL 1172, BIOL 1173.

This upper-level lecture, laboratory, and field course on avian biology has an emphasis on ecology and evolution. The course familiarizes students with the staggering diversity of birds and the adaptations that have contributed to their success. The laboratory focuses on unique adaptations of birds and means of identification of birds found in Connecticut through weekly field trips.

BIOL 3366L Ornithology Lab**0 Credits**

Fee: \$120 Science Lab Fee

BIOL 3372 Environmental Toxicology**4 Credits**

Attributes: BEEE Biology Ecology Block, EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective

Corequisite: BIOL 3372L.

Prerequisites: BIOL 1171, BIOL 1172, BIOL 1173, CHEM 2272.

Environmental toxicology is the study of the nature, properties, effects and detection of toxic substances in the environment and in any environmentally exposed species, including humans. Fundamental toxicological concepts will be covered including dose-response relationships, absorption of toxicants, distribution and storage of toxicants, biotransformation and elimination of toxicants, target organ toxicity, teratogenesis, mutagenesis, carcinogenesis, and risk assessment. The course will include an overview of chemodynamics of contaminants in the environment including fate and transport. The effects of these contaminants will then be explored on a series of scales: the molecular level (biochemical pathways of metabolism and detoxification); the organismal level (target organs, behavioral effects); and the ecosystem level (nutrient cycling and ecosystem services).

BIOL 3372L Environmental Toxicology Lab**0 Credits**

Fee: \$120 Science Lab Fee

BIOL 4971 Biology Research I**1-3 Credits**

This course requires a research thesis involving laboratory investigation. Seniors and qualified juniors obtain the consent of the professor supervising their research interest area prior to registering for this program. Past topics include aquatic ecology, bacterial ecology and physiology, biochemistry, cell-wall biosynthesis, evolution of marine invertebrates, genetic regulation of animal development, mammalian physiology, plant biostimulants, plant/insect ecology, population and disease dynamics of shellfish, and signal transduction/gene regulations.

BIOL 4972 Biology Research II**1-3 Credits**

This course requires a research thesis involving laboratory investigation. Seniors and qualified juniors obtain the consent of the professor supervising their research interest area prior to registering for this program. Past topics include aquatic ecology, bacterial ecology and physiology, biochemistry, cell-wall biosynthesis, evolution of marine invertebrates, genetic regulation of animal development, mammalian physiology, plant biostimulants, plant/insect ecology, population and disease dynamics of shellfish, and signal transduction/gene regulations.

BIOL 4973 Biology Research III**1-3 Credits**

This course requires a research thesis involving laboratory investigation. Seniors and qualified juniors obtain the consent of the professor supervising their research interest area prior to registering for this program. Past topics include aquatic ecology, bacterial ecology and physiology, biochemistry, cell-wall biosynthesis, evolution of marine invertebrates, genetic regulation of animal development, mammalian physiology, plant biostimulants, plant/insect ecology, population and disease dynamics of shellfish, and signal transduction/gene regulations.

BIOL 4974 Biology Research IV**1-3 Credits**

This course requires a research thesis involving laboratory investigation. Seniors and qualified juniors obtain the consent of the professor supervising their research interest area prior to registering for this program. Past topics include aquatic ecology, bacterial ecology and physiology, biochemistry, cell-wall biosynthesis, evolution of marine invertebrates, genetic regulation of animal development, mammalian physiology, plant biostimulants, plant/insect ecology, population and disease dynamics of shellfish, and signal transduction/gene regulations.

BIOL 4975 Biology Research V**1-3 Credits**

This course requires a research thesis involving laboratory investigation. Seniors and qualified juniors obtain the consent of the professor supervising their research interest area prior to registering for this program. Past topics include aquatic ecology, bacterial ecology and physiology, biochemistry, cell-wall biosynthesis, evolution of marine invertebrates, genetic regulation of animal development, mammalian physiology, plant biostimulants, plant/insect ecology, population and disease dynamics of shellfish, and signal transduction/gene regulations.

BIOL 4976 Biology Research VI**1-3 Credits**

This course requires a research thesis involving laboratory investigation. Seniors and qualified juniors obtain the consent of the professor supervising their research interest area prior to registering for this program. Past topics include aquatic ecology, bacterial ecology and physiology, biochemistry, cell-wall biosynthesis, evolution of marine invertebrates, genetic regulation of animal development, mammalian physiology, plant biostimulants, plant/insect ecology, population and disease dynamics of shellfish, and signal transduction/gene regulations.

BIOL 4981 Internship**1-3 Credits**

Prerequisite: Junior standing.

Internships are available to biology majors in good academic standing, subject to individual arrangement, for students interested in allied health, environmental science, marine science, medicine, dentistry, biotechnology, and emergency medicine. Students provide their own transportation and must discuss their internships with the department chair and obtain consent of the supervising professor prior to registering for this course.

BIOL 4982 Internship**1-3 Credits**

Prerequisite: Junior standing.

Internships are available to biology majors in good academic standing, subject to individual arrangement, for students interested in allied health, environmental science, marine science, medicine, dentistry, biotechnology, and emergency medicine. Students provide their own transportation and must discuss their internships with the department chair and obtain consent of the supervising professor prior to registering for this course.

BIOL 4990 Independent Study**1-3 Credits**

This course requires library research and the writing of a scholarly paper on a special topic. Students discuss topics with and must obtain consent from an appropriate professor prior to registration.

BIOL 4999 Capstone Seminar (Shell)**3 Credits**

During the capstone experience, students connect the diverse experience and knowledge they have acquired as biology majors, focusing these skills on examining in depth, a specific topic. In a small class setting (10-12 students maximum), students and the professor delve deeply into the chosen topic, assessing the peer-reviewed literature and most current trends around the particular subject. Students bring their breadth of knowledge to the discussion, and apply what they have learned over the course of their academic training to critically analyze the arguments and experiments presented in the literature. In most cases, students will be responsible for presenting a paper to the class, driving the content of discussion and debate with their fellow students and instructor. The capstone is a reading extensive experience, and by definition, shows that the biology major is able to synthesize and apply their knowledge to examine interesting questions. To maximize the value of the capstone experience, students enroll in an upper-level seminar course during their senior year.

BIOL 4999A Senior Capstone Seminar: Biology of Cancer**3 Credits**

Attributes: BICP Biology Major Capstone Course

Prerequisites: BIOL 1171, BIOL 1172, BIOL 1173, one course from the Molecular Block, senior standing.

This seminar requires students to draw on nearly all of their training as biology majors to understand the disease of cancer in great detail. Topics include the genetic/cellular basis for the disease, physiological effects of tumor progression and metastasis, environmental influences, treatment modalities, and the personal, familial and societal impacts of the disease. Students read extensively for the course and summarize and formally present current research in the field in an effort to develop their scientific communication skills. Numerous short reviews of research articles are also produced by students.

BIOL 4999B Senior Capstone Seminar: Molecular Mechanisms of Human Disease**3 Credits**

Attributes: BICP Biology Major Capstone Course

Prerequisites: BIOL 1171, BIOL 1172, BIOL 1173, one course from the Molecular Block, senior standing.

This seminar covers the molecular and cellular events that underlie complex human diseases. Students learn to critically analyze and interpret primary literature on the molecular aspects of such diseases as cancer, diabetes, heart disease, Alzheimer's, and AIDS. Students summarize and present selected articles at each meeting and use these acquired skills to investigate a particular topic of their choice in the form of a grant proposal for their final project.

BIOL 4999C Senior Capstone Seminar: Bacterial Pathogenesis**3 Credits**

Attributes: BICP Biology Major Capstone Course

Prerequisites: BIOL 1171, BIOL 1172, BIOL 1173, one course from the Molecular Block, senior standing.

This seminar examines the role of prokaryotes in disease, with an emphasis on the genetics and physiology of disease mechanisms. Topics include aspects of the human immune response, host-parasite relationships, and the epidemiology and evolution of infectious disease.

BIOL 4999E Senior Capstone Seminar: Reproductive Tactics**3 Credits**

Attributes: BICP Biology Major Capstone Course

Prerequisites: BIOL 1171, BIOL 1172, BIOL 1173, one course from the Physiology Block, senior standing.

This seminar explores the ways animals have evolved creative mechanisms, physiological and behavioral, to maximize their reproductive success. Topics will include mate choice and sexual conflict, paternity, variability in reproductive anatomy, mechanisms for successful fertilization, sperm competition, and sperm choice. Course format: A reading extensive course. Students will read from a source text for foundation ideas, then will each find and present to the entire class, scientific research papers from the primary literature.

BIOL 4999F Senior Capstone Seminar: Coral Reef Ecology**3 Credits**

Attributes: BICP Biology Major Capstone Course, EVME Environmental Studies Major Elective, EVPE Environmental Studies Elective

Prerequisites: BIOL 1171, BIOL 1172, BIOL 1173, one course from the Ecology Block, senior standing.

Students study the complex ecological relationships found in coral reef ecosystems. Topics include discussions of reef development, coral symbiosis and growth, reef trophic dynamics, ecology and behavior of coral reef fish and invertebrates, and effects of natural and human disturbance on coral reef communities. Course format: seminar in which students read, analyze, and present scientific research papers from the primary literature.

BIOL 4999G Senior Capstone Seminar: Ecology of the North Atlantic Coast **3 Credits****Attributes:** BICP Biology Major Capstone Course**Prerequisites:** BIOL 1171, BIOL 1172, BIOL 1173, one course from the Ecology Block, senior standing.

This seminar examines the processes that generate ecological patterns in North Atlantic coastal ecosystems with a focus on the ecology of salt marshes, tidal rivers, sandy beaches, and rocky shores, and the human impact on these systems. The course centers on student-led discussions of readings from scientific literature.

BIOL 4999I Senior Capstone Seminar: Topics in Evolutionary Biology **3 Credits****Attributes:** BICP Biology Major Capstone Course**Prerequisites:** BIOL 1171, BIOL 1172, BIOL 1173, one course from the Ecology Block, senior standing.

Evolution is the theme that unites all fields of biology. The broad objective of this course is to encourage students to integrate all the knowledge they have acquired as a biology major to critically interpret and analyze questions from an evolutionary perspective. In this seminar, we will read and discuss the current literature on major evolutionary topics, which have revolutionized the way in which we think about genomics, sex and reproduction, and our own human beginnings. We will also address important contemporary but controversial topics such as evolutionary medicine and evolutionary psychology. The course centers on student led discussions, presentations and literature critiques.

BIOL 4999J Senior Capstone Seminar: Pathophysiology of Bone and Cartilage **3 Credits****Attributes:** BICP Biology Major Capstone Course**Prerequisites:** BIOL 1171, BIOL 1172, BIOL 1173, one course from the Physiology Block, senior standing.

This seminar will focus on the biochemistry and physiology of human bone and cartilage. Emphasis will be placed on the normal development and healing of these tissues along with an introduction to common skeletal tissue disorders such as osteoporosis and arthritis. Students will be expected to analyze and present scientific literature while integrating the material with basic knowledge acquired from previous courses.

BIOL 4999K Senior Capstone Seminar: Ichthyology **3 Credits****Attributes:** BICP Biology Major Capstone Course**Prerequisites:** BIOL 1171, BIOL 1172, BIOL 1173, one course from the Physiology Block, senior standing.

This seminar will explore the diversity of fishes, the largest group of vertebrates. Topics for discussion will include feeding, locomotion, metabolism, and sensory systems of fishes. Students will analyze and present scientific literature and write a grant proposal.

BIOL 4999M Senior Capstone Seminar: Conservation Biology **3 Credits****Attributes:** BICP Biology Major Capstone Course, EVME Environmental Studies Major Elective, EVNS Environmental Studies: Natural Science, EVPE Environmental Studies Elective**Prerequisites:** BIOL 1171, BIOL 1172, BIOL 1173, one course from the Ecology Block, senior standing.

Conservation biology is focused on scientific investigation of the maintenance, loss, and restoration of biodiversity. It relies on biological principles (from disciplines such as population genetics, biogeography, and community ecology) applied in the context of human-modified environments. In this seminar, students will read and discuss the primary literature in this field and gain an appreciation of the linkages of conservation problems across biological scales (genes to ecosystems) and geographical scales (local to global). Students will also prepare a review of research on a current conservation issue, and will practice with conservation planning and management tools.

Faculty

Professors

Gerry, *Chair*

Klug

Phelan, *Director, Science Institute*Walker, *Graduate School Advisor*

Associate Professors

Biardi, *Study Abroad Advisor*

Byun

Fernandez

Harriott

Osier

Sauer, G.

Weatherbee

Assistant Professors

Date (visiting)

D'Andrea-Winslow (visiting)

George (visiting instructor)

Kelley (visiting) *Director, Health Studies Minor*

Riccio

Professors of the Practice

Church, *Health Professions Advisor*DeCristofaro, *Education Advisor*Earls, *Health Professions Advisor*

Maswood

Rodriguez

Santiago

Lecturers

Clark

Dutta

Fine, B.

Fraser

Hudson

Mahar

Mauro

Muthukumarana

Racioppo

Spendore Gordonos

Zavras

Faculty Emeriti

Braun

Brousseau

Hodgkinson

Poincelot