

# BIOLOGY

**Phone:** (845) 257-3770

**Location:** Coykendall Science Building, Room 106

**Web address:** [www.newpaltz.edu/biology](http://www.newpaltz.edu/biology)

The Biology program at New Paltz offers students excellent preparation for graduate school, medical school, or a career in industry or one of the many allied health fields. Our faculty-mentored research opportunities are unparalleled, and our modern, research-quality instrumentation enables students to pursue every interest from molecular signaling and environmental conservation to neurophysiology and animal behavior.

Within the Biology curriculum, students may choose one of five tracks, one leading to a Bachelor of Arts degree and four leading to a Bachelor of Science degree:

- Biology (BA degree track)
- Cellular Biology (BS degree track)
- Environmental Biology (BS degree track)
- Integrative Biology (BS degree track)
- Organismal Biology (BS degree track)

We also offer a minor in Biology and contribute to the university's interdisciplinary minors in [Environmental Science](#), [Environmental Studies](#), and [Evolutionary Studies](#). The Departments of Biology and Chemistry collaborate to offer an [interdisciplinary major in Biochemistry](#) leading to a Bachelor of Science degree.

In addition to these programs, the Department of Biology offers the core biology courses typically required to pursue [study for a health career](#). Two accelerated medical programs with other institutions are currently in place:

1. a seven-year, dual-degree BS/Doctor of Optometry program with the SUNY College of Optometry and
2. a seven-year, dual-degree BS/Doctor of Osteopathic Medicine program with the New York College of Osteopathic Medicine.

For information about these programs, or for guidance related to medical, dental and veterinary school admission, please contact Dr. Debra Adair, Health Career Advisor (CSB 104; 845-257-2614; [adaird@newpaltz.edu](mailto:adaird@newpaltz.edu)).

## Majoring in Biology

A minimum MPL of 4 and a minimum cumulative GPA of 2.5 are required to declare a major in Biology.

### Minimum grade requirements:

- A minimum grade of C- is required to advance from BIO201 General Biology I to BIO202 General Biology II and from BIO202 General Biology II to BIO320 Genetics.
- A minimum grade of C- in BIO320 Genetics is a prerequisite for several 300-level biology courses. Most 400-level biology courses require a minimum grade of C- in both BIO320 Genetics and BIO322 Evolution.
- A minimum grade of C- is required to advance from CHE201 General Chemistry I to CHE202 General Chemistry II, from CHE202 General Chemistry II to CHE318 Organic Chemistry I, and from CHE318 Organic Chemistry I to CHE319 Organic Chemistry II.

- A minimum grade of C- in CHE319 Organic Chemistry II is required to enroll in BCM461 Biochemistry I.
- A minimum grade of C- in MAT251 Calculus I is required to enroll in MAT252 Calculus II and in PHY201 General Physics I.

## Biology (BA) Program Learning Outcomes

Students who successfully complete the BA program in Biology will be able to:

- Understand fundamental biological principles.
- Collect data, present data appropriately, and analyze data.
- Apply information from cognate courses to their biology coursework (and vice versa).
- Solve problems related to course material.
- Interact with and learn from scientists actively engaged in research.
- Demonstrate experience with modern lab and field techniques and technology.
- Work collaboratively.
- Think quantitatively.

## Biology (BS) Program Learning Outcomes

Students who successfully complete the BS program in Biology will be able to:

- Understand fundamental biological principles.
- Collect data, present data appropriately, and analyze data.
- Apply information from cognate courses to their biology coursework (and vice versa).
- Solve problems related to course material.
- Interact with and learn from scientists actively engaged in research.
- Demonstrate experience with modern lab and field techniques and technology.
- Work collaboratively.
- Think quantitatively.
- Learn about current and future directions in research.

- [Biology \(BA Degree Track\)](#)
- [Cellular Biology \(BS Degree Track\)](#)
- [Environmental Biology \(BS Degree Track\)](#)
- [Integrative Biology \(BS Degree Track\)](#)
- [Organismal Biology \(BS Degree Track\)](#)
- [Minor in Biology](#)

**BIO111. Introduction To Animal Life. 3 Credits.**

A survey of the animal phyla including the study of structure, metamorphosis, adaptations, and behavior. The development of the students' sensitivity and awareness of what can be learned from careful observations in natural field situations will be emphasized. Designed for non-science majors; does not count toward biology major.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

May not be repeated for credit

**BIO112. Biology Today. 3 Credits.**

Designed to introduce students to selected aspects of biology science. By augmenting their understanding of biological concepts, students develop a deeper appreciation of the natural biological phenomena they are in contact with on a daily basis. In addition, students gain the working background necessary to understand contemporary biological issues such as environmental quality (population, pollution, global climate change), the human genome project, genetic engineering, and discoveries in medicine. When individuals become more biologically literate, they are also better equipped to make informed decisions that directly and indirectly impact their own lives.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

May not be repeated for credit

**BIO115. Intro To Plant Life. 3 Credits.**

Introduction to the form and function of plants. The student should acquire an appreciation for plants as living organisms in a biological world, and their economic importance to human beings. Designed for non-science majors; does not count toward biology major.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

May not be repeated for credit

**BIO119. Inheritance. 3 Credits.**

Students will learn and apply basic principles of Mendelian inheritance and DNA manipulation. Students will also examine current genetic technology advances as applied to genetic diseases.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

**Prerequisites:**

- Math Placement Level Minimum Score of 4 or MAT152 Minimum Grade of D- or MAT193 Minimum Grade of D- or MAT153 Minimum Grade of D-

May not be repeated for credit

**BIO120. Global Change Biology. 3 Credits.**

An investigation of global environmental change from a biological and ecological perspective with a primary focus on human ecology, the global carbon cycle, climate change, and environmental sustainability.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

May not be repeated for credit

**BIO130. Cancer Biology. 3 Credits.**

Students will explore the biological mechanisms that underlie the development of cancer and the mechanisms by which various cancer treatments work.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

May not be repeated for credit

**BIO135. Evolution for Everyone. 3 Credits.**

An introduction to modern evolutionary theory and its applications to a wide range of topics, including epidemiology, forensic medicine, conservation, population biology, social behavior, altruism, sex/mating strategies, religion, and many other aspects of human biology.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

May not be repeated for credit

**BIO140. Modern Biotechnology. 3 Credits.**

Students will explore how modern biotechnology impacts our everyday lives with a topical survey of applications that may include stem cells, biofuels, genetically modified organism (GMOs) and forensics. Students will also learn about the underlying biological principles and molecular techniques that are the basis of modern biotechnology.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

**Prerequisites:**

- Math Placement Level Minimum Score of 3 or MAT 151 Minimum Grade of D- or MAT093 Minimum Grade of D- or MAT120 Minimum Grade of D- or MAT121 Minimum Grade of D-

May not be repeated for credit

**BIO150. Insects and Human Society. 3 Credits.**

Students will be introduced to the most abundant, diverse, and widespread class of animals on Earth and investigate the critical interactions between insects and humans that influence human behaviors and activities.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

May not be repeated for credit

**BIO170. Human Biology. 3 Credits.**

A survey in several phases of human biology. Normal life processes will first be explored followed by the alteration and relationship of alterations to life styles. Subject matter will include human physiology, genetics, evolution and behavior. Designed for non-science majors; does not count toward biology major.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Course
- GE5: Natural Science Course
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

May not be repeated for credit

**BIO193. Biology Selected Topic. 1-12 Credits.**

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

May be repeated for credit

**BIO199. Pre-Osteo Seminar. 1 Credit.****Restrictions:**

- Must have the following level: Undergraduate

May be repeated for credit

**BIO201. General Biology I. 3 Credits.**

An introduction to modern biology: molecular and cellular organization of living systems, energy transformations and metabolism, the principles of classical and molecular genetics, and the basic embryological changes during the development of an organism.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Lecture
- GE5: Natural Science Lecture
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must have the following level: Undergraduate

**Prerequisites:**

- Math Placement Level Minimum Score of 4 or MAT152 Minimum Grade of C-
- BIO211 Minimum Grade of C-\*

\* May be taken at the same time

May not be repeated for credit

**BIO202. General Biology II. 3 Credits.**

An introduction to modern biology: diversity of life forms, the process of evolution, and the interactions of organisms with their environment and with each other.

**Attributes:**

- Liberal Arts
- GE4: Natural Science Lecture
- GE5: Natural Science Lecture
- GE3: NSCI
- Systematic Inquiry

**Restrictions:**

- Must have the following level: Undergraduate

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO212 Minimum Grade of C-\*
- Math Placement Level Minimum Score of 4 or MAT152 Minimum Grade of C-

\* May be taken at the same time

May not be repeated for credit

**BIO211. Gen Bio 1 Lab. 1 Credit.**

An introduction to modern biology: molecular and cellular organization of living systems, energy transformations and metabolism, the principles of classical and molecular genetics, and the basic embryological changes during the development of an organism. COURSE FEE.

**Attributes:**

- Research
- Information Literacy Intro
- Information Mgmt Intro
- Liberal Arts
- GE4: Natural Science Lab
- GE5: Natural Science Lab

**Prerequisites:**

- BIO201 Minimum Grade of C-\*

\* May be taken at the same time

May not be repeated for credit

**BIO212. Gen Bio 2 Lab. 1 Credit.**

An introduction to modern biology: diversity of life forms, the process of evolution, and the interactions of organisms with their environment and with each other. COURSE FEE.

**Attributes:**

- Research
- Critical Thinking Introductory
- Critical Think Reason Intro
- Liberal Arts
- GE4: Natural Science Lab
- GE5: Natural Science Lab

**Prerequisites:**

- BIO202 Minimum Grade of C-\*

\* May be taken at the same time

May not be repeated for credit

**BIO293. Biology Selected Topic. 1-12 Credits.**

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.

**Restrictions:**

- Must have the following level: Undergraduate

May be repeated for credit

**BIO295. Indep Study Biology. 1-12 Credits.****Restrictions:**

- Must have the following level: Undergraduate

May be repeated for credit

**BIO296. Departmental Elective. 1-12 Credits.****Restrictions:**

- Must have the following level: Undergraduate

May be repeated for credit

**BIO299. Pre-Osteopathic Seminar. 1 Credit.****Attributes:**

- Clinical Placement

**Restrictions:**

- Must have the following level: Undergraduate

May be repeated for credit

**BIO301. Field Biology Fall. 3 Credits.**

Diversity in the plant and animal kingdom; sound scientific methods of observation; interrelationships of organisms to each other and to their environment. Importance of the flora and fauna in our economic and cultural life and the need for conservation practices. Field trips are devoted to the study of several ecological units during fall. Identifications of the common plants and animals and the ability to interpret the signs, sounds, and behavior patterns of organisms. COURSE FEE.

**Attributes:**

- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-

May not be repeated for credit

**BIO305. Plant Morphology. 4 Credits.**

Comparative study of life histories, morphology, and phylogenetic relationships of the major plant groups. COURSE FEE.

**Attributes:**

- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-

May not be repeated for credit

**BIO307. Comparative Vertebrate Anatomy. 4 Credits.**

Gross anatomy and functions of systems of representative vertebrates. Skeletal, muscular, circulatory, digestive, respiratory, excretory, reproductive, nerve, and endocrine systems. Dissection is required. COURSE FEE.

**Attributes:**

- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-

May not be repeated for credit

**BIO311. Developmental Plant Anatomy. 4 Credits.**

Developmental phenomena and anatomical characteristics of plant cells, tissues, and organs. COURSE FEE.

**Attributes:**

- Research
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-

May not be repeated for credit

**BIO320. Genetics. 3 Credits.**

A study of the principles of heredity from classical experiments with *Drosophila* to current research in molecular genetics utilizing recombinant DNA and gene cloning methodologies. The organization, function, and behavior of the genetic material are discussed on the molecular, chromosomal and population levels.

**Attributes:**

- Research
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO321 Minimum Grade of C-\*

\* May be taken at the same time

May not be repeated for credit

**BIO321. Genetics Lab. 1 Credit.**

Laboratory investigation of a broad range of topics in Genetics. COURSE FEE.

**Attributes:**

- Information Literacy Intermed
- Information Mgmt Intrmd
- Liberal Arts

**Prerequisites:**

- BIO320 Minimum Grade of C-\*

\* May be taken at the same time

May not be repeated for credit

**BIO322. Evolution. 3 Credits.**

A survey of evolutionary principles, hypotheses, and interactions, with particular emphasis on population-level thinking, phylogenetics, and mechanisms of evolution. Topics will include hypothesis testing, selection, drift, quantitative genetics, genomics, adaptation, speciation, costs and benefits of sex, and coevolution.

**Attributes:**

- Critical Thinking Intermediate
- Critical Think Reason Intern
- Liberal Arts

**Restrictions:**

- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-

May not be repeated for credit

**BIO327. Wildlife Biology. 3 Credits.**

The biology and conservation of local wildlife using a case study approach. The identification, habitat requirements, and behavior of species along with past and current conservation challenges at four local sites. On field trip dates, we will visit the sites to gather data on wildlife abundance, diversity, or habitat.

**Attributes:**

- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-

May not be repeated for credit

**BIO340. Ecology. 4 Credits.**

A study of principles and concepts of ecology at the ecosystem, community, population, and organism levels of organization. Laboratory and fieldwork emphasize methods of acquiring, analyzing, and interpreting ecological data. COURSE FEE.

**Attributes:**

- Research
- Liberal Arts
- Writing Intensive

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-

May not be repeated for credit

**BIO346. Bio Data Analysis & Communicat. 3 Credits.**

An introduction to computer programming in R to perform biological data analytics including reading/writing files, data manipulations, graphics, and statistical analyses. Additionally, a focus on improving scientific communication skills including reading, writing, and presentation.

**Attributes:**

- Liberal Arts
- Writing Intensive

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-

May not be repeated for credit

**BIO348. Biological Statistics. 4 Credits.**

A practical application of data collection and statistical methods for biologists and will include topics such as hypothesis testing, t-tests, analysis of variance, and regression. This course is recommended for students currently interested in or involved with research.

**Attributes:**

- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- Math Placement Level Minimum Score of 5

May not be repeated for credit

**BIO349. Biology Research. 1-4 Credits.**

Individual laboratory and/or field research under the supervision of a faculty member. Permission of instructor required.

**Attributes:**

- Liberal Arts

**Restrictions:**

- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-

May be repeated for credit



**BIO350. General Microbiology. 4 Credits.**

Morphological, biochemical, physiological, and genetic aspects of microbial growth, especially bacteria. Bacterial classification, growth control, and roles in environment and health also considered. Laboratory teaches essential techniques. COURSE FEE.

**Attributes:**

- Research
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO320 Minimum Grade of C-

May not be repeated for credit

**BIO358. Molecular Biology. 4 Credits.**

Background, theory and techniques of molecular biology with the analysis of published research. Class discussions, independent research, written and oral presentations required. COURSE FEE.

**Attributes:**

- Research
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- CHE201 Minimum Grade of D-
- CHE202 Minimum Grade of D-

May not be repeated for credit

**BIO359. Cell Biology. 4 Credits.**

A detailed examination of the events that occur within living cells. Particular attention is paid to current experimental techniques and analysis of the recent literature. COURSE FEE.

**Attributes:**

- Research
- Liberal Arts
- Writing Intensive

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- CHE201 Minimum Grade of D-
- CHE202 Minimum Grade of D-

May not be repeated for credit

**BIO360. Virology. 3 Credits.**

Prokaryotic and eukaryotic viral structure and function as they relate to replication strategies, control, pathogenesis, the immune system and laboratory analysis methods. Emphasis will be placed on viruses that cause human disease.

**Attributes:**

- Liberal Arts

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-

May not be repeated for credit

**BIO370. Animal Physiology. 4 Credits.**

Physiology is the study of how living organisms function. This course is designed to give students a basic understanding of physiological principles relating to cells, organs and organ systems and the integration of animals with their environment. Material presented in lecture and lab will use comparative animal models to demonstrate general physiological concepts. COURSE FEE.

**Attributes:**

- Research
- Liberal Arts
- Writing Intensive

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO320 Minimum Grade of C-
- CHE201 Minimum Grade of D-

May not be repeated for credit

**BIO388. Biological Chemistry. 3 Credits.**

Study of the chemistry of biologically significant compounds; enzymes and metabolic reactions involved in energy transformations.

**Attributes:**

- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman
- Must be enrolled in the following field(s) of study (major, minor or concentration): Biology (508)

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- CHE201 Minimum Grade of C-
- CHE202 Minimum Grade of C-

May not be repeated for credit

**BIO393. Biology Selected Topic. 1-12 Credits.**

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of D-
- BIO202 Minimum Grade of D-

May be repeated for credit

**BIO396. Departmental Elective. 1-12 Credits.****Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of D-
- BIO202 Minimum Grade of D-

May be repeated for credit

**BIO399. Pre-osteopathic Seminar. 1 Credit.**

Third year students participate in patient care including performing patient interviews and some routine medical procedures, to the extent allowed by state law. Third year students visit the NYCOM campus in the fall for their final interview with the NYCOM admissions committee.

**Attributes:**

- Clinical Placement

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

**BIO412. Evolutionary Theory. 3 Credits.**

A survey of evolutionary theory, including population genetics, drift, adaptive mechanisms and application to modern biology. The historical development of the subject will illustrate the philosophy of science.

**Attributes:**

- Critical Thinking Advanced
- Critical Think Reasoning Adv
- Information Literacy Advanced
- Information Mgmt Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

**BIO413. Developmental Biology. 4 Credits.**

Fundamental concepts, principles, and mechanisms of animal development, including classical descriptive embryology and cellular and molecular mechanisms. Laboratory sessions focus on experimental manipulations of early invertebrate and vertebrate embryos and include student-designed research projects. COURSE FEE.

**Attributes:**

- Research
- Critical Thinking Advanced
- Critical Think Reasoning Adv
- Information Literacy Advanced
- Information Mgmt Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit



**BIO418. Animal Behavior. 4 Credits.**

A survey of the science of animal behavior as understood through modern evolutionary theory including the behaviors of wild and domestic animals such as learning, communication, foraging, antipredator behavior, migration, mating, parental care, and sociality. The lab focusses on field trips to observe animal behavior in a variety of settings of animals both in the wild and in captivity, and on conducting research using the primary literature.

**Attributes:**

- Critical Thinking Advanced
- Critical Think Reasoning Adv
- Information Literacy Advanced
- Information Mgmt Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

**BIO425. Plant Ecophysiology. 4 Credits.**

The physiological mechanisms underlying the ecological relationships of plants. Explores processes affecting plant growth, reproduction, survival, and biogeography in the context of global environmental change. Lab emphasizes local ecosystems and teaches modern instrumentation, techniques, and field skills. COURSE FEE.

**Attributes:**

- Research
- Critical Thinking Advanced
- Critical Think Reasoning Adv
- Information Literacy Advanced
- Information Mgmt Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

**BIO435. Entomology. 4 Credits.**

An introduction to the biology of insects and closely related arthropods. Topics covered will include the evolutionary history, developmental biology, physiology, diversity, behavior, and ecology of insects. The laboratory will provide hands-on experience with insect identification, specimen preparation, and behavioral and physiological experimentation. COURSE FEE.

**Attributes:**

- Research
- Critical Thinking Advanced
- Critical Think Reasoning Adv
- Information Literacy Advanced
- Information Mgmt Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

**BIO440. Freshwater Biology. 3 Credits.**

Students will learn the applied and theoretical concepts of freshwater biology. The class will have weekly laboratories and field trips aimed at the study of the biological, chemical, and physical properties of lakes and streams.

**Attributes:**

- Critical Thinking Advanced
- Critical Think Reasoning Adv
- Information Literacy Advanced
- Information Mgmt Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

**BIO441. Freshwater Bio Lab. 1 Credit.**

Students will examine aquatic ecosystems through field and laboratory experiences. The class will examine ecological concepts and take field trips that will help examine the biological, chemical, and physical properties of lakes and streams. COURSE FEE.

**Attributes:**

- Liberal Arts

**Restrictions:**

- Must not be enrolled in the following class: Freshman

**Corequisites:**

- BIO440

May not be repeated for credit

**BIO444. Nucleic Acid Technologies. 3 Credits.**

Seminar course where primary literature is used to explore several Nucleic Acid-based technologies (ribozymes/aptamers, RNAi, CRISPR/Cas9, etc.)

**Attributes:**

- Critical Think Reasoning Adv
- Information Literacy Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-

May not be repeated for credit

**BIO445. Ornithology. 4 Credits.**

Students will learn about the biology of birds, including avian evolution, anatomy and physiology, ecology, behavior, and conservation. In the laboratory and on field trips, students will explore avian taxonomy, develop identification skills, and undertake ornithological research. COURSE FEE.

**Attributes:**

- Critical Think Reasoning Adv
- Information Literacy Advanced
- Liberal Arts

**Restrictions:**

- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

**BIO446. Cellular Evolution. 3 Credits.**

Discussion-based seminar course in which primary literature is used to explore the origins of life on earth, the deep evolutionary history of cells, and cellular diversity among living cells.

**Attributes:**

- Critical Think Reasoning Adv
- Information Literacy Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-

May not be repeated for credit

**BIO448. Host-Microbe Coevolution. 3 Credits.**

Discussion-based seminar course in which primary literature is used to explore the coevolutionary interactions between prokaryotic microbes and eukaryotic hosts, ranging from pathogenic to symbiotic associations.

**Attributes:**

- Critical Think Reasoning Adv
- Information Literacy Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-

May not be repeated for credit

**BIO450. Conservation Biology. 4 Credits.**

The science of biodiversity, ecological concepts for understanding and protecting species and ecosystems, and perspectives, philosophies and laws that underlie conservation and enable its protection. Labs focus on quantitative analysis and field visits.

**Attributes:**

- Critical Think Reasoning Adv
- Information Literacy Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Graduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of D-
- BIO201 Minimum Grade of D-
- BIO202 Minimum Grade of D-
- BIO320 Minimum Grade of D-
- BIO322 Minimum Grade of D-

May not be repeated for credit

**BIO451. Capstone Microbiology. 4 Credits.**

The application of molecular microbial ecology concepts to examine bacterial structure, genetics and metabolism. Activities will include bioinformatics and bacteriological laboratory work.

**Attributes:**

- Critical Think Reasoning Adv
- Information Literacy Advanced

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-

May not be repeated for credit

**BIO491. Capstone Research. 3 Credits.**

Individual laboratory and field research under the supervision of a faculty member, resulting in a written report, and an oral presentation to biology faculty and students.

**Attributes:**

- Critical Thinking Advanced
- Critical Think Reasoning Adv
- Information Literacy Advanced
- Information Mgmt Advanced
- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must be enrolled in the following class: Senior

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May not be repeated for credit

**BIO493. Biology Selected Topic. 1-12 Credits.**

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

**Prerequisites:**

- BIO201 Minimum Grade of C-
- BIO202 Minimum Grade of C-
- BIO320 Minimum Grade of C-
- BIO322 Minimum Grade of C-
- Math Placement Level Minimum Score of 5 or MAT181 Minimum Grade of C-

May be repeated for credit

**BIO494. Fieldwork In Biology. 1-12 Credits.****Attributes:**

- Field Study
- Research

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May not be repeated for credit

**BIO495. Indep Study Biology. 1-12 Credits.****Attributes:**

- Liberal Arts

**Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

**BIO499. Modular Course. 1-3 Credits.****Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

May be repeated for credit

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