

# BIOLOGY (BIO)

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## BIO 0--. BIO LOWER DIVISION. (1-10 Credits)

Lower Level Coursework in Biology

**Level:** Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Transfer

**Schedule type(s):** Lecture

**Area(s) of Inquiry:** None

## BIO 0--L. BIO LAB LOWER DIVISION. (0-10 Credits)

Lower Level Coursework in Biology

**Level:** Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Transfer

**Schedule type(s):** Lab

**Area(s) of Inquiry:** None

## BIO 001. BIOLOGICAL SCIENCES FOR NON-MAJORS. (2-3 Credits)

A survey course exploring principles and current topics in the biological sciences - origin of life; representatives of the biological kingdoms; structure and function of cells; ecology; genetics; evolution; bioethics. Applications of critical thinking in solving biological problems. Co-requisite lab: BIO 001L. For Non-Majors.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 001L

**Restrictions:**

Students cannot enroll who have a major in Biology.

Students in the Pharmacy & Health Sciences college may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Life Science, Scientific Literacy

## BIO 001L. BIOLOGY LABORATORY. (1 Credit)

Co-requisite lab for BIO 001.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 001

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** Life Science, Scientific Literacy

## BIO 1--. BIO UPPER DIVISION. (1-10 Credits)

Upper Level Coursework in Biology

**Level:** Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Transfer

**Schedule type(s):** Lecture

**Area(s) of Inquiry:** None

## BIO 012. GENERAL/PRE-PROFESSIONAL BIOLOGY I. (0,3 Credits)

This course covers topics cell biology, biochemistry, and genetics. The labs, which focus on content covered in the lectures, will incorporate the process of inquiry through active learning and the scientific method. Students will have repeated opportunities in the inquiry-based laboratories to develop and test hypotheses, analytically explore the natural world, collect, analyze, and formally present data. Offered fall semesters. No prerequisites. Co-requisite lab BIO 012L. Students who take BIO 012 online in the summer term must still complete the lab section, but may take BIO 012L in the fall term.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012L (may be taken concurrently)

**Corequisite(s):** BIO 012PL

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Life Science, Scientific Literacy

## BIO 012L. GENERAL/PRE-PROFESSIONAL BIOLOGY I LAB. (1 Credit)

Co-requisite lab for BIO 012.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 (may be taken concurrently)

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** Scientific Literacy

## BIO 012PL. BIOLOGY CONCEPTS APPLICATION. (0 Credits)

This course covers topics cell biology, biochemistry, and genetics. The labs, which focus on content covered in the lectures, will incorporate the process of inquiry through active learning and the scientific method. Students will have repeated opportunities in the inquiry-based laboratories to develop and test hypotheses, analytically explore the natural world, collect, analyze, and formally present data. Offered fall semesters. No prerequisites. Co-requisite lab BIO 012L and co-requisite discussion recitation BIO 012-PL Biology Concepts Application. Students who take BIO 012 online in the summer term must still complete the lab section, but may take BIO 012L in the fall term.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 012

**Restrictions:** None

**Primary grade mode:** Credit/No Credit

**Schedule type(s):** Discussion/Recitation, Independent Study, Web Instructed

**Area(s) of Inquiry:** None

**BIO 013. GENERAL/PRE-PROFESSIONAL BIOLOGY II. (0-3 Credits)**

This course covers the topics of ecology, evolution, and the physiology of animals. The labs, which focus on content covered in the lectures, will incorporate the process of inquiry through active learning and the scientific method. Students will have repeated opportunities in the inquiry-based laboratories to develop and test hypotheses, analytically explore the natural world, collect, analyze, and formally present data. No prerequisites. Co-requisite lab BIO 013L and co-requisite discussion recitation BIO 013-PL Biology Concepts Application. Students who take BIO 013 online in the summer term must still complete the lab section, but may take BIO 013L in the spring term. Section information text: If retaking BIO 013 (lecture only), please contact Eric Swafford (eric.swafford@drake.edu) or Heath Weeks at (heath.weeks@drake.edu) for registration.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 013L (may be taken concurrently)

**Corequisite(s):** BIO 013PL

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Discussion/Recitation, Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Life Science, Scientific Literacy

**BIO 013L. GENERAL/PRE-PROFESSIONAL BIOLOGY II LAB. (1 Credit)**

Co-requisite lab for BIO 013.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 013 (may be taken concurrently)

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** Scientific Literacy

**BIO 013PL. BIOLOGY CONCEPTS APPLICATION. (0 Credits)**

This course covers the topics of ecology, evolution, and the physiology of animals. The labs, which focus on content covered in the lectures, will incorporate the process of inquiry through active learning and the scientific method. Students will have repeated opportunities in the inquiry-based laboratories to develop and test hypotheses, analytically explore the natural world, collect, analyze, and formally present data. No prerequisites. Co-requisite lab BIO 013L and co-requisite discussion recitation BIO 013-PL Biology Concepts Application. Students who take BIO 013 online in the summer term must still complete the lab section, but may take BIO 013L in the spring term. Section information text: If retaking BIO 013 (lecture only), please contact Eric Swafford (eric.swafford@drake.edu) or Heath Weeks at (heath.weeks@drake.edu) for registration.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 013

**Restrictions:** None

**Primary grade mode:** Non-Gradeable

**Schedule type(s):** Discussion/Recitation, Independent Study, Lab, Lecture

**Area(s) of Inquiry:** None

**BIO 015. INTRODUCTION TO BIOLOGY. (1 Credit)**

Readings discussions and projects in selected areas of biology. For first-year biology students or interested open enrolled first year students.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Enrollment limited to students with a classification of Freshman.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 018. INTRODUCTION TO ANATOMY AND PHYSIOLOGY. (3 Credits)**

Vertebrate anatomical structure and function, including evolutionary events leading to certain structures including diseases and anomalies resulting from failure of certain structures. Co-requisite lab BIO 018L.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 018L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 018L. ANATOMY AND PHYSIOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 018.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 018

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 019. INTRODUCTION TO BOTANY. (3 Credits)**

Broad introduction to the disciplines in the science of plant biology including - morphology, anatomy, physiology, evolution, taxonomy, ecology and ethnobotany. Lecture, laboratory, field trips, term paper. Co-requisite lab BIO 019L.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 019L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Life Science, Scientific Literacy

**BIO 019L. BOTANY LAB. (1 Credit)**

Co-requisite lab for BIO 019.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 019

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** Scientific Literacy

**BIO 021. SPECIAL TOPICS IN BIOLOGY. (1-3 Credits)**

Selected topics developed by biology faculty and sometimes cross-listed with First-Year Seminars for entering first-year students.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 025. ANIMAL BEHAVIOR. (3 Credits)**

This course provides an introduction to the study of animal behavior often called ethology, with an emphasis on evolutionary approach.

Although ethological and evolutionary approaches can be successfully applied to human behavior, this course will primarily deal with animal behavior in natural environments. We will cover a variety of topics, including: natural selection and evolution, development of behavior, neural and hormonal control of behavior, predator-prey interactions, foraging behavior, territoriality, reproductive behavior, and social behavior. In addition, students will design, conduct, write up, and present a group research project as part of their coursework. Prerequisites: PSY 001 or BIO 013 or NSCI 001.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Critical Thinking

**BIO 026L. ETHOLOGICAL METHODS. (3 Credits)**

This course will provide a hands-on introduction to the methods of direct and indirect behavioral observation, including the development of observation techniques, ethogram construction, field methods, use of video and other technologies, appropriate data management and analysis. The course will have a significant component of experiential learning, including each student's individual design and execution of a substantial behavioral observation project.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 013 (may be taken concurrently) or BIO 024 (may be taken concurrently) or BIO 025 (may be taken concurrently)

**Corequisite(s):** None

**Restrictions:** None

**Restrictions:**

Students with a classification of Freshman may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 031. KINESIOLOGY ORIENTATION. (1 Credit)**

Skills-focused course that helps first-year students transition from high school to college. Skills are developed in the context of exploring kinesiology as both a career and academic discipline. Intended for first-year kinesiology majors.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 032. WELLNESS AND NUTRITION. (3 Credits)**

A survey course examining physical, mental, and social aspects of wellness and nutrition as a basis for understanding and preventing health problems. Students will practice being critical consumers of wellness and nutrition information, identifying key factors necessary for improving wellness, and developing lifestyle plans to improve health.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Enrollment is limited to students with an major in Kinesiology.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 033. STRENGTH AND CONDITIONING. (3 Credits)**

This course is an introduction to strength and conditioning. It will examine the biology and nutrition of resistance exercise, linear and lateral speed development, strength training program design and philosophy, adaptations to aerobic and anaerobic exercise, test selection and administration, and other aspects and components related to the NSCA's application of strategies for performance enhancement.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 034. PLYOMETRICS & SPRINT TRAINING. (3 Credits)**

This course is an introduction to plyometric and sprint training. It will examine the history of and development of plyometric and sprint training, basic principles of plyometric and sprint training technique, bioenergetics, biomechanics of linear and lateral speed development, plyometric and sprint practicum, warm-up procedures and movement assessments, test selection and administration, periodization and program design.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 035. SPORTSTEM. (3 Credits)**

The course will introduce concepts of Science, Technology, Engineering and Math through a variety of sport and exercise applications. Course content will primarily be delivered through the design and completion of experiments that relate an area of STEM to exercise and sport. The audience for this course is non-science majors, but anyone with an interest in the topic is invited. This course fulfills the Drake University Scientific Literacy Life/Behavioral and Physical Sciences AOI. Life/behavioral science is addressed through work in human anatomy, physiology and performance studies. Physical science is addressed through work in basic physics and its application to movement, exercise and sport performance.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Lecture

**Area(s) of Inquiry:** Life Science, Physical Science, Scientific Literacy

**BIO 036. EXERCISE AND SPORT PSYCHOLOGY. (3 Credits)**

Psychology of physical activity at both the individual (exercise psychology) and group (sport psychology) levels, viewed through psychophysiological, social-psychological, and cognitive-psychological lenses. Content is applied to both regular/professional athletes and lay people.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 061. NATURE PHOTOGRAPHY. (3 Credits)**

Basic to intermediate instruction in the application of photography to natural landscapes, flora and fauna. Emphasis is on making artistic images in the field using three principles that contribute to the aesthetic appeal of an image: content, technique, and composition. Major topics include the basics of digital SLR cameras and lenses, digital sensors, exposure and the use of light. Field techniques for plant, animal and landscape photography will be covered, with an emphasis on ethical practice. Students should have access to a digital SLR camera and at least one lens. No previous experience needed. Lectures, field shooting assignments, image submissions, and writing to develop photographic vocabulary.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Artistic Literacy

**BIO 063L. ZOO BIOLOGY LAB. (3 Credits)**

This course will provide an overview of the field of zoo biology, with emphases on the role of zoos in conservation, species survival plans, captive management of small populations of exotic animals (especially including endangered species), and the use of behavioral research and environmental enrichment methods in captive animal welfare. The course will have a significant component of experiential learning including participation in ongoing and newly-initiated behavioral research in a zoo setting. Prerequisite: BIO 013 or instructor permission.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 013

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 064. MUSEUM CURATION. (1 Credit)**

In this course you will learn to prepare scientific research specimens (science taxidermy) for the Drake University Biodiversity Center.

Concurrently, you will learn about diversity, anatomy, and biology of vertebrates, invertebrates, or plants. We will meet once a week for three hours throughout the semester, and you will become proficient with the following: specimen preparation, specimen data collection methods, proper specimen storage techniques, and a host of other museum curation related skills. If you are interested, please contact the Vertebrate Biologist, Plant Biologist, or Invertebrate Biologist to inquire if the class will meet during a given semester. May retake a maximum of 6 semesters for credit with a maximum of 3 credits applied toward a Biology major. No prerequisites but instructor permission is required.

**Level:** Graduate, Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Graduate, Law, Professional Health Care or Undergraduate level students may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 092. INTRODUCTION TO ETHNOBOTANY. (3 Credits)**

Ethnobotany is a multidisciplinary field of study that investigates the role of relationships between humans and plant populations in shaping human behavioral and biological adaptations as well as plant community structures. Topics will include uses of plants, how people think about plants and the natural world, the origins of agriculture, ecological relationships between humans and plants, and the relevance of ethnobotany to contemporary global issues.

**Level:** Graduate, Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 092L (may be taken concurrently)

**Corequisite(s):** None

**Restrictions:**

Students with a classification of Freshman may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Global and Cultural Understand, Life Science

**BIO 092L. INTRODUCTION TO ETHNOBOTANY LAB. (1 Credit)**

Co-requisite lab for Bio 092: Laboratory exercises will focus on field techniques used in the practice of Ethnobotany, including plant identification and collection, interviewing, sampling methodologies, and data handling. Field trips can include visits to natural areas, ethnic markets, community gardens, and/or alternative healers.

**Level:** Graduate, Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Students with a classification of Freshman may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** Global and Cultural Understand, Life Science, Scientific Literacy

**BIO 093L. LAB/FIELD ASSISTANT. (1-2 Credits)**

Student assistant in biology laboratory/field research setting. Prereq: Consent of instructor.

**Level:** Graduate, Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Credit/No Credit

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 095. MEDICAL MICROBIOLOGY. (3 Credits)**

Structure and function of microorganisms with emphasis on human pathogens. Prereq: BIO 001, 012, 013, or 018 and CHEM 097. Intended for pre-pharmacy majors.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** None

**Restrictions:**

Students with a classification of Freshman may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Off-campus catalog credit, Web Instructed

**Area(s) of Inquiry:** None

**BIO 098. INTRODUCTION TO PRIMATOLOGY. (3 Credits)**

This survey course focuses on the psychological, biological, and ethological aspects of primatology and will be taught from a neo-Darwinian perspective. Areas of emphasis include taxonomy, social behavior, reproductive strategies, and intelligence.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 099. BIOLOGY RESEARCH AND STATISTICAL METHODS. (4 Credits)**

Introduction to research methods used in the biological sciences including hypothesis formation, research design, ethics in research, scientific integrity, data collection, probability, and confidence intervals, statistical analyses, inference and interpretation, and preparation of research papers. Lectures and project required. Prereq: BIO 001, 012, 013, or 018.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 001 or BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Discussion/Recitation, Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Critical Thinking

**BIO 101. COMPARATIVE ANATOMY OF VERTEBRATES. (3 Credits)**

Full Title: Comparative Anatomy of Vertebrates Principles and evolution of vertebrate structure including the human. A comparative study of laboratory forms including amphioxus, elasmobranchs, cat and other mammals. Prereq: BIO 001, 012, 013, or 018. Co-requisite lab BIO 101L.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 101L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture

**Area(s) of Inquiry:** None

**BIO 101L. Comparative Anatomy Lab. (1 Credit)**

**Level:** Non-Drake, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 101

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Lab

**Area(s) of Inquiry:** None

**BIO 103. MICROBIOLOGY. (3 Credits)**

A study of microbial life with an emphasis on prokaryotes. Core concepts include evolution, cell structure and function, metabolic pathways, genetics, systems, and the impact of microorganisms in the environment and in the human body. Prerequisite: BIO 001, 012, 013, or 018. Organic chemistry recommended. Co-requisite lab: BIO 103L.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 103L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None



**BIO 103L. MICROBIOLOGY LAB. (2 Credits)**

Co-requisite lab for BIO 103 focuses on developing scientific thinking and microbiology laboratory skills. Exercises introduce students to techniques used to safely grow, isolate, and characterize microorganisms, with an emphasis on bacteria.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 103

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 104. VIROLOGY. (3 Credits)**

Examination of virus structure, genetics, taxonomy, diversity and evolution, and processes of infection and replication in the context of virus-host interactions, with an emphasis on viruses influential to human society. Prereq.: BIO 001, 012, 013, or 018.

**Level:** Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 105. INTRODUCTION TO GENETICS. (3 Credits)**

The principles of heredity and their theoretical and practical applications. Prereq: BIO 001, 012, 013, or 018. Organic Chemistry recommended.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 107. BEHAVIOR GENETICS. (3 Credits)**

This course will provide an overview of the field of behavior genetics, with special emphasis given to the use and interpretation of animal models in behavioral genetic research.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or NSCI 001

**Corequisite(s):** None

**Restrictions:**

Enrollment limited to students in the Arts & Sciences college.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 108. INFECTIOUS DISEASES. (3 Credits)**

In-depth examination of selected infectious diseases/ epidemics in scientific, social (political, geographical), and historical contexts. Course content changes each year contingent on global and local trends and will include basic epidemiology relevant to the selected diseases. Counts for Engaged Citizen AOI.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** (BIO 012 and BIO 013) or (BIO 001 and BIO 018)

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Engaged Citizen

**BIO 109. ZOO/GREAT APE PRACTICUM. (2 Credits)**

Supervised experience in practices and protocols used in captive animal management. conducted at off-campus locations.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 025

**Corequisite(s):** None

**Restrictions:**

Students with a classification of Freshman may **not** enroll.

**Primary grade mode:** Credit/No Credit

**Schedule type(s):** Independent Study, Lab, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 110. IOWA NATURAL HISTORY. (2 Credits)**

An examination and discussion of the natural history and biodiversity of Iowa and the Midwest with an emphasis on an understanding and protection of native ecosystems and their organisms. Key topics will include geological history, geomorphology and landform development, landscape ecology, observing nature and Iowa's most important natural landscapes. Opportunity for an extended overnight field trip. Offered alternate springs.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 110L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 110L. IOWA NATURAL HISTORY LAB. (1 Credit)**

Co-requisite lab for BIO 110. The biology and identification of organisms commonly encountered in natural areas throughout Iowa and the Midwest. A comprehensive approach will include trees, shrubs, wildflowers, grasses, insects, fish, birds, mammals and their skulls, reptiles, amphibians and fossils. Field trips.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 110

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 111. EVOLVED FOODWAYS. (3 Credits)**

Exploration of interactions of environment, culture, and plant biology as they relate to human food plants. Discussions focus on impact of diverse global environments on evolutionary adaptations in native plant species and exploitation of these adaptations by native human cultures to produce fascinating foodways important for human health and culture. Features student-led discussions and cooking regional cuisine.

**Level:** Graduate, Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Students with a classification of Freshman may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Global and Cultural Understand, Life Science, Scientific Literacy

**BIO 112L. AVIAN WINTER ECOLOGY. (3 Credits)**

In this J-term course, you will gain extensive experience working with birds in a field setting. You will learn and practice a fundamental tool used by ornithologist and wildlife biologist for studying birds: mist-netting and banding of individuals. In addition, you will learn identification of Iowa's winter bird species, working with museum study skins as well as captured live individuals, and you will design and conduct behavioral experiments on birds, exploring their winter physiology and ecological roles. Class time will be outdoors as much as possible. You will become expert at handling and releasing live birds, and the skills developed in this course will well prepare you for advanced field studies and graduate work in Ornithology. This is an on-campus course, and we will be working at natural areas nearby Drake. Prerequisites: BIO 001, 012, 013, or 018 or see instructor for approval.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 113. VERTEBRATE BIOLOGY. (3 Credits)**

An introduction to vertebrate biology including fish, amphibians, reptiles, birds, and mammals. Lecture material will emphasize evolutionary history, including major morphological transitions, and taxonomy, behavior, and ecology among the major extant vertebrate groups. Pre-reqs: BIO 001, 012, 013, or 018. Co-requisite lab BIO 113L.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 113L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 113L. VERTEBRATE BIOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 113. Laboratory exercises will focus on taxonomy and field identification of Iowa's fish, amphibians, reptiles, birds, and mammals. Lab will utilize heavily both natural history museum collections and field capture techniques for studying vertebrates. Pre-reqs: BIO 001, 012, 013, or 018.

**Level:** Graduate, Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 113

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 114. EVOLUTION. (3 Credits)**

Mechanisms of evolution and evidence of evolutionary change, considered from an analytical perspective. Development of scientific reading and writing skills. Lab exercises will demonstrate principles from lecture through computer simulations and data collection and analysis.

Prereq: BIO 001, 012, or 013. Co-requisite lab BIO 114L.

**Level:** Graduate, Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 114L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 114L. EVOLUTION LAB. (1 Credit)**

Co-requisite lab for BIO 114.

**Level:** Graduate, Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 114

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 116. BIOINFORMATICS. (3 Credits)**

An introduction to the principles, practice, and application of bioinformatics. The focus of the course will be the analysis of biological systems through the use of computational methods. Topics include: sequence alignment, algorithm analysis, genome assembly, and databases. Cross-listed with CS 116.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** (CS 065 or BIO 165)

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 117. ECOLOGY. (3 Credits)**

An introduction to the study of the relationships between organisms and their environment, or more specifically, the distribution and abundance of organisms, particularly plant, animal, and fungi species. Emphasis on the physical environment, organisms, populations, communities, and ecosystems and biomes. Lecture, optional field trips. Prereq.: BIO 001, 012, 013, or 018. (BIO 118L - Ecology laboratory may be taken concurrently.)

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 118L. ECOLOGY LAB. (2 Credits)**

Techniques of ecological study in the field and laboratory. Emphasis on the collection, analysis, and interpretation of ecological data. Field trips, research paper. Offered fall semester. Prereq: BIO 117 or concurrent enrollment.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 117 (may be taken concurrently)

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 119. HERPETOLOGY. (2 Credits)**

A survey of reptiles, with special attention toward taxonomy, ecology and behavior of reptiles and amphibians of Iowa. Prereq.: BIO 001, 012, 013, or 018.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 001 or BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 119L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 119L. HERPETOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 119. Identification, ecology and research of Midwestern amphibians and reptiles through the study of museum specimens, live animals, and field trips.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 119

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 120. ECOSYSTEM ECOLOGY. (3 Credits)**

Ecological processes and dynamics associated with grasslands, forests, and wetlands. Detailed examination of soil, climate, fire, microclimate, disturbance regimes and species interactions. Emphasis relevant to management and ecological restoration. Lecture, lab, field trips, presentation. Prereq: BIO 117. Co-requisite lab BIO 120L.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 117

**Corequisite(s):** BIO 120L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 120L. ECOSYSTEM ECOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 120.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 120

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 122. MAMMALOLOGY. (2 Credits)**

A survey of mammals with special attention directed toward taxonomy, ecology and behavior of mammals of Iowa. Prereq.: BIO 001, 012, 013 or 018 or equivalent. Co-requisite lab BIO 122L.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 122L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture

**Area(s) of Inquiry:** None

**BIO 122L. MAMMALOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 122. Identification, ecology, and research of Midwestern mammals through the study of museum specimens, live animals and field trips.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 122

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab

**Area(s) of Inquiry:** None

**BIO 123. BIOLOGY OF INVERTEBRATES. (3 Credits)**

Comparative anatomy with biological principles of invertebrates. Prereq.: BIO 001, 012, 013, or 018 or equivalent. Co-requisite lab BIO 123L.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture

**Area(s) of Inquiry:** None



**BIO 124L. RESEARCH COLLABORATION. (1-3 Credits)**

**Level:** Non-Drake, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 001 or BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Lab

**Area(s) of Inquiry:** None

**BIO 126. DEVELOPMENTAL BIOLOGY. (3 Credits)**

The development of organisms with special reference to vertebrates and humans; formation of germ cells, fertilization, differentiation, development of organs and systems with emphasis on molecular concepts. Prereq.: BIO 105 or BIO 165, or equivalent or consent of instructor.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 165 or BIO 105

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 127. HISTOLOGY. (3 Credits)**

Study of microscopic structure of cells, tissues and organs with some reference to pathology. Prereq.: BIO 001, 012, 013, 018, or equivalent. Co-requisite lab BIO 127L.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 127L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 127L. HISTOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 127.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 127

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 128L. ZOO DESIGN AND OPERATIONS. (3 Credits)**

This course will provide an overview of the field of zoo biology, with emphases on the role of zoos in conservation, species survival plans, captive management of small populations of exotic animals (especially including endangered species), and the use of behavioral research and environmental enrichment methods in captive animal welfare. The course typically will meet at Blank Park Zoo and will have a significant component of experiential learning.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 129. MAMMALIAN PHYSIOLOGY. (4 Credits)**

A laboratory-based course in mammalian physiology. Emphasis on the integration of physiological systems including mechanisms of fundamental principles progressing from molecular events to cellular, organ, and system levels. Laboratory exercises feature inquiry-based learning. Organic chemistry recommended. Prereq.: Two intro courses of BIO 001, 012, 013, 018, or equivalent. Corequisite lab BIO 129L.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 129L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 129L. MAMMALIAN PHYSIOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 129. A systems-level approach to investigation and experimentation using computer simulations, student volunteers, and animal subjects.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 129

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 130. ORNITHOLOGY. (2 Credits)**

This course will provide an in-depth exploration of avian biology, with a particular focus on bird behavior, ecology, and evolution. Pre-reqs: BIO 001, 012, 013, or 018. Co-requisite lab BIO 130L.

**Level:** Graduate, Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 130L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Off-campus catalog credit, Web Instructed

**Area(s) of Inquiry:** None

**BIO 130L. ORNITHOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 130. Laboratory exercises will focus on anatomy, taxonomy, and field identification (visual and vocal) of avian species. Pre-reqs: BIO 001, 012, 013, or 018.

**Level:** Graduate, Law, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 130

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Off-campus catalog credit, Web Instructed

**Area(s) of Inquiry:** None

**BIO 131. BIOCHEMISTRY. (3 Credits)**

A study of the nature of the chemical constituents of living matter, the functions and transformation of these chemical entities in biological systems, and the chemical changes associated with these transformations in the course of the activity of living matter. Prereq.: CHEM 108, CHEM 110. Co-requisite lab BIO 131L. Cross-listed with CHEM 130.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** CHEM 108 and CHEM 110

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 131L. BIOCHEMISTRY LAB. (1 Credit)**

Co-requisite lab for BIO 131. Introduction to biochemical laboratory techniques. Provides practical experiences with techniques for separation and characterization of biomolecules and methods of examining biochemical reactions including kinetics. Prereq: CHEM 130/ BIO 131 or concurrent with CHEM 130/BIO 131 or consent of instructor. Cross-listed with CHEM 131.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** CHEM 130 (may be taken concurrently) or BIO 131 (may be taken concurrently)

**Corequisite(s):** BIO 131

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 132. MEDICAL BIOPHYSICS. (3 Credits)**

This course offers a comprehensive introduction to fundamental concepts and methods in medical biophysics, an interdisciplinary field at the interface of physics, biology and medicine. The course will explore the physical and physiological principles underlying the behavior of biological systems, in particular the human body. Concepts from various branches of physics will be introduced in the context of living organisms. Additionally, modern methods from medical physics, including laser surgery, ultrasound imaging, computed tomography, radiation therapy and magnetic resonance imaging, will be investigated. The emphasis will be on the applications of physics in biology and medicine.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** PHY 011 and PHY 012

**Corequisite(s):** None

**Restrictions:**

Enrollment limited to students with a classification of Junior, Sophomore or Senior.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 133. KINESIOLOGY. (3 Credits)**

Kinesiology is the study of human movement, specifically examining the roles of bones, joints, muscles, ligaments, and tendons. This course includes an examination of functional anatomy, current research methods, analytical and diagnostic methods, and practical applications of knowledge to basic movements such as walking/running and throwing and sport-specific movements. Pre-reqs: Two introductory Biology courses and junior standing. Co-requisite lab BIO 133L. .

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** (BIO 012 and BIO 013) or (BIO 001 and BIO 018) or (BIO 013 and BIO 018)

**Corequisite(s):** BIO 133L

**Restrictions:**

Enrollment limited to students with a classification of Junior or Senior.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 133L. KINESIOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 133. Kinesiology lab accompanies lecture and focuses on methods for collecting and analyzing data related to human anatomy or motion in exercise and sport contexts. Students will practice current kinesiology techniques in an original research-based setting similar to that encountered by career kinesiology researchers. Pre-req: Two introductory Biology courses and junior standing. Lecture and lab must be taken concurrently.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** (BIO 012 and BIO 013) or (BIO 001 and BIO 018) or (BIO 013 and BIO 018)

**Corequisite(s):** BIO 133

**Restrictions:**

Enrollment limited to students with a classification of Junior or Senior.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 134. EXERCISE PHYSIOLOGY. (3 Credits)**

Biological aspects of physical activity in the context of exercise, recreation, and sport using multidisciplinary instructional approaches. Content includes neuromuscular, metabolic, cardiorespiratory, and other physiological changes to training or environmental conditions. Co-requisite lab BIO 134L.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 129 (may be taken concurrently) or HSCI 125

**Corequisite(s):** BIO 134L

**Restrictions:**

Students with a classification of Freshman or Sophomore may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 134L. EXERCISE PHYSIOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 134. Basic skills in exercise testing and analysis within the context of original research frameworks, emphasizing human subject research and repeated practice of techniques. Specific experiments change each semester to reflect current topics in the field.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 129L or HSCI 125

**Corequisite(s):** BIO 134

**Restrictions:**

Students with a classification of Freshman or Sophomore may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 136. MOTOR CONTROL AND LEARNING. (3 Credits)**

How the brain/nerves and muscles work together to plan, perform, and learn daily and athletic activities. Topics include: behavioral/psychological and physiological models of movement preparation, behavior, execution, and learning; movement perception and sensation; and skill presentation, practice, and correction.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 136L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 136L. MOTOR CONTROL AND LEARNING LAB. (1 Credit)**

This laboratory course will reinforce the fundamental principles of motor learning and control that are introduced in BIO 136. This laboratory course provides a hands-on opportunity to apply the principles of evaluating motor skills, perception, motor learning, and memory. Students also will have the opportunity to design and implement their own hypothesis-based research project utilizing the concepts and methods they have learned during this laboratory class. BIO 136 (lecture) is a co-requisite for this class.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 136

**Restrictions:**

Enrollment limited to students in the Arts & Sciences, Education or Pharmacy & Health Sciences colleges.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 137. MEDICAL AND SPORTS BIOMECHANICS. (3 Credits)**

This course is a synthesis of biology and mechanics that seeks to explain human movement in terms of space, time, direction, and forces. The course involves application of mechanics for the expressed purpose of analyzing/improving performance and locating the mechanical causes of faults observed in performance. A key purpose of this course is to provide future clinicians and researchers in kinesiology with an extensive knowledge base of the principles, theories, and concepts concerning human movement. BIO 137L is a co-requisite for this course and must be taken simultaneously with the BIO 137 lecture.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 137L

**Restrictions:**

Students with a classification of Freshman or Sophomore may **not** enroll.

Enrollment limited to students in the Arts & Sciences or Pharmacy & Health Sciences colleges.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 137L. MEDICAL AND SPORTS BIOMECHANICS LAB. (1 Credit)**

This course is a synthesis of biology and mechanics that seeks to explain human movement in terms of space, time, direction, and forces. The course involves application of mechanics for the expressed purpose of analyzing/improving performance and locating the mechanical causes of faults observed in performance. The laboratory portion of the course synthesizes and applies through various modalities the content presented in the lecture. This laboratory course will prepare the student to both utilize and analyze "video," force, and qualitative movement analysis in their future kinesiology career. In addition, the student also will enhance their analytical skills through biomechanical research evaluation and review. BIO 137 is a corequisite.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 137

**Restrictions:**

Students with a classification of Freshman or Sophomore may **not** enroll.

Enrollment limited to students in the Arts & Sciences or Pharmacy & Health Sciences colleges.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 138. MEDICAL ASPECTS OF EXERCISE. (3 Credits)**

How chronic conditions (cancer, obesity, arthritis, asthma, and so forth) impact exercise capacity, how exercise impacts on those same chronic conditions ("exercise is medicine"), and the role of contributing factors such as nutrition and environment.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 129 and BIO 129L

**Corequisite(s):** None

**Restrictions:**

Students with a classification of Freshman or Sophomore may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 139. KINESIOLOGY CAPSTONE. (1 Credit)**

The objectives of this capstone course are to 1) integrate the knowledge, skills, and experience you have gained from across your kinesiology courses and apply them to a special population; 2) reflect on the role(s) played by kinesiology professionals in promoting and implementing strategies to improve the health of people through physical activity and exercise; and 3) represent the Drake University Kinesiology Program in a service-learning opportunity within the Des Moines community. These objectives will be met by assessing the physical activity and exercise needs of a local organization, designing a program to meet those needs, critically evaluating the effectiveness of the program, and using evidence of effectiveness to revise and improve the programming.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Enrollment limited to students with a classification of Third year Pharmacy or Senior.

Enrollment limited to students in the Arts & Sciences or Pharmacy & Health Sciences colleges.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 140. BIOLOGY RESEARCH AND STATISTICAL METHODS. (4 Credits)**

Introduction to research methods used in the biological sciences including hypothesis formation, research design, ethics in research, scientific integrity, data collection, probability, and confidence intervals, statistical analyses, inference and interpretation, and preparation of research papers. Lectures and project required. Prereq: BIO 11 and 12 or consent of instructor.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** Critical Thinking, Quantitative

**BIO 145. SELECTED TOPICS IN BIOLOGY. (1-3 Credits)**

Serves as a forum for class-structured studies of selected topics in biology or the trial presentation of new biology courses. Offered only as needed. Could require BIO 145L. Prerequisites will vary.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Students with a classification of Freshman may **not** enroll.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 145L. SELECTED TOPICS IN BIOLOGY LAB. (1-3 Credits)**

Lab component for Selected Topics in Biology, BIO 145. Offered only as needed.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 152. FIELD BOTANY. (0-3 Credits)**

General principles of plant taxonomy and plant ecology. Emphasis on classification and nomenclature, botanical terminology, recognition of plant families, use of plant keys, Iowa plant species identification and ecology and plant collecting and voucher preparation. Lecture, lab, field trips. One weekend field trip required. Offered spring semester of alternating years. Prereq: BIO 001, 012, 013, or 018, or consent of instructor. Co-requisite lab BIO 152L.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 152L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Off-campus catalog credit, Web Instructed

**Area(s) of Inquiry:** None

**BIO 152L. FIELD BOTANY LAB. (1 Credit)**

Co-requisite lab for BIO 152.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** BIO 152

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Off-campus catalog credit, Web Instructed

**Area(s) of Inquiry:** None

**BIO 156. BIOLOGY SHORT COURSE. (1 Credit)**

**Level:** Non-Drake, Graduate, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Lecture

**Area(s) of Inquiry:** None

**BIO 159. ZOO/GREAT APE INTERNSHIP. (3 Credits)**

Supervised practical experience in husbandry, management, and research in a captive animal setting. Involves progressively greater responsibility and probable involvement in research, depending on the performance of individual student. Specific work assignments will vary based on the needs of the host institution and the individual professional goals of the student.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Students with a classification of Freshman or Sophomore may **not** enroll.

**Primary grade mode:** Credit/No Credit

**Schedule type(s):** Independent Study, Lab, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 165. CELL BIOLOGY. (0-4 Credits)**

A comprehensive introduction to molecular cell biology with an emphasis on applications to biology and medicine. Basic structure and chemistry of cells, protein-targeting, cellular signaling, the cytoskeleton, and the cell cycle. Prereq: BIO 001, 012, 013, or 018, or equivalent.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 012 or BIO 013 or BIO 018

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Discussion/Recitation, Independent Study, Lab, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 167. POPULATION AND COMMUNITY ECOLOGY. (3 Credits)**

Principles of population growth, cycles, genetics and regulation. Examination of emerging theories regarding the interaction and assembly of plant and animal populations into ecological communities. Field studies and computer modeling are used to examine behavioral ecology, spatial dispersion, demography, life histories, competition and predation. Application of theory and principles to complex environmental problems such as pest management, viability analysis, and the spread of infectious diseases. Lecture, lab, field trips, research project and paper. Offered spring semester of even-numbered years. Prereq: BIO 118L; STAT 060 or BIO 099. Co-requisite lab BIO 167L.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 118L and (STAT 060 or BIO 099 or BIO 140)

**Corequisite(s):** BIO 167L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 167L. POPULATION ECOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 167.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 167

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 176. NEUROPHYSIOLOGY. (3 Credits)**

The physiology of excitable cells with emphasis on cellular mechanisms, synaptic integration, signal processing, and sensory/motor interactions in nervous systems. Computer simulations and hands-on experience with stimulating and recording in live systems. With laboratory. Prereq.: Two intro courses of BIO 001, 012, 013, or 018 or equivalent or consent of instructor. Co-requisite lab BIO 176L.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** (BIO 001 and BIO 012) or (BIO 001 and BIO 013) or (BIO 001 and BIO 018) or (BIO 012 and BIO 013) or (BIO 012 and BIO 018) or (BIO 013 and BIO 018)

**Corequisite(s):** BIO 176L

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 176L. NEUROPHYSIOLOGY LAB. (1 Credit)**

Co-requisite lab for BIO 176.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 176

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 182. IMMUNOLOGY. (3 Credits)**

Principles and concepts of immunology; characteristics of antigens and antibodies; antibody reactions; hypersensitivity; discussions of immune response with applications to biology and humans. Prereq: BIO 165.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 165

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 182L. IMMUNOLOGY LAB. (2 Credits)**

Optional lab for BIO 182.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 185. HUMAN GENETICS. (2 Credits)**

Principles and concepts of inheritance in humans with special reference to medical genetics. Prereq.: BIO 105. College algebra and organic chemistry recommended.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 105 and (MATH 020 or MATH 050 or MATH 070 or MATH 100)

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None



**BIO 186. MOLECULAR BIOLOGY. (3 Credits)**

Introduction to principles, practice, and applications of modern molecular biology. Chemistry of informational macromolecules, mechanism regulation and integration of informational processes in the cell; application to basic biology and medicine. Implications for society. Prereq.: BIO 165 or consent of instructor. Crosslisted with CHEM 134.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 165

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 187L. APPLIED MOLECULAR BIOLOGY LAB. (0-3 Credits)**

Introduction to the methods and practice of molecular cell biology, with an emphasis on the development of critical thinking and problem-solving skills. Students carry out an independent research project in molecular cell biology, culminating in a formal paper and presentation. Prereq: BIO 165 or consent of instructor.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 165

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 188. STRUCTURAL BIOLOGY. (3 Credits)**

Introduction to the principles, methods and applications of structural biology – a discipline that seeks to relate molecular form to biological function. An analysis of molecular structure and biological function in relationship to the molecular biology of the cell, and an exploration of the applications of this understanding. Practical experience in the use of sequence analysis and molecular graphics computer programs as applied to structural problems in cellular and molecular biology. Prereq.: BIO 165 or CHEM 130/BIO 131 or consent of instructor. Cross-listed with CHEM 136.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 165 or CHEM 130

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 188L. STRUCTURAL BIOLOGY LAB. (2 Credits)**

Co-requisite lab for BIO 188.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** BIO 188

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 189. REGULATORY BIOLOGY. (2 Credits)**

Principles of cellular regulation as illustrated by the molecular biology of the cell cycle and programmed cell death. Prereq: BIO 165, 186, or CHEM 132 or consent of instructor.

**Level:** Graduate, Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 165 or BIO 186 or CHEM 132

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 190. BIOLOGY PEER LEARN ASSISTANT. (1 Credit)**

Peer Learning Assistants (PLAs) will enroll in this course during each semester they serve as a PLA for BIO 12 and/or BIO 13. PLAs will work closely with faculty to learn course content, prepare curriculum, and practice effective strategies for peer instruction. This course will prepare PLAs to lead a discussion section and/or contribute to lecture activities.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** (BIO 012 or BIO 013) and BIO 145 (may be taken concurrently)

**Corequisite(s):** None

**Restrictions:**

Enrollment limited to students with a classification of Junior, Sophomore or Senior.

**Primary grade mode:** Credit/No Credit

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 193L. SENIOR LAB ASSISTANT. (2 Credits)**

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Enrollment limited to students with a classification of Senior.

Enrollment is limited to students with an major in Biology.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 195L. ADVANCED MOLECULAR LIFE LAB. (3 Credits)**

A biochemistry, cellular/molecular biology capstone, interdisciplinary course that involves students in laboratory research problems. A structure course to mimic the processes used by practicing scientists as they conduct research. Students develop effective experimental and effective communication skills. Prereq.: CHEM 130/BIO 131 or BIO 165. Does not count as senior capstone experience for biology majors. Cross-listed with CHEM 137.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** BIO 165 or CHEM 130 or BIO 131

**Corequisite(s):** None

**Restrictions:** None

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 196. BIOLOGY INTERNSHIP. (1-3 Credits)**

An off-campus, one semester, experiential learning outcome that incorporates a biological theme. May include work in local or state governments, biotechnology firms, medical or health businesses, conservation agencies, or private businesses. Registration with the College of Arts and Sciences Internship Registration form is required, and an internship supervisor must be identified. Students will compile a list of responsibilities and learning objectives, and provide a written report upon completion. Prerequisites: BIO 012/012L or BIO 013/013L, consent of the Biology Chair.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Enrollment limited to students with a classification of Junior, Sophomore or Senior.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 197. UNDERGRADUATE RESEARCH. (1-3 Credits)**

Supervised undergraduate research in biology required in the BS program. Prereq: Sophomore standing and consent of instructor.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Students with a classification of Freshman may **not** enroll.

**Primary grade mode:** Standard Letter with IP

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None

**BIO 197L. UNDERGRADUATE RESEARCH. (1-3 Credits)**

Supervised undergraduate research in biology. Prereq.: Sophomore standing and consent of the instructor.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Enrollment limited to students with a classification of Junior, Sophomore or Senior.

**Primary grade mode:** Standard Letter with IP

**Schedule type(s):** Independent Study, Lab, Web Instructed

**Area(s) of Inquiry:** None

**BIO 198. INDEPENDENT STUDY IN BIOLOGY. (1-3 Credits)**

A forum for a student-initiated and directed study of a biological topic of interest. Must be mentored by a Biology faculty member. Requires completion of an independent study form and approval by the chair.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Students with a classification of Freshman may **not** enroll.

Enrollment is limited to students with an major in Biology.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Discussion/Recitation, Independent Study, Lecture, Off-campus catalog credit, Web Instructed

**Area(s) of Inquiry:** None

**BIO 199. SENIOR CAPSTONE EXPERIENCE. (3 Credits)**

Topics will vary in different semesters and will focus on the unifying theme of evolution. Students will complete an instructor-approved project requiring analysis and synthesis of a problem involving biological principles pertaining to the course topic. This project will culminate with a written document and an oral presentation of the chosen project. This course is required for completion of the biology major. Prereq.: Enrollment restricted to biology majors with senior standing. Offered fall semester only.

**Level:** Non Degree Coursework, Professional Health Care, Undergraduate

**Prerequisite(s):** None

**Corequisite(s):** None

**Restrictions:**

Enrollment limited to students with a classification of Senior.

Students cannot enroll who have a major in Biology.

**Primary grade mode:** Standard Letter

**Schedule type(s):** Independent Study, Lecture, Web Instructed

**Area(s) of Inquiry:** None