

377 Research Courses Offered by the Biology Department

BIOL 377: Research in Animal Form and Function

Using select readings from the primary literature, we will explore how the form of living things dictates their performance during vital behaviors or life events. Students will also discuss and be trained in methods for quantifying and analyzing anatomical data. Using this knowledge, will propose, implement, analyze, and interpret the results of an anatomical research project. (This course will have set meeting time, but will require extra out- of-class work to complete.)

***Prerequisites:** Junior-senior status or permission of instructor; completion of BIOL128 with C or greater; and completion of at least one of the following with C or greater: BIOL211, 217, 219, 221, 227, 230, 237.*

BIOL 377: Animal Behavior Research Experience

This is a research-intensive course that will emphasize research experience exploring animal behavior. Topics may include: habitat selection, dispersal, foraging, aggression, mating, reproduction, social organization, cooperation, and communication. Classes will involve in-depth studies of animal behavior and independently designed student projects.

Prerequisites: Biology 128 and one of the following: Biol 201, Biol 202 or Biol 230 (or permission of instructor).

Corequisite: BIO 334 (ANIMAL BEHAVIOR) MUST BE TAKEN CONCURRENTLY.

BIOL 377: Research Experience in Biotechnology

Throughout this course, you will learn biotechnology research techniques and best practices utilized in Biotech and Pharma. You will be conducting a group research project in order to understand the process, from start to finish, of drug manufacturing.

Specifically, we will be focusing on the process of producing a “biologic” protein, which are not only used as a tool in biotechnology, but biologics are the number one selling drugs prescribed on the market. Further, Good Laboratory Practices will be followed and operational and quality management policies and practices will be taught.

Prerequisites: Either Cell-Bio, Genetics, Immunology

BIOL 377: Research Methods in Cell Biology

Class discussions and literature review will focus on in vitro model systems to analyze cell signaling and cellular responses to stimuli, specifically in the fields of immunology and bacteriology. Using human-derived cell lines, students will be trained in basic cell culture technique, as well as methods to analyze cellular responses (ELISA, cell viability, and invasion assays). Based on outside reading, students will propose, perform, and analyze the results of a research project.

Prerequisites: Completion of one the following: Cell Biology, Immunology, or Microbiology

BIOL 377: Research Experience in Computational Biology

This course will introduce students the basic programming and computational skills in biology. Topics include DNA sequence manipulation, biological databases, and reproducible research. Students will learn about utilizing public databases to investigate biological questions. Students will be expected to work in groups to conduct a research project.

Prerequisites: Biostatistics

BIOL 377: Research Experience in Organismal Neurobiology

Research Experience in Organismal Neurobiology accompanies BIOL0333. Throughout this course, you will learn neurobiology research techniques and will conduct an independent research project in which you collect preliminary data and write a grant proposal.

Prerequisites: BIOL0333 (Organismal Neurobiology)

BIOL 377: Research Experience in Forest Ecology

Students in this course will develop field-based skills necessary to address the ecology, management, and conservation of forests and other terrestrial ecosystems of New England. Students will get experience with techniques such as: tree identification, surveying and measuring forests, coring trees and interpreting tree rings, describing and testing soils, interpreting air photos and satellite data, and analyzing data with spreadsheets and statistical packages.

Prerequisites: Biol 128 and one of the following: Biol 201, Biol 202, Envs 225 or Envs 309

Corequisite: BIOL 340

BIOL 377: Research Experience in Stream Ecology and Restoration

This is a field-based course designed to give students experience conducting research on actual stream restoration projects overseen by state management agencies. The ecology of the stream and its connectivity to terrestrial environments will be explored in the context of human disturbances such as dams and culverts. Students will collect chemical, physical and biological data from local streams as part of a long-term evaluation of the effectiveness of restoration activities. They will gain experience collecting ecological data using methods or equipment such as electrofishing, ground surveying, unmanned aerial vehicle surveys, pebble counts, hydrolabs, stream discharge, macroinvertebrate collections and habitat quality modelling. This course is offered during the Summer I term which runs for six weeks from mid-May to the end of June.

Prerequisites: BIOL 128 and one of the following: BIOL 201, BIOL 202, ENVS 225 or permission by instructor.

BIOL0377: Genetic Cloning: From Plasmids to Proteins

In this research-intensive course, students will learn about Genetic Cloning. This technique, also called DNA cloning, is widely used by biologists to determine the functions of genes/proteins and as a first step in gene therapy. In this class, students will design and construct a DNA plasmid to produce a specific protein, then use mammalian cell culture to examine the effects of the protein on cells. Throughout the course, students will gain experience in plasmid design, bacterial cell culture, electrophoresis, eukaryotic cell culture, and protein quantification.

Prerequisites: BIOL203, BIOL0205, or BIOL022