

# BIO: BIOLOGY

## Courses

### **BIO 510. Graduate Seminar in Biology. 3 Credits.**

This course provides students with an overview and development of skills needed by professional biologists to communicate with scientific and non-scientific audiences. Skills include effectively accessing and using scientific information, preparing and presenting poster or slide presentations, understanding the publication process, and writing research papers or proposals in a scientific context.

### **BIO 511. Experimental Design and Analysis. 3 Credits.**

An introduction to the design and analysis of biological research. An independently conducted research project is a required part of the course. Lab BIL 511.

### **BIO 513. Research Techniques in Bio Sci I. 3 Credits.**

Techniques course covering current techniques in ecology, evolution or organismal biology. Repeatable for credit.

### **BIO 514. Research Techniques in Bio Sci II. 3 Credits.**

Introduces students to current laboratory research skills and methods/techniques in the fields of microbiology, immunology and molecular genetics research. Repeatable for credit.

### **BIO 515. Research Techniques in Bio Sci III. 3 Credits.**

Introduces students to current laboratory research skills and methods/techniques in the fields of physiology, developmental and cell biology. Repeatable for credit.

### **BIO 520. Topics and Research Methods in Cellular, Microbial, and Molecular Biology. 3 Credits.**

This course exposes students to key content and current topics in the fields of cellular, microbial, and molecular biology, as well as an introduction to current research methods and techniques in these fields so that students can demonstrate competency in understanding the content and using the techniques to gain a wholistic preparation for the field of biological science. Specific content and methods covered depends on the faculty member teaching the course.

### **BIO 521. Topics and Research Methods in Ecology, Evolution, and Organismal Biology. 3 Credits.**

This course exposes students to key content and current topics in the fields of ecology, evolution, and organismal biology, as well as providing an introduction to current research methods and techniques in these fields so that students can demonstrate competency in understanding the content and using the techniques to gain a wholistic preparation for the field of biological science. Specific content and methods covered depends on the faculty member teaching the course.

### **BIO 531. Molecular Genetics. 3 Credits.**

This course exposes graduate students interested in gene manipulation to up-to-date information in prokaryotic and eukaryotic genetics.

### **BIO 535. Course Topics in Biology I. 3 Credits.**

Lecture/seminar course on the latest topics in ecology, evolution, or organismal biology. Specific content varies depending on faculty involved. Offered in rotation with BIO 536 and 537. May be repeated for credit if a different topic is presented. Distance education offering may be available. Repeatable for credit.

### **BIO 536. Course Topics in Biology II. 2-3 Credits.**

Lecture/seminar course on the latest topics in microbiology, immunology, or molecular genetics. Specific content varies depending on faculty involved. Offered in rotation with BIO 535 and 537. May be repeated for credit if a different topic is presented. Repeatable for credit.

### **BIO 537. Course Topics in Biology III. 3 Credits.**

Lecture/seminar course on the latest topics in cell biology, physiology, or development. Specific content varies depending on faculty involved. Offered in rotation with BIO 535 and 536. May be repeated for credit if a different topic is presented. Distance education offering may be available. Repeatable for credit.

### **BIO 564. Microbial Physiology. 3 Credits.**

Physiology and biochemical variations are studied in the prokaryotes and lower eukaryotes. BIO 564 Corequisite: BIO 564L.

### **BIO 564L. Microbial Physiology Lab. 0 Credits.**

Laboratory studies of physiology and biochemical variations that are studied in the prokaryotes and lower eukaryotes. BIO 564L Corequisite: BIO 564.

### **BIO 565. Immunology. 4 Credits.**

Immunoglobulin structure and function, nature of antigens, cell-mediated immunity, hypersensitivity, regulation of immunity, and immunological diseases. Laboratory experience in immunological techniques. BIO 565 Corequisite: BIO 565L.

### **BIO 565L. Immunology Lab. 0 Credits.**

Laboratory studies of immunoglobulin structure and function, nature of antigens, cell-mediated immunity, hypersensitivity, regulation of immunity, and immunological diseases. Laboratory experience in immunological techniques. BIO 565L Corequisite: BIO 565.

### **BIO 566. Plant Physiological Ecology. 3 Credits.**

Mechanistic exploration of how plants respond to their environments, with central focus on carbon, water, and nutrient cycling. Global environmental change is used as a backdrop to examine physiological processes from the cell to whole-plant scale. BIO 566 Corequisite: BIO 566L. Equivalent courses: BIO 466

### **BIO 566L. Plant Physiological Ecology Lab. 0 Credits.**

Laboratory studies of how plants respond to their environments, with central focus on carbon, water, and nutrient cycling. Global environmental change is used as a backdrop to examine physiological processes from the cell to whole-plant scale. BIO 566L Corequisite: BIO 566.

### **BIO 567. Endocrinology. 3 Credits.**

An integrative look at the physiology of the mammalian endocrine system in the regulation and maintenance of homeostasis. The pathology associated with hormone imbalance will be included.

### **BIO 571. Wetlands. 3 Credits.**

A course designed to provide practical experience in wetlands classification, delineation, regulation, management, and mitigation practices. The abiotic and biotic characteristics of inland and coastal wetlands are emphasized. BIO 571 Corequisite: BIO 571L.

### **BIO 571L. Wetlands Lab. 0 Credits.**

Laboratory studies designed to provide practical experience in wetlands classification, delineation, regulation, management, and mitigation practices. The abiotic and biotic characteristics of inland and coastal wetlands are emphasized. BIO 571L Corequisite: BIO 571.

### **BIO 575. Plant Communities. 3 Credits.**

A survey of ecological, morphological, and physiological strategies of plants from seed through adult stages. The integration of these strategies to explain the major plant communities of North America will be covered. BIO 575 Corequisite: BIO 575L.

### **BIO 575L. Plant Communities Lab. 0 Credits.**

Laboratory studies of ecological, morphological, and physiological strategies of plants from seed through adult stages. The integration of these strategies to explain the major plant communities of North America will be covered. BIO 575L Corequisite: BIO 575.

### **BIO 576. Freshwater Ecology. 3 Credits.**

The environmental and biological characteristics of freshwater. Emphasis is placed on field methods, water quality evaluation based on the interpretation of comprehensive datasets, and management strategies for lakes, ponds and streams. BIO 576 Corequisite: BIO 576L.

### **BIO 576L. Freshwater Ecology Lab. 0 Credits.**

Laboratory studies of environmental and biological characteristics of freshwater. Emphasis is placed on field methods, water quality evaluation based on the interpretation of comprehensive datasets, and management strategies for lakes, ponds and streams. BIO 576L Corequisite: BIO 576.

### **BIO 580. Light Microscopy and the Living Cell. 3 Credits.**

Theory and practical techniques of all types of light microscopy and their uses in investigating living cells. Also includes techniques such as microinjection, cell electrophysiology, and others. Strong emphasis on 'hands-on' work with equipment.

**BIO 584. Epidemiology. 3 Credits.**

A general study of the epidemiology of both infectious and environmentally related health problems. Methods of interviewing and data collecting also are included.

**BIO 590. Directed Study in Biology. 3 Credits.**

In depth directed study of a specific topic in biology, under the direction of a faculty member of the Biology Department and requiring prior approval by the graduate committee. Field or laboratory work may be part of the course, but a research project is not required.

**BIO 591. Directed Research in Biology. 3 Credits.**

To be taken when the student begins the capstone research project. Can include a research project, an in-depth literature review, or development of a specialized technique(s), each under the facilitation of a faculty advisor. The course should be preceded by the acceptance of a project proposal by an appropriate faculty committee and culminate in a project presentation as a seminar. At the conclusion of the course, students will be able to critically access and synthesize relevant scientific information in order to integrate it for communicating and presenting results of research.

**BIO 593. Directed Research III. 1-3 Credits.**

A continuation of the research proposed and initiated in BIO 591. To be taken for credit only with the approval of the graduate coordinator. (Does not count towards 30 credits required for graduation.)

**BIO 599. Biology Transfer Credits (Graduate). 3-9 Credits.**

Transfer Credits

Repeatable for credit.

**BIO 608. Thesis Proposal. 3 Credits.**

To be taken when the student begins his/her thesis research. Includes a comprehensive literature search and development of specialized techniques. This course should culminate in the acceptance of the thesis proposal by an appropriate committee of faculty and is required for degree candidacy. To be taken for credit only with the approval of the graduate coordinator. Thesis track only.

**BIO 609. Thesis Research. 3 Credits.**

Completion of the research proposed in BIO 608. To be taken for credit only with the approval of the graduate coordinator. Thesis track only.

BIO 609 Prerequisite: Successful completion of BIO 608 with a minimum grade of C-.

**BIO 610. Thesis and Defense. 3 Credits.**

A culmination of thesis research by production of a written thesis and a successful public oral defense of the research proposed in BIO 608 and conducted in BIO 609. Public defense must be advertised department wide 14 days in advance. In addition to the thesis committee, the graduate coordinator or a designee of the graduate coordinator must be in attendance at the public defense. To be taken for credit only with the approval of the graduate coordinator.

Thesis track only.

BIO 610 Prerequisite: Successful completion of BIO 609 with a minimum grade of C-.