

BIOLOGY (BIO)

- BIO 500. Special Topics in Molecular and Cell Biology.** **3 Credits.**
BIO 501. Special Topics: Advanced Protein Methods. **4 Credits.**
Offered: As needed
- BIO 505. Writing and Science.** **3 Credits.**
 This course reviews how scientific results and ideas are communicated and reviewed. Course content includes the storage and retrieval of scientific information, data presentation (table, figures, graphics), the writing of reports and papers as well as the preparation of publications for peer review. Copyright, patent law and the ethical issues involved in scientific communication also are considered. Assignments include oral and written presentations and attendance at assigned seminars and meetings.
Offered: Every year, Fall
- BIO 510. Special Topics.** **3-4 Credits.**
Offered: As needed
- BIO 515. Advanced Biochemistry.** **4 Credits.**
 This course offers advanced insights into major areas of biochemistry, including the structure and function of biological molecules, cell and membrane structure and function, bioenergetics and enzyme function, and cellular metabolism. This is a suitable prerequisite for many graduate courses.
Offered: Every year, Spring
- BIO 521. Stem Cell Biology.** **3 Credits.**
 This course provides a comprehensive overview of stem cell biology. Participants explore the topics of embryonic and adult stem cells, stem cell characteristics, reprogramming, stem cell therapies and tissue regeneration. Primary research literature associated with each topic is discussed and students gain an understanding of the role of stem cells in health and disease.
Offered: Every year, Spring
- BIO 523. Classical Genetics.** **1 Credit.**
 This 1-credit course is aimed at graduate students who are preparing to teach in the biological sciences and are preparing for the PRAXIS exam—specifically the Biology Content Test. In this interactive course, students review foundational information pertaining to classical genetics and further develop a knowledge base by participating in in-depth examination of primary research papers.
Offered: As needed
- BIO 524. Evolution.** **1 Credit.**
 This 1-credit course is aimed at graduate students who are preparing to teach in the biological sciences and are preparing for the PRAXIS exam—specifically the Biology Content Test. In this interactive course, students review foundational information pertaining to evolution and further develop a knowledge base by participating in in-depth examination of primary research papers.
Offered: As needed
- BIO 525. Diversity of Life and Organismal Biology.** **2 Credits.**
 This 2-credit course is aimed at graduate students who are preparing to teach in the biological sciences and are preparing for the PRAXIS exam—specifically the Biology Content Test. In this interactive course, students review foundational information pertaining to organismal biology and further develop a knowledge base by participating in in-depth examination of primary research papers.
Offered: As needed
- BIO 526. Ecology.** **2 Credits.**
 This 2-credit course targets graduate students who are preparing to teach in the biological sciences and are preparing for the PRAXIS exam—specifically the Biology Content Test. In this interactive course, students review foundational information pertaining to ecology and further develop a knowledge base by participating in in-depth examination of primary research papers.
Offered: As needed
- BIO 562. Bioinformatics.** **3 Credits.**
 This hands-on course is for students seeking to understand methods of sequence and structural analysis using nucleic acid and protein databases. An understanding of the database format provides the basis for sequence analysis and alignment to determine common evolutionary origins, RNA secondary structure, gene prediction and regulation, protein structure prediction and classification, genome analysis and analysis of microarrays.
Offered: As needed
- BIO 568. Molecular and Cell Biology.** **4 Credits.**
 This course examines the cell from a molecular perspective. Cell composition, structure and organization are investigated in order to understand how cells grow, divide and respond to different intracellular and extracellular signals.
Offered: Every year, Fall
- BIO 571. Molecular Genetics.** **4 Credits.**
 This study of the prokaryotic and eukaryotic genetic material including transcription, translation, DNA replication and repair, gene cloning techniques, the regulation of the synthesis of gene products and genomics. Emphasis is placed on new genetic techniques that are used in industry and medicine.
Offered: Every year, Fall
- BIO 589. Molecular and Cell Neurobiology.** **3 Credits.**
 This course provides students with a detailed foundation of the basic principles of cellular and molecular neurobiology. Through lectures and interactive simulations, students become fluent in modern experimental approaches to explore and understand the properties of electrical signaling and cell-cell communication. Students apply their knowledge in independent projects investigating the physical basis of a disease of neurophysiological origin.
Offered: As needed
- BIO 605. DNA Methods Laboratory.** **4 Credits.**
 This project lab course enables students to develop hands-on experience with the basic techniques in cell and molecular biology including DNA purification, cloning, and gene expression analysis.
Prerequisites: Take BIO 571.
Offered: Every year, Spring
- BIO 606. Protein Methods Laboratory.** **4 Credits.**
 This project-based lab course enables students to develop hands-on experience with basic techniques in cell biology and protein biochemistry including protein purification, chromatographic and electrophoretic techniques, and immunoanalysis.
Prerequisites: Take BIO 515.
Offered: Every year, Fall
- BIO 649. Independent Research.** **2 Credits.**
 Students work independently to define and conduct original research. This course is required for students anticipating thesis work in Molecular and Cell Biology, and is conducted under the guidance and with the approval of a thesis adviser and thesis committee.
Offered: As needed

BIO 650. Thesis I in Molecular and Cell Biology. 4 Credits.

This course is a requirement for the thesis option within the MS in Molecular and Cell Biology. Students must demonstrate both breadth and depth of knowledge in their field of specialization. They also must demonstrate scientific research skills and present their findings to a thesis committee and the greater molecular and cell biology community.

Prerequisites: Take BIO 649.

Offered: Every year, All

BIO 651. Thesis II in Molecular and Cell Biology. 4 Credits.

Thesis II is a requirement for the thesis option MS in Molecular and Cell Biology. Students complete their independent research project, write an original thesis describing their research results, defend their thesis in front of a thesis committee, and give a presentation to the greater molecular and cell biology community.

Prerequisites: Take BIO 650 BIO 688.

Offered: Every year, All

BIO 675. Comp Exam in Molecular and Cell Biology. 2 Credits.

The written comprehensive exam is a requirement of the non-thesis option for the MS in Molecular and Cell Biology. Students must demonstrate both breadth and depth of knowledge by illustrating a command of the subject matter obtained from individual courses into unified concepts which link the student's own specialization to other fields of study. Students are encouraged to meet with the program director before registering for the comprehensive exam. Minimum grade of a B- is required to pass the comprehensive examination.

Prerequisites: Take a minimum of four of the five following courses:

BIO 515 BIO 568 BIO 571 BIO 605 BIO 606.

Offered: Every year, Fall and Spring

BIO 688. Independent Study. 1-4 Credits.

Offered: As needed

BIO 689. Independent Study. 1-4 Credits.

Offered: As needed