PhD in Biosciences

The educational objective of the doctoral program in Bioscience is to prepare students for research in the field of Biological Sciences. Students in the PhD in Bioscience program work under the mentorship of faculty conducting research in the following areas:

- mechanisms and interventions of infectious diseases
- mechanisms and interventions of cancer
- mechanisms and interventions of neurological disorders
- mechanisms and interventions of metabolic disorders
- toxicology of environmental and synthetic pollutants
- carcinogenic effects of pollutants and manufactured chemicals
- brain development and function
- genetics and developmental biology
- immunology
- microbiology and biochemistry

Requirements for Admission

1. Bachelor's degree from an accredited institution in the United States or proof of equivalent education in a foreign institution with:
   a. Two semesters of Organic Chemistry with lab.
   b. One semester of Calculus.
   c. Coursework in Physiology, Microbiology, Cell Biology, Biochemistry, and Genetics.
2. Competitive scores in the Verbal, Quantitative, and Analytical Writing components of the Graduate Record Examination (GRE).
3. Personal statement of research and professional interests.
4. Three letters of recommendation indicating endorsement of the applicant for doctoral study.
5. Competitive TOEFL score for international applicants whose first language is not English or who have not completed a university degree in the U.S. or at an English-speaking institution. Successful candidates typically have scores above 550.

Requirements for the PhD Degree in Biosciences

With departmental approval, students entering the program with a master's degree can count up to 24 semester hours of graduate coursework towards advanced standing in the PhD degree. Students with deficiencies in Biochemistry, Cell Biology, Microbiology, Physiology, Genetics, Ecology, or Evolutionary Theory will be required to take additional course work to remove the deficiencies.

Admission to Candidacy

The student must pass a qualifying oral examination to advance to candidacy for the doctorate. This exam is designed to assess the candidate's knowledge and understanding of the material covered in the core courses as well as the candidate's ability to rationally discuss the design, implementation, and analysis of a research problem of the student's and the committee's choosing. The Preliminary Examination Committee will determine whether the student displays sufficient breadth of knowledge and understanding of basic principles to undertake original research.

Dissertation

A dissertation demonstrating both the ability to do original independent research and competence in scholarly exposition will be required of all students. The dissertation must present original research and should provide the basis for one or more publishable contributions to the research literature. The dissertation will be supervised by the Dissertation Advisor, in consultation with a Dissertation Committee consisting of at least three additional members, at least one of whom must be a graduate faculty member from outside the Department of Biological Sciences. The candidate will present a dissertation proposal for approval by the Dissertation Committee.

Final Oral Examination

Upon completion of the dissertation, the student must defend, in public, his or her work. The Dissertation Committee will be responsible for administering the final public oral defense and will have the responsibility of determining whether the written dissertation and its oral presentation and defense are acceptable.

Degree Plan

Required Credits: 63
# PhD in Biosciences

## Code | Title | Hours
--- | --- | ---
**PhD in Biological Sciences (All courses require a grade of C or better)**

### Required Courses:
- BIOL 5130  Seminar (Complete three semesters)  3
- BIOL 5131  Ethical, Soc/Poli Dimensions  1
- BIOL 5328  Biostatistics  3
- BIOL 5340  Structure/Funct Macromolecules  3
- BIOL 6301  Environmental Pathobiology  3
- BIOL 6310  Adv Research Techniques  3

### Additional Requirements:
Select two courses from the following:
- BIOL 5326  Advances Immunological Concept  3
- BIOL 5346  Ecosystem Toxicology  3
- BIOL 5360  Limnology  3
- BIOL 6303  Gene Regulation  3
- BIOL 6304  Physiological Regulatory Mech  3

### Dissertation Research:
Select thirty-three hours from the following:
- BIOL 6190  Independent Research  33
- BIOL 6290  Independent Research  33
- BIOL 6390  Independent Research  33
- BIOL 6490  Independent Research  33
- BIOL 6590  Independent Research  33
- BIOL 6690  Independent Research  33

### Biology Electives:
Select three courses from the following:
- BIOL 5301  Select Adv Topics Biol Science  5
- BIOL 5305  Herpetology  5
- BIOL 5307  Biology of the Pleistocene  5
- BIOL 5308  Rsrch Funding & Prof Developmt  5
- BIOL 5313  Biogeography  5
- BIOL 5316  Biosystematics  5
- BIOL 5318  Ecology of Desert Organisms  5
- BIOL 5322  Advances/Evolutionary Theory  5
- BIOL 5323  Ultrastructure  5
- BIOL 5324  Mammalogy  5
- BIOL 5326  Advances Immunological Concept  5
- BIOL 5327  Advances in Ecological Theory  5
- BIOL 5329  Physiology of Bacterial Cell  5
- BIOL 5342  Synthesis/Degrad Macromolecule  5
- BIOL 5343  Mechanisms-Cellular Toxicity  5
- BIOL 5344  Molecular Pathogenesis  5
- BIOL 5351  Intro Bio I: Basic Seq. Comp.  5
- BIOL 5352  Intro Bio II: Gene Find/Compar  5
- BIOL 5353  Internship in Biological Sci.  5
- BIOL 5354  Post-genomic Analysis  5
- BIOL 5355  Genomic Analysis and Assembly  5
- BIOL 5360  Limnology  5
- BIOL 6303  Gene Regulation  3
- BIOL 6304  Physiological Regulatory Mech  3
- BIOL 6305  Cell Physiology  3
- BIOL 6306  Membrane Biology  3
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<td>&amp; BIOL 6399</td>
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**Total Hours:** 63