

PHD IN BIOLOGY

Cell/Molecular Biology Concentration

The doctoral degree in biology (cell/molecular biology concentration) is awarded to a student who has demonstrated mastery in the field of biology and a distinct and superior ability to make substantial contributions to the field. It is not awarded merely as a result of courses taken, nor for years spent in studying or research. The quality of work and the resourcefulness of the student must be such that the faculty can expect a continuing effort toward the advancement of knowledge and significant achievement in research and related activities.

The doctoral degree in biology prepares students to enter research careers in academic and industrial settings, and non-research careers in a variety of areas including public policy, science communication, intellectual property law, and science education.

The doctoral degree provides a foundation in molecular and cellular biology, research methodologies and practices, rigorous hypothesis-driven scientific investigation, and the dissemination of research results and ideas.

In general, work for the Ph.D. takes five years of study beyond the bachelor's degree. A substantial portion of this time is spent in independent research leading to a dissertation. Up to 30 hours toward a master's degree may apply as part of the student's doctoral program. Normally 90 credit hours of study beyond the bachelor's degree are required for the Ph.D.

Biology -Ecology And Organismal Biology Concentration, PhD

The doctoral degree in biology (Ecology And Organismal Biology Concentration) is awarded to a student who has demonstrated mastery in the field of ecology and a distinct ability to make substantial contributions to the field. The doctoral degree in biology prepares students to enter research careers at academic institutions or **state and federal natural-resource agencies**, environmental consulting firms, and nonprofit and non-government organizations (NGOs).

The doctoral degree provides a foundation in ecology, research methodologies and practices, rigorous hypothesis-driven scientific investigation, and the dissemination of research results and ideas.

In general, work for the Ph.D. takes five years of study beyond the bachelor's degree. A substantial portion of this time is spent in independent research leading to a dissertation. Up to 30 hours from a master's degree program may apply as part of the student's doctoral program. Normally 90 credit hours of study beyond the bachelor's degree are required for the Ph.D.

Biology - Cell and Molecular Biology Concentration, PhD

Each student must complete an individualized program of study in the area of cell/molecular biology approved by the student's advisory committee and the department. This course of study must include:

Code	Title	Hours
BIOL 8000	Introduction To Scientific Thought And Expression	3
BIOL 8010	Advanced Molecular Biology	4
BIOL 8090	Advanced Cell Biology	4
BIOL 8100	Research Methodology: Cell And Molecular Biology	3
BIOL 8200	Advanced Signal Transduction	3
BIOL 8930	Seminar In Biology (take 3 times)	1
Select additional course and research credits to attain the minimum number of semester hours		
Total Hours		90

Ph.D. candidates must pass a written and oral qualifying examination in the Spring of their second year of the program and a final written and oral dissertation defense examination. After passing the qualifying examination, the student must meet each year with their Dissertation Committee and have a first-authorship manuscript accepted by a peer-reviewed scientific journal in order to be qualified for defense of their dissertation research.

Courses numbered at the 5000 and 6000 levels are intended primarily for students at the master's level. Courses numbered at the 7000 and 8000 levels are intended primarily for students at the post-master's (students with a master's degree, or with more than 34 graduate credit hours) and doctoral levels. Courses carrying a dual listing (numbered at both 5000/7000 or 6000/8000 levels) are available to students at both levels. In these cases, there may be substantive differences in the course requirements for students registered at the advanced level.

The department considers experience in teaching to be a vital and significant component of graduate education. Therefore, all graduate students in the Ph.D. program are required to complete at least one semester of formal teaching experience. M.S. students also are expected to acquire teaching experience as part of their graduate programs.

Biology -Ecology and Organismal Biology Concentration, PhD

The doctoral degree in biology (Ecology and Organismal Biology Concentration) is awarded to a student who has demonstrated mastery in the field of biology and a distinct and superior ability to make substantial contributions to the field. The quality of work and the resourcefulness of the student must be such that the faculty can expect a continuing effort toward the advancement of knowledge and significant achievement in the discipline.

In general, work for the Ph.D. requires a minimum of 90 credit hours of study beyond the bachelor's degree. A substantial portion of this time is spent performing independent research leading to an original thesis that is substantially more in depth than a MS thesis. Work performed toward a MS may apply in part to the student's doctoral program.

Each student must complete an individualized program of study in an area of ecology that is approved by the student's advisory committee. This program must include 24 hours of formal courses (excluding EEES 8960 and EEES 8990) with a minimum of 19 hours in DES that must include EEES 5160, EEES 8250, two semesters of statistics (e.g., EEES 8400 and an advanced statistics course such as EEES 8650), EEES 8600, 8930-009 Departmental Seminar (1 hr. per semester), and the remaining courses selected with approval of the student's thesis

committee taken at the 7000 level or above; all but EEES 8930 (seminars) must be taken for a letter grade (A–F). Additional credit hours will include EEES 8960 and/or EEES 8990, a maximum of 6 hours of which may be taken for a letter grade, and may also include other DES or non-DES courses that need not be taken for a letter grade. Within the first two years of study students must pass a written qualifying examination and an oral comprehensive examination and a defense of their research proposal.

All graduate students in the Ph.D. program are required to complete at least one semester of formal teaching-assistant experience before graduation. In addition, each student must:

1. submit a manuscript on their research to a scholarly, peer-reviewed journal;
2. give a presentation of their research at a professional conference; and
3. make an oral presentation on their research at a scholarly forum (an oral presentation at a professional conference would satisfy both latter requirements, but a poster presentation would not).

Finally, each student must prepare a dissertation consisting of a written report on original independent research conducted by the student under the supervision of their dissertation advisor (or co-advisors) and defend this dissertation before their advisory committee.

Biology - Cell And Molecular Biology Concentration, PhD

- Our students will be able to analyze and solve relevant problems from the core areas of environmental biology at the PhD-level.
- Our students will be able to analyze and solve relevant problems from their specific area of research.
- Our students will be able to critique any publication from their research area.
- Our students will be able to propose, design and conduct novel research using experimental, observational, analytical and/or theoretical techniques.
- Our students will be able to generate novel research products. They will be able to 1) write documents suitable for peer-review and 2) produce oral and visual presentations that are shared with peers in a professional setting.
- Our students will be able to explain and demonstrate undergraduate-level concepts in environmental sciences and biology and will be to instruct students in relevant subject areas.

Biology -Ecology And Organismal Biology Concentration, PhD

Students will demonstrate an in-depth understanding of and the ability to communicate scientific information within an area of specialized study within the biological sciences.

Students will demonstrate an ability to conduct experiments, collect and interpret data, and disseminate those data in written and verbal modalities.

Students will demonstrate knowledge of their ethical responsibility when conducting research in terms of proper scientific conduct and the rights of human subjects.