

Integrated Biology, PhD

The Department of Biology's graduate programs in integrated biology (iBio) emphasize original research and developing the skills essential for publishing and communicating research findings to the scientific community. Research programs in the department cover many areas of the biological sciences: cell biology, developmental biology, ecology, evolution, genetics, and neurobiology. Graduate study in the department provides students with a broad understanding of these basic areas.

Newly admitted graduate students are assigned a temporary advisor and together they discuss the student's educational background to formulate a first-semester study plan before registration. The programs allow each student to tailor coursework to their own research interests. Students may be advised to take specific coursework in order to enhance their background in certain areas.

During the first year, students whose preparation in chemistry, genetics, mathematics, or physics is insufficient may need to remedy deficiencies by taking appropriate coursework.

Entering students typically will have taken the following courses: two semesters of organic chemistry or one semester of organic chemistry and one semester of biochemistry; one semester of calculus; two semesters of college physics; and 20 s.h. of coursework in biology, including genetics.

Students with bachelor's degrees outside the biological sciences may request modification of certain area requirements. The Graduate Affairs Committee decides whether portions of the requirements may be waived.

Learning Outcomes

Graduates will:

- master the skill of reading, understanding, and summarizing primary literature across a variety of biology subdisciplines, demonstrating effective scholarly communication in the process;
- explain in writing the rationale for their primary area of research, articulate the central hypothesis/hypotheses and/or research questions, and outline the major investigative steps that will be undertaken;
- use established scientific communication norms to orally communicate established scientific concepts, ongoing research questions and/or hypotheses, research design approaches (descriptive, experimental, theoretical, as appropriate), results, and specific and broader implications of research to a wide array of audiences;
- master in-depth disciplinary concepts through advanced lecture courses and engage in a critical analysis of a single topic over many levels of basic biology;
- learn and implement field-specific research processes, techniques, and data analyses in a responsible manner consistent with current bioethical protocols;
- establish networking connections within the scientific profession, from peer level through established, independent researchers; and
- become a research sub-project leader, within the context of a research group.