

# INTEGRATIVE BIOLOGY (PH.D.)

<https://colsa.unh.edu/biological-sciences/program/phd/integrative-biology>

## Description

The Integrative and Organismal Biology (IOB) option offers a home to students interested in basic organismal biology in all of its diverse aspects (physiology, neurobiology, behavior, cell biology, genetics, evolution, ecology, systematics, etc.), in both terrestrial and aquatic environments. Modern biology employs approaches and tools ranging from molecular to ecological levels to gain a deep understanding of organismal functions and adaptations. Students in IOB approach their studies with a focus on organisms, and apply whatever tools are necessary to answer thematic and specific questions. Students interested in combining hands-on biological projects with research on teaching and learning biology at the post-secondary level should choose this option. Students completing degrees in IOB will be prepared for a wide range of professional careers in animal and/or plant biology, whether in academia, government, research, or nonprofit organizations.

## Requirements

### Ph.D. Degree Requirements

Students work with their advisor and their Doctoral Guidance Committee to plan a program of study including the required core courses and competencies, and develop a viable research proposal. The Guidance Committee is normally established by the end of the first semester, and should meet by the end of the second semester. The student presents to the Guidance Committee a preliminary research proposal in which the soundness, originality, and feasibility of the planned research are clearly described. The Guidance Committee is responsible for approving the proposal, and also oversees the qualifying examination through which the student is admitted to doctoral candidacy. The Doctoral Dissertation Committee is established at this point. To earn the Ph.D. degree, students must complete an original dissertation project, present the results at a public seminar, pass an oral dissertation defense consisting of questions from members of the Dissertation Committee, and have the dissertation approved by the Dissertation Committee and accepted by the Graduate School.

### Number of Credits Required

There is no specific credit requirement for the Ph.D., though students must take required core courses and meet competency requirements. The Integrative Biology Program specifies the following requirements: (BIOL 901 Introductory Graduate Seminar); 2 courses in experimental design/analysis; 1 course in writing/communication; and an ethics requirement (either RCR training and/or a graduate level class in ethics).

Up to 8 credits of graduate credit from another institution may be transferred, provided the credits were not counted toward another degree, and the course grade was a B or higher. Petitions requesting transfer credit must be supported by the advisor and graduate committee, and approved by the UNH Graduate School.

## Required Courses, Competencies, and Electives

All students in the Integrative Biology Graduate Program are required to take:

1. Core Course: Introductory Graduate Seminar (BIOL 901). This first-semester course focuses on key information and skills for a successful transition into the graduate program, familiarizing students with program requirements and faculty and providing an opportunity to meet others in their cohort.
2. Two courses in experimental design and analysis: This may be fulfilled by previous graduate coursework (as determined by the student's advisor and committee), or by taking two graduate-level course.
3. One course in writing/communication: This may be fulfilled by previous graduate coursework (as determined by the student's advisor and committee), or by taking one graduate-level course. Recommendations often include coursework in professional writing and communication: Scientific Writing - Writing and Publishing Science (BIOL 902) is taught fall semester, and open to students at any stage of the program. Scientific Communication edited Course (BIOL #950) is usually taught in spring.
4. Ethics requirement: Students can fulfill this requirement by either taking the Responsible Conduct of Research training workshop or by taking a graduate level ethics course.
5. Electives: Students will work with their advisor and committee to identify additional courses appropriate for their area of specialization and their career objectives.

## Additional Information/Requirements

All students in the Biological Sciences Program are expected to present their research in public seminars (including the UNH Graduate Research Conference), and acquire teaching and/or mentoring experience.

## Student Learning Outcomes

### Program Learning Outcomes Core Knowledge

- Demonstrate expert knowledge of the subdiscipline relevant to their research project and general knowledge of the broader discipline of biology.

### Critical Thinking

- Critique, evaluate, and integrate qualitative and quantitative biological research and methods to develop original hypotheses.

### Research

- Synthesize research methods and data analysis techniques to conduct an independent and original research project that contributes new knowledge to address a gap in the field.

### Communication

- Ability to effectively communicate scientific information, concepts, theories, and methods to professional colleagues (specialists), invested parties, and the general public.

## **Professionalism**

- Conduct research ethically and responsibly and intellectually engage with the broader scientific community.