

Honors B.S. in Biology (Aug 2014)

Overview: The H.B.S in Biology is a collaboration between the Honors College and the Biology Department to reward students undertaking and completing a more rigorous, research-oriented curriculum while pursuing their Honors Bachelor's Degree in Biology at the University of Utah. The centerpiece of Biology Honors Track is a research project culminating in the submission of a written thesis, and presentation of the student's thesis research in a public forum.

Admission to the Biology Honors Track. Honors College students majoring in Biology may apply for admission to the Biology Departmental Honors Track by submitting to the chairman of the Biology Honors Committee: (1) an unofficial transcript of all college-level courses completed; (2) a brief written proposal (<5 pages) outlining the research project to be undertaken; (3) a letter from the research advisor stating that he/she will supervise the research project, (4) an Honors application form included in this document and available at the Biology Advising office, and (5) an Honors College Thesis Proposal Form.

Requirements. The Biology Honors Track is intended to be flexible and to provide maximum access for all Honors Biology majors, including transfer students. To receive an Honors Bachelor of Science degree in Biology students must:

Be admitted to the Honors College of the University of Utah.

Meet all University and Departmental requirements for a bachelor's degree in Biology.

Maintain a cumulative GPA of 3.5 overall, a minimum grade of B in all Biology courses, and a cumulative GPA of 3.5 in all Biology courses.

Complete at least 9 units (3 semesters)^{1,2} of honors independent research (Biology 4995) in a laboratory approved by the Biology Honors Committee. One semester of Biology 4955 (non-honors independent research) may be substituted for one semester of Biology 4995, pending approval of the Biology Honors Committee.

Complete Biology 4999: Thesis preparation and submission to the Honors College and Biology Department (3 units^{2,3}). All students must complete and submit a thesis discussing the results of their research project. To receive honors at graduation, students must receive a grade of B or better in Biology 4999 (as well as fulfill the Honors College requirements for the degree). Details of thesis preparation are discussed at the end of this document. The Committee may request faculty in the specific research discipline to aid in evaluating the thesis.

Present the results of their research in an appropriate forum (i.e. Biology Undergraduate Research Symposium, University Undergraduate Research Symposium) approved by the Biology Honors Committee. Students should consult with the chair of the Biology Honors Committee (currently Professor Martin Horvath, martin.horvath@utah.edu) to arrange their presentation when they enroll in Biology 4999.

Complete at least additional 12 units² of Honors courses and electives fulfilling the requirements outlined in Table 1 (below).

¹ The minimum requirement is 3 semesters of research totaling 9 credit hours, but students are encouraged to pursue their research in greater depth.

² Required Honors courses and electives may be applied to major and graduation requirements. Specifically, 3 credit hours of Biology 4999 and 6 credit hours of Biology 4995 count as electives towards the major.

³ Students should attend a group Thesis Information Session or schedule a Thesis Information meeting with the Associate Dean of the University Honors College (<http://www.honors.utah.edu/curriculum-dept.html>) prior to enrolling in Biology 4999 and are required to submit to the Honors College a Thesis Proposal form, available at honors.utah.edu, that outlines the thesis research project and is signed by the student's faculty supervisor and the Biology Honors Advisor.

The Biology Honors Committee oversees all aspects of the Biology Honors Track. The Committee will (i) approve the research proposal and admission, (ii) monitor the relationship between student and research supervisor, (iii) assess research progress, and (iv) approve the final thesis. To maintain high standards, the Committee may request faculty in the specific research discipline to aid in monitoring and evaluating the research experience. For more information, contact the Biology advising office or the chair of the Biology Honors Committee.

Table 1. Required courses and electives for Honors B.S. in Biology

The following Biology courses (totaling 12 semester hours) must be completed by all students receiving Departmental Honors in Biology:

Biology 4995 Honors Research; 3 semesters totaling 9 credits of research are required for Departmental Honors in Biology. Students may substitute one semester of Biol 4955 (Independent Research) for one semester of Biology 4995, subject to approval of the Biology Honors Committee. Biology 4955/4995 can be completed in any University laboratory approved by the Biology Honors Committee. Six of these 9 units count as upper division Biology electives.

Biology 4999 Honors Thesis Preparation (3 credits). These 3 units count as upper division Biology electives.

Additional information on these courses can be found at the end of this document.

Electives. In addition to the required Biology courses (above), students must complete at least 12 additional hours of elective honors courses as described below.

Electives to total at least 12 hours

- Students must complete 3 University Honors courses totaling 9 credits.
 - 2 Intellectual Traditions courses (e.g., HON 2101, HON 2102, HON 2103, etc.).
 - 1 Writing course (HON 2211, HON 3200)
- Complete at least 3 additional credits from approved Biology honors electives (see Appendix 1 below).

*Students completing the required courses, electives, and thesis will graduate with **Honors Bachelor's Degree of Science (or Arts) in Biology.***

Appendix 1. Biology Honors elective courses

Biology courses that can be used to fulfill the elective requirements (units in parentheses) for graduation with Departmental Honors in Biology:

Honors Biology 2021: Principles of Cell Science (4)

Biology 2870: Faculty Research Seminar (1)

Biology 3115: Computer Applications: Cell Biology (2)

Biology 3125: Molecular Evolution Laboratory (3)

Biology 3215: Cell Biology Laboratory (2)

Biology 3235: Developmental Biology Laboratory (3)

Biology 3345: Plant Biology Lab (2)
Biology 3245: Cell Neurobiology Laboratory (2)
Biology 3246: Basic Cellular Neurobiology Laboratory (2)
Biology 3247: Advanced Cellular Neurobiology Laboratory (2)
Biology 3315: Vertebrate Morphology Laboratory (1)
Biology 3325: Comparative Physiology Laboratory (3)
Biology 3355: Physiology of Plants Lab (1)
Biology 3415: Ecology Laboratory (3)
Biology 3515: Biological Chemistry Laboratory (2)
Biology 3525: Molecular Biology of DNA Laboratory (3)

Biol 5011: Mathematical Biology I (3)
Biol 5012: Mathematical Biology II (3)
Biol 5030: Basic Immunology (3)
Biol 5110: Molecular Biology and Genetic Engineering (3)
Biol 5120: Gene Expression (3)
Biol 5130: Plant Biochemistry and Molecular Biology (3)
Biol 5140: Genome Biology (3)
Biol 5210: Cell Structure and Function (3)
Biol 5221: Human Evolutionary Genetics (3)
Biol 5240: Plant Developmental Biology (3)
Biol 5255: Prokaryotic Genetics (3)
Biol 5275: Microbial Diversity (4)
Biol 5285: Biological Microscopy Laboratory (1 to 3)
Biol 5312: Human Dissection (1 to 4)
Biol 5320: The Biology of Aggression (2)
Biol 5360: Human Form, Function and Evolution (3)
Biol 5365: Form, Function, and Adaptation of Plants (4)
Biol 5370: Mammalogy (3)
Biol 5385: Ornithology (4)
Biol 5395: Advanced Field Ornithology (2)
Biol 5401: Vertebrate Paleontology and Evolution (3)
Biol 5420: Advanced Ecology (3)
Biol 5435: Plant Systematics (4)
Biol 5445: General Entomology (4)
Biol 5455: Desert Ecology Field Course (5)
Biol 5460: Plant Ecology (3)
Biol 5465: Plant Ecology Laboratory (2)
Biol 5470: Stable Isotope Ecology (3)
Biol 5471: Fundamental Methods of Evolutionary Ecology (3)
Biol 5475: Stable Isotope Ecology Laboratory (3)
Biol 5490: Ecosystem Ecology (3)
Biol 5495: Biophysical Ecology (4)
Biol 5510: Evolutionary Developmental Biology (30)
Biol 5540: Biochemistry of Membrane Processes (3)
Biol 5810: Nanoscience: Where Biology, Chemistry and Physics Intersect
Biol 5910: Mathematical Models in Biology (2)
Biol 5955: Scientific Immersion (3)
Biol 5960: Advanced Special Topics in Biology (1 to 5)

Biol 6XXX: Any 6000-level Biology course.
Biol 7XXX: Any 7000-level Biology course.

Application for Departmental Honors in Biology

Student information

Student name (print): _____ Student ID#: _____

Phone number: _____ e-mail: _____

Student signature: _____

Faculty research advisor

Faculty research advisor (print): _____ e-mail: _____

Research advisor signature: _____

Curriculum plan

Required courses: 12 units

Course number	Course name	Units	Semester planned	Semester completed	Notes
Biol 4995*	Honors Research				
Biol 4995*	Honors Research				
Biol 4995*	Honors Research				
Biol 4999	Honors Thesis	3			

Three semesters totaling 9 units are required. One Biology 4955 can be substituted for one Biology 4995 with approval of Biology Honors Committee.

Electives: 12 units minimum

Course number	Course name	Units	Semester planned	Semester completed	Notes
	Intellectual Traditions	3			HON 2101, HON 2102, HON 2103 or other approved IT course
	Intellectual Traditions	3			HON 2101, HON 2102, HON 2103 or other approved IT course
	Honors Writing	3			HON 2211, HON 3200
					3 additional credits from Biology Honors Electives (see Appendix 1)

Approved by Chair of Biology Honors Committee

Signature of Chair of Biology Honors Committee: _____ Date _____

_____ Original to Chair/Biology Honors _____ Copy to University Honors _____ Copy to file

Biology 4995 and 4999 – Honors Research and Thesis Preparation

The centerpiece of the Honors B.S. in Biology is an intensive research experience in a laboratory at the cutting edge of science. In Biology 4995, students will be trained in laboratory techniques and then work intensively on a research project for three semesters under the guidance of their faculty research advisor. It is expected that the honors student will have a semi-independent project with the opportunity to make substantial new discoveries. At the end of each term of Biology 4995, the honors student will submit a one-page report (single spaced) of his/her research progress to the chair of the Biology Honors Committee.

Following completion of three semesters of research, students must enroll in Biology 4999: *Thesis Preparation* (typically one semester before they plan to graduate). Biol 4999 is a writing intensive course in which the student prepares a research thesis in consultation with their faculty research advisor. The format of the Honors thesis should be consistent with standard scholarly practice (i.e. Abstract, Introduction, Methods, Results, Discussion, and References) and must conform to the Honors College guidelines. Most theses are 30-50 pages long (double spaced). Examples of theses submitted in past years are available in the Marriot Library (Science and Special Collections) and in the Honors Center in Ft. Douglas.

The student's research advisor is responsible for helping the student prepare a quality thesis, and must approve the thesis prior to its submission to the chair of the Biology Honors Committee. Once approved by the research advisor, the thesis should be submitted to the chair of the Biology Honors Committee for approval *no less than 2 weeks before the deadline published by the University Honors Program*. The Biology Honors Committee will often require additions or revisions to the thesis document prior to its approval. Final approvals by the Chair of Biology and University Honors Program are also required. As per University Honors policy, the thesis must be completed 'with distinction,' and a grade of B or better in Biology 4999 is required for graduation with honors.

Preparation of a quality thesis is a time-intensive process. Students are encouraged to begin preparation of their thesis, with guidance from their research advisor, early in the semester in which they are enrolled in Biol 4999.

By signing below, the student and research advisor acknowledge the requirements for successfully completing Biology 4995 and 4999.

Student signature: _____ Date: _____

Faculty research advisor signature: _____ Date: _____