

# BIOLOGY

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## Faculty

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Each degree offered by the Biology Department includes a common core curriculum and additional courses tailored to students' special needs.

Highly motivated students may compete for the Biology Undergraduate Research Traineeship (BURT) program. For full details, consult the Biology Department.

## Undergraduate Programs

### BS: Biology

All biology majors must complete the following core and cognate courses:

#### Biology Core—24

BIOL165, 166, 348, 371, 372, 449, 451, 452.

#### Cognate Core—24 or 26

CHEM131, 132, 231, 232, 241, 242; PHYS141, 142 or 241, 242, 271, 272.

#### General Education Cognates

RELT340, PSYC101. Students taking the Honors Core do not need RELT340.

Students must complete the biology core, the cognate core, and the requirements for one of the emphases listed below.

### Botany Emphasis—18

Upper-division biology courses; must include a botany course (BOT prefix) drawn from each of the environmental, morphological, and functional groups of courses listed below. In addition, one zoological course (ZOOL prefix) must be included.

### Zoology Emphasis—18

Upper-division biology courses; must include a zoology course (ZOOL prefix) drawn from each of the environmental, morphological, and functional groups of courses listed below. In addition, one botany course (BOT prefix) must be included.

### Biomedical Emphasis—13-14

Must include four of the following: ZOOL315, 464, 465, BIOL475; or PHTH 417, 427. BCHM421 must be included in the cognate core.

### Molecular Biology Emphasis—12-13

Must include BIOL418, 419, 445, 447, and **one** of the following four courses: BIOL475; BIOL444, 446; ZOOL315; BOT470 or ZOOL464. BCHM421 must be included in the cognate core.

### Neurobiology Emphasis—14

Upper-division biology courses; must include a zoology course (ZOOL prefix) drawn from each of the environmental, morphological, and functional groups of courses listed below. In addition, ZOOL475 and either PSYC364 or 449 must be taken. BCHM442 must be included in the cognate core.

### Special Emphasis—18

In situations where students are preparing for a specific job opportunity or a graduate or professional program, the special emphasis may be considered if other degree programs are not adequate. The credits must include one biology course each from the functional, morphological, and environmental courses listed below. Additional credits to reach a minimum of 18 are to be selected from courses in biology or other disciplines in consultation with a Biology Department advisor. Departmental approval must be received before the beginning of the spring semester of the student's junior year.

### Minor in Biology—22

BIOL165, 166, 449 and one course each from environmental, morphological, and functional biology electives.

### SENIOR THESIS

A minimum of 3 credits of BIOL495 or HONS497. Biology majors may elect to complete a minimum of 3 credits of original research in a topic of mutual interest with a Biology Department staff member and present this original work in the form of a senior thesis. This research experience may be supported by a research scholarship.

# Graduate Programs

The Biology Department offers courses leading to the Master of Science degree and also cooperates with the School of Education in offering courses leading to the Master of Arts in Teaching degree. Students are strongly urged to incorporate into their programs a summer of study at the Rosario Beach Marine Station at Anacortes, Washington. During the 8-week summer session, students may earn 6 to 8 credits.

## MS: Biology

In addition to the general requirements for admission to and enrollment in graduate degree programs outlined in this bulletin on pp. 41-50, students must meet the following departmental requirements.

### Admission Requirements

- A bachelor's degree with major in biology or an approved, related discipline, including courses in cell/molecular biology, organismal physiology, developmental biology, genetics, and ecology.
- A minimum GPA of 3.00 (B) in the undergraduate major for admission to regular student status.
- Cognate sciences, including full-year courses in general chemistry, organic chemistry, and physics. Mathematics through calculus level is encouraged.

### Degree Requirements

- The inclusion of BIOL550 or IDSC526, and BIOL681, 682.
- A written comprehensive examination completed before the third semester in residence.
- A thesis earning 6 credits.
- A final oral examination in defense of the thesis.
- A minimum of 30 credits of approved course work and thesis.

## MAT: Biology

Designed to prepare students for teaching biology in secondary schools, this degree is offered through the School of Education. A minor or its equivalent in biology on the undergraduate level is a prerequisite. In consultation with the department chair or the graduate program director, a minimum of 12 (6 credits must be 500-level or above) credits from courses listed below may be applied toward this program.

Required courses are BIOL550 or IDSC526. For further information, see the School of Education section of this bulletin on p. 251.

## Courses

(Credits)

See inside front cover for symbol code.

### GENERAL

**BIOL100** \$ (3)  
*Human Biology*

A survey of the structure and function of the human body, for those not requiring the depth offered in BIOL111, 112. Meets the natural science elective course requirement. Two lectures, one lab per week. Does not apply to a major or minor. *Spring*

**BIOL111, 112, 113** \$ (4, 3, 1)

### *Anatomy and Physiology I, II, III*

BIOL111 and 112 includes cell biology, functional anatomy and control of each organ system of the human. BIOL111 Weekly: 3 lectures and 1 lab; BIOL112 Weekly: 2 lectures and 1 lab; BIOL113 Weekly: 1 lecture and 1 lab, includes more detailed anatomy. BIOL111 is a prerequisite for BIOL112. BIOL112 or consent of the instructor is the prerequisite for BIOL113. Does not apply to a major or minor. BIOL111: *Fall*; BIOL112: *Spring*; BIOL113: *Spring*.

**BIOL208** \$ (4)

### *Principles of Environmental Science*

Study of basic ecological principles as applied to human activities. Discussions deal with contemporary environmental issues. Lab includes field trips, guest speakers, and experiments. Meets General Education science requirements for non-science majors and applies toward the environmental science major and certain state educational certification requirements. Weekly: 3 lectures and 1 lab. *Fall*

**BIOL260** \$ (4)

### *General Microbiology*

Includes history, morphology, classification, control, growth, transmission, and pathogenicity of selected bacteria, viruses, rickettsia, fungi, and parasites. Covers the nature of host defenses against pathogens, including the acquisition of specific immunity and immune disorders. Weekly: 3 lectures and two 1½ hour labs. Does not apply on major or minor. *Fall*

**BIOL330** \$ (3)

### *History of Earth and Life*

Survey of fundamental concepts of geology and paleontology with application to a study of the history of the earth and of life. Consideration is given to interactions of religious, philosophical, and geological ideas, within a biblical world view. Weekly: 2 lectures and 1 lab. Does not apply to a major or minor. *Spring*

## REQUIRED CORE

**BIOL165, 166** \$ (5, 5 or 4, 4)

### *Foundations of Biology*

Provides a firm foundation for students majoring or minoring in the biological sciences. Weekly: 5 lectures and one 3-hour lab. Ten credits when offered during the academic year; 8 credits when offered at the Marine Biological Station during the summer. BIOL165: *Fall*; BIOL166: *Spring*

**BIOL348** \$ (3)

### *General Ecology*

Ecological principles as applied to individual, population, community, and ecosystem levels of organization. Labs feature the characterization of ecological systems using standard field and lab techniques. Weekly: 2 lectures and 1 lab. Prerequisites: BIOL165, 166 or 208. *Fall*

**BIOL371** \$ (3)

### *Genetics, Cellular and Molecular Biology I*

Mechanisms of heredity are considered in light of classical population and molecular genetics. Labs feature experience in *Drosophila* genetics, chromosome analysis, statistical techniques, and recombinant DNA technology. Prerequisite: BIOL166, and completion of or simultaneous enrollment in CHEM131. *Fall*

**BIOL372** \$ (3)

### *Genetics, Cellular and Molecular Biology II*

Information from molecular biology, biochemistry, biophysics, phys-

ical chemistry, and electron microscopy are integrated to present the cell as a functional unit. Labs provide experience in the collection and analysis of quantitative data about cells. Prerequisite: BIOL166, and completion of or simultaneous enrollment in CHEM132. *Spring*

immunoglobulins, the MHC, antibody diversity, tolerance and memory, complement, cell mediated immunity, regulation, hypersensitivity, autoimmune diseases, transplantation, and tumor immunology. Weekly: 2 lectures. Prerequisites: BIOL166. *Spring*

**BIOL419** **g** \$ (1)  
***Immunology Lab***

A theoretical and practical study of techniques used in modern immunology. Includes immunoserological methods; isolation and detection of immunoglobulin molecules in immune serum by SDS-PAGE, western blotting, and immunofluorescence antibody (IFA) methods; enzyme-linked immunosorbant assay (ELISA), in vitro phagocytosis. Weekly: 1 lab. Pre- or corequisite: BIOL418. *Spring*

**BIOL445** **g** \$ (3)  
***Molecular Genetics***

An advanced consideration of the structure, function, and manipulation of nucleic acids and application of molecular information in other disciplines. Weekly: 2 lectures and 1 lab. Prerequisites: BIOL371. *Spring*

**BOT470** **g** \$ (3)  
***Plant Physiology***

Study of plant functions including water relations, metabolic pathways, growth regulators, and photomorphogenesis. Weekly: 2 lectures and 1 lab. Prerequisites: BIOL166; CHEM131. *As scheduled*

**ZOOL464** **g** \$ (4)  
***Systems Physiology***

Functional processes used by animals in adjusting to their external environment and controlling their internal environment. Labs involve the firsthand analysis of selected aspects of the major functional systems. Weekly: 3 lectures and 1 lab. Prerequisite: BIOL166, CHEM131. *Fall*

**ZOOL484** **g** \$ (3)  
***Animal Behavior***

Behavior of animals including considerations of social interactions, learning processes, instinct, motivation, experimental meth-

