

# Biology

The Albertson College Biology program is an interactive, research-based curriculum that emphasizes the concepts and skills necessary for thinking critically about biological issues and problems.

Consistent with the liberal arts tradition, our objectives are to give students a strong foundation in the natural and biological sciences, to prepare them for science-based careers, and to enhance their appreciation and understanding of life on earth. The Biology Major emphasizes breadth of experience but it also allows students to pursue their own areas of interest within the field of biology. Small class sizes and the accessibility of the Biology Faculty provide opportunities not usually found at larger colleges and universities.

Fieldwork is an important part of the ACI Biology program. The College is located near mountain and desert habitats that provide numerous study sites for student research. Longer field trips to Australia, Costa Rica, and Hawaii offer opportunities for in-depth learning.

Students interested in health care or in laboratory research may study a variety of topics ranging from human anatomy to molecular biology. Students are encouraged to participate in internships in their areas of interest; these open doors for career opportunities after graduation.

Other resources available to Albertson College biology students, in addition to the molecular, cellular, organismal, and environmental laboratories located in Boone Hall, are the Orma J. Smith Museum of Natural History and the Harold M. Tucker Herbarium.

The Department has a "4-1" cooperative program with the University of Idaho whereby students can complete a bachelor of science degree (BS) in biology from Albertson College of Idaho and a master of natural resources degree (MNR) from the University of Idaho. See the "COOPERATIVE PROGRAMS WITH OTHER COLLEGES/UNIVERSITIES" section of this catalog for specific requirements.

A major in biology consists of a minimum of 34 credits distributed as follows:

## The Lower Division Core (16 credits)

- BIO 130 Frontiers in Genetics
- BIO 220 Organismal Biology
- BIO 221 Population and Ecosystems Biology
- BIO 230 Cell and Molecular Biology
- BIO 260 Diversity of Life

## The Upper Division Courses

One laboratory course from each of the following three groups. At least two of these three laboratory courses must emphasize experimental approaches (hypothesis testing, data collection, analysis & interpretation). Courses satisfying this criterion are indicated by an asterisk(\*).

**A course emphasizing molecular/cellular biology chosen from:**

- BIO 356 Molecular Biology\*
- BIO 360 Microbiology
- BIO 365 Immunology\*
- BIO 372 Developmental Biology

#### **A laboratory course emphasizing organismal biology/physiology chosen from:**

- BIO 304 Mammalian Physiology
- BIO 374 Animal Physiology\*
- BIO 375 Plant Physiology\*

#### **A laboratory/field course emphasizing ecological concepts chosen from:**

- BIO 318 Aquatic Ecology\*
- BIO 341 Tropical and Subtropical Ecology\* and/or BIO 344 Coral Reef Ecology\*
- BIO 345 Ecology\*

#### **Elective upper-division credits:**

- Four or more credits to total at least 34 credits of biology. Internships and independent study credits do not fulfill this category.

#### **Senior Capstone:**

- BIO 400 Biology Seminar
- BIO 499 Senior Comprehensive Examination

Additional sciences needed as prerequisites for courses in the major are:

- CHE 141
- PHY 231/231L **or** PHY 271/271L
- MAT 211
- CHE 142, MAT 212 and GOL 101 are recommended.

For a career in biology, or for graduate study, students should include:

- CHE 301-302
- PHY 232/232L **or** PHY 272/272L
- MAT 151-152
- Independent research in biology.

Students desiring teacher certification must consult with a member of the Education department.

## **Biology Minor**

The minor consists of 20 credits including BIO 130, at least two courses chosen from:

- BIO 220
- BIO 221
- BIO 230

plus BIO 260 and at least one upper-division biology course. This minor is not open to students electing the biology major.

## Human Biology Minor

A minor that emphasizes the biology of the human body. This minor is not open to students electing the biology major. However, it is recommended for students interested in health professions, psychology, or exercise science.

The minor consists of 20 credits including:

- BIO 130 **or** BIO 102
- BIO 220
- BIO 230
- Three or more courses chosen from two or more of the following groups:
  - **Cellular & Molecular Biology**
    - BIO 315
    - BIO 360
    - BIO 365
    - BIO 371
    - BIO 372
  - **Biochemistry/Neurochemistry**
    - PSY 331 **or** CHE 412
  - **Anatomy & Physiology**
    - BIO 304
    - BIO 355
    - BIO 374
    - PHE 319 **or** PHE 443

## Environmental Studies Minor

For a description of this interdisciplinary minor, see the Environmental Studies section of the catalog.

## Biology (BIO)

### LOWER DIVISION

#### **BIO-102 Biology of Human Disease 4.0 cr.**

Winter, spring. Emphasis on pathogenic organisms and human immune responses. This is a laboratory course designed for students not majoring in biology. Three lectures and one three-hour laboratory weekly. (NATURAL SCIENCE LAB)

#### **BIO-105 Human Anatomy & Physiology 4.0 cr.**

Spring. Anatomy and physiology of the human body; cell structure and function; tissues; skeletal, muscular, circulatory, and nervous systems. Three lectures and one three-hour laboratory weekly. This course is designed for students not majoring in biology. (NATURAL SCIENCE LAB)

#### **BIO-122 Introduction to Environmental Biology 4.0 cr.**

Study of ecological principles and application of biological concepts to environmental problems and issues. Topics include: interactions of organisms with their environment; impacts of human activities on the biosphere; energy flow, resources, climate, and nutrient cycles; species, population-, community-, and ecosystem-level processes and organization; physiological, behavioral and life history adaptations of organisms to their environments; species interactions, population growth, and extinction. Lectures, discussion, laboratory, and field activities. (NATURAL SCIENCE LAB)

#### **BIO-129 Murder, Medicine, & Magic 3.0 cr.**

Winter. A study of ethnobotany and the uses that people have made of plants. Topics include the uses of plants in various cultures for foods, fibers, shelter, beverages, medicines, rituals, and other ends. Emphasis will be placed on basic botanical principles (e.g. taxonomy, anatomy, evolution, chemistry), and the human needs (physiological, behavioral, cultural) that plants satisfy. (NON-LAB NATURAL SCIENCE)

#### **BIO-130 Frontiers in Genetics 2.0 cr.**

Fall, winter, spring. Fundamental concepts in the biology of inheritance are developed with emphasis on scientific problem-solving--collection, analysis, and interpretation of genetic data. Emphasis on frontier areas of genetics including human genetics, genetic engineering, and biotechnology. Readings, lectures, discussions, lab activities, and computer simulations. (NATURAL SCIENCE LAB)

#### **BIO-140 Idaho Natural History 4.0 cr.**

Spring. Natural history, flora, fauna, and ecological relationships of the local area. Three lectures and one four-hour laboratory weekly. This course is designed for students not majoring in biology. (NATURAL SCIENCE LAB)

#### **BIO-205.1 Uncharted Territories 3.0 cr.**

(Same as ENG 205.1) Winter. Analysis of texts that both concern biology and literature and challenge existing literary/biological paradigms. Requires a reading and travel journal and a final comprehensive written project that reflect the ways in which the winter Sawtooth experience informs the assigned texts and vice versa. Assigned texts include works by Oliver Sacks, Peter Hoeg, Diane Ackerman, Loren Eiseley, John Horgan, and others. (LITERATURE)

#### **BIO-220 Organismal Biology 4.0 cr.**

Spring. Prereq.: BIO 130. The biology of individual and major taxonomic groups of organisms: development, functional morphology, anatomy, and physiology. (NATURAL SCIENCE LAB)

#### **BIO-221 Population & Ecosystem Biology 4.0 cr.**

Fall. Prereq.: BIO 130 or 220; prereq. or coreq.: MAT 211. The biology of populations and communities: population genetics, evolution, ecology, and animal behavior. Three lectures and one four-hour laboratory weekly. (NATURAL SCIENCE LAB)

#### **BIO-230 Cell & Molecular Biology 4.0 cr.**

Fall, spring. Prereq.: BIO 130 and CHE 141. Introduction to the components of cells and processes that occur in living cells. Topics include cell structure and function, genetic events, regulation of gene expression, and the chemical pathways of metabolism. Readings, lectures, discussions, and laboratory activities. Three lectures and one three-hour lab weekly. (NATURAL SCIENCE LAB)

#### **BIO-260 Diversity of Life 2.0 cr.**

Fall, winter, spring. Prereq.: completion of two courses among BIO 220, 221, or 230. A survey of living organisms with an emphasis on biological classification, phylogeny reconstruction, biological diversity, and comparative morphology. Readings, lectures, discussions, and lab activities. Six hours per week for six weeks. (NATURAL SCIENCE LAB)

### **UPPER DIVISION**

#### **BIO-304 Human Physiology 4.0 cr.**

Fall. Prereq.: BIO 220. A study of the physiology and morphology of human cells, tissues and organs, with emphasis on selected human organ systems. Three lectures/discussion and one three-hour laboratory weekly.

#### **BIO-306 Conservation Biology 3.0 cr.**

Winter. Prereq.: BIO 221. Application of scientific principles to conservation of biological diversity, with emphasis on patterns and explanations for diversity, threats to and value of diversity, habitat relationships and extinction processes, and conservation strategies.

#### **BIO-318 Aquatic Ecology 4.0 cr.**

Spring. Alt. years. Prereq.: BIO 220 and 221. This course examines the ecology of freshwater and marine environments with emphasis on primary production, nutrient dynamics, population dynamics, and community organization. Two lectures and one four-hour laboratory weekly. Some weekend field trips are required.

#### **BIO-319 Ichthyology 4.0 cr.**

Fall. Alt. years. Prereq.: BIO 221. A study of the evolution, classification, diversity, morphology, and biogeography of marine and freshwater fishes. Two lectures and one four-hour laboratory weekly. Some weekend field trips are required. Extra fee. Limited enrollment.

#### **BIO-322.1 Field Botany 4.0 cr.**

Spring. Alt. years. Prereq.: BIO 220. Field based investigation of diversity, history, and adaptations of plants with emphasis on local examples. Methods of taxonomic identification and classification emphasized. Two lectures and one four-hour laboratory period weekly. Some weekend field trips are required.

#### **BIO-324 Natural History Preparation (for Australia, Costa Rica, Baja, Hawaii) 1.0 to 2.0 cr.**

Fall. Prereq.: BIO 220 and coreq. BIO 221. Preparation for off-campus field trips.

### **BIO-325 Natural History (of Australia, Costa Rica, Baja, Hawaii) 1 to 3.0 cr.**

Winter. Prereq.: BIO 221, 324 and permission. An evolutionary synthesis of topics in zoology, botany, geology, geography, and anthropology.

### **BIO-332 Evolution 3.0 cr.**

Spring. Prereq.: lower division core. The study of organic evolution as an organizing principle of biology, including a synthesis of principles of population genetics, paleontology, ecology, and molecular, developmental and organismal biology.

### **BIO-333 Plant Biosystematics & Biogeography 4.0 cr.**

Fall. Alt. years. Prereq.: BIO 221 or permission. Descriptive and experimental approaches to interpreting evolutionary relationships, taxonomy, and distributions of plants. Projects involve phenetic and cladistic analyses of Southwestern Idaho plant species. Two lectures and one four-hour laboratory weekly.

### **BIO-336 Ornithology 4.0 cr.**

Spring. Alt. years. Prereq.: BIO 221. A field oriented introduction to avian biology with emphasis on classification, identification, structure, distribution, ecology and habits of birds. Two lectures and one four-hour laboratory weekly.

### **BIO-339.1 Mammalogy 4.0 cr.**

Spring. Alt. Years. Prereq.: BIO 221. Biological principles as applied to mammals with emphasis on adaptations, behavior, evolution, classification, and ecological relationships. Three lectures and one four-hour laboratory weekly. Some overnight field trips may be required.

### **BIO-341 Tropical & Subtropical Ecology 1.0 to 3.0 cr.**

Winter. Prereq.: BIO 221, 324 and permission. A study of the origin, structure, composition, species diversity, and ecological relationships of tropical and subtropical biotic communities.

### **BIO-344 Coral Reef Ecology 1.0 to 2.0 cr.**

Winter. Prereq.: BIO 221, 324 and permission. A study of coral reef formation, marine habitats, species diversity and ecological relationships on coral reef ecosystems.

### **BIO-345 Ecology 4.0 cr.**

Spring. Alt. years. Prereq.: BIO 221. Interrelationships between plants, animals, and their environments. Emphasizes population interactions and community organization. Laboratory emphasizes techniques of ecosystem analysis. Three lectures and one four-hour laboratory weekly.

### **BIO-349 Vertebrate Natural History 4.0 cr.**

Spring. Alt. years. Prereq.: BIO 221. Vertebrate classification, life histories, adaptations, distribution, and evolution. Three lectures, one four-hour laboratory weekly and occasional field trips.

#### **BIO-355 Selected Topics: Human Anatomy 3.0 cr.**

Winter. Prereq.: BIO 105, 350 and permission. A laboratory-only course consisting of selected dissections on a cadaver, including muscles of the extremities, neck, shoulder, and trunk. Two three-hour laboratories weekly. Discussion sessions arranged. Limited enrollment.

#### **BIO-356 Molecular Biology 4.0 cr.**

Fall. Prereq.: BIO 230. A detailed study of the mechanisms of spatial and temporal control of gene expression. Emphasis will be placed on recombinant DNA techniques.

#### **BIO-360 Microbiology 4.0 cr.**

Fall. Prereq.: BIO 230. Morphology and physiology of microorganisms, including viruses, bacteria, fungi, algae and protozoa, with emphasis on bacteria and on medically important microorganisms. Three lectures and one three-hour laboratory weekly.

#### **BIO-365.1 Immunology 4.0 cr.**

Spring. Prereq.: BIO 230. Study of immune responses at molecular, cellular, and organismal levels. Application of this knowledge to study autoimmunity, hypersensitivity, immunodeficiency, and manipulation of the immune system in the treatment of human diseases. Three lecture/discussions and one 3-hour laboratory weekly.

#### **BIO-371 Endocrinology 3.0 cr.**

Fall. Alt. years. Prereq.: BIO 222 or 230. Study of hormones and the mechanisms by which hormones regulate genetic and cellular function, and metabolism.

#### **BIO-372 Developmental Biology 4.0 cr.**

Fall. Prereq.: BIO 230. Study of the main principles of animal developmental biology on the molecular, cellular, and organismal level. Three lecture/discussions and one three-hour lab weekly.

#### **BIO-374 Animal Physiology 4.0 cr.**

Fall. Prereq.: BIO 220 and 230; PHY 231 or 271 recommended. Comparative study of temperature, respiration, circulation, energy metabolism, homeostasis, and neuromuscular function. Three lectures/discussion and one three-hour laboratory weekly.

#### **BIO-375 Plant Physiology 4.0 cr.**

Fall. Alt. years. BIO 220 and 230; PHY 231 or 271 recommended. Nutrition, gas exchange, water relations, transport, metabolism, growth and development with

special emphasis on environmental influences. Three lectures and one three-hour laboratory weekly.

#### **BIO-396 or 496 Biology Research 1.0 to 3.0 cr.**

Fall, winter, spring. Prereq.: permission. A laboratory or field research problem culminating in a paper written according to departmental guidelines. (INDEPENDENT WORK)

#### **BIO-397 or 497 Internship 1.0 to 6.0 cr.**

Fall, winter, spring. Prereq.: junior or senior standing and permission. Internships are designed to give students experience in the fields of their interest. A written summary of the internship and a seminar are presented to the department at the conclusion of the internship. NOTE: BIO 497 (but not 397) fulfills the general graduation requirement for independent work. See internship guidelines.

#### **BIO-398 Readings & Conference 1.0 to 2.0 cr.**

Fall, winter, spring. Prereq.: permission. Independent reading and weekly conference with a faculty supervisor. Appropriate for fields of special interest, but will not substitute for required courses.

#### **BIO-400 Biology Seminar 2.0 cr.**

Winter, spring. Prereq.: senior standing and completion of two courses in the upper-division biology core. A capstone seminar course focused on topics that integrate molecular, cellular, organismal, and population level processes; course topic varies. Readings, lectures, and discussions. May be repeated for credit with different topics. (INDEPENDENT WORK)

#### **BIO-494 Independent Study 1.0 to 3.0 cr.**

Fall, winter, spring. Prereq.: permission. Library research in biology. Critical review of literature pertaining to a problem or specialized topic in biology culminating in a paper written according to department guidelines. See independent study guidelines. (INDEPENDENT WORK)

#### **BIO-499 Senior Comprehensive Examination 0 cr.**

Prereq.: senior standing. A written comprehensive examination designed to measure the full range of students' understanding of biology.