Biology

Biology Office
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College of Biology and Agriculture Office of Academic Advisement
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Admission to Degree Program

The degree program in biology has open enrollment.

The Discipline

A degree for students who desire a broad approach to biology, the major provides solid preparation for graduate schools in most fields of biology as well as for a full range of professional schools.

Learning Outcomes

The biology major is designed to provide the following student learning outcomes:

1. Demonstrate a proficiency of knowledge in the following areas of biology: cell biology; molecular biology and genetics; organismal biology; and population, evolution, and ecological biology.
2. Demonstrate critical or analytical thinking skills by analyzing and interpreting experimental data.
3. Exhibit proficient writing skills by producing a portfolio, research paper, scientific journal article, and/or scientific poster.
4. Critically read scientific literature and evaluate the ability of an argument or evidence to support a conclusion.
5. Function as a collaborative team member by participating in student-mentored learning groups or research groups.

These skills will be valuable for those students desiring to enter a variety of graduate programs or professional schools.

Graduation Requirements

To receive a BYU bachelor's degree a student must complete, in addition to all requirements for a specific major, the following university requirements:

- The university core, consisting of requirements in general and religious education (See the University Core section of this catalog for details. For a complete listing of courses that meet university core requirements, see the current class schedule.)
- A minimum of 30 credit hours in residence
- A minimum of 120 credit hours
- A cumulative GPA of at least 2.0

Undergraduate Program and Degree

BS Biology

Students should see their college advisement center for help or information concerning the undergraduate programs.

BS Biology (58.5–61.5 hours*)

Major Requirements

1. Complete the following core requirements:
   Biol 101, 120, 220, 240, 241, 340, 350, 360, 420, 421.
2. Complete one course from the following:
   InBio 380.
   PAS 440.
   PDBio 362.
3. Complete one course from the following:
   Math 112, 119.
   Stat 221.
4. Complete one of the following options:
   Either Phscs 105, 106, 107, 108.
   Or Phscs 121, 123, 220.
5. Complete at least 13 hours from the following:
   Chem 105, 106, 107, 223, 285, 351, 352, 353, 481.
6. Complete at least 12 hours of elective courses. Electives may include upper-division courses, mentored experience, or a combination of the two.
   a. Upper-division courses:
      1. Electives must include 6 hours of approved upper-division courses from the college (any R or stand-alone lab courses are not acceptable). The remaining 6 hours may include other approved upper-division courses (chemistry courses must be 352 or above) and/or a mentored experience (Biol 399R, 489R, 494R, 499R).
      2. Students who are admitted to dental, optometry, podiatry, chiropractic, naturopathic, or pharmacy schools after their junior year can transfer credits from the first year of professional school back to BYU to fulfill the biology electives.

   b. Mentored experience:
      The mentored experience requires from three hours' minimum to six hours' maximum effort per week each semester for 1 hour of credit. Three options exist for obtaining mentored experience (BYU Study Abroad programs are unacceptable substitutes):
      1. Mentored research. Students must be accepted to work under a faculty member's direction. They will frequently associate with other researchers working under the mentor's direction. A written paper and oral presentation are required as fulfillment of the mentored experience. Student research often leads to participation in a publication and/or a presentation at a professional meeting.
      2. Mentored internship. Students may obtain credit for a previously approved academic internship program in which the appropriate credit hours are assigned for the experience (limit of 6 credit hours toward biology electives). Students may also plan a semester away into their schedule. By interning in the U.S. and being a full-time student through Independent Study, they may keep scholarships and financial aid without attending class or deferring.
      3. Senior thesis. The student may obtain credit for the production of a senior thesis, derived primarily from library study that extensively explores relevant questions determined by an approved faculty mentor. The senior thesis option consists of a combination of course work and credit for the senior thesis research. A prospectus for the senior thesis must be approved by the Biology Office prior to assigning the number of credit hours that apply to the thesis. The final thesis must be submitted and approved before credit will be accepted for the mentored experience.
7. Complete an exit interview.
8. Pass a national biology field examination.

Recommended Courses

The following courses are recommended for students interested in graduate and professional programs:

Chem 351, 352, 353, 481.
Math 119 or higher.
Phscs 105, 106, 107, 108

*Hours include courses that may fulfill university core requirements.

Biology Composite Teaching

See the Department of Integrative Biology for this degree program.

Preveterinary Medicine

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Students interested in applying to veterinary medicine schools should take the following courses as part of the biology major:

Biol 291R, 392R (2 hours).
Chem 351, 352, 353 (1 hour), 481.
Engl 316.
InBio 270.
Math 119 or higher.
MMBio 221, 222.
NDFS 330.
PDBio 484.
Stat 221.
TMA 150.

Biology Courses (Biol)

100. Principles of Biology. (3:3:1) F, W, Sp, Su Honors also.
Introductory course for general education students.

101. Freshman Biology Seminar. (0.5:1:0) F, W
Presentations of the various majors offered in the College of Biology and Agriculture.

120. Science of Biology. (2:2:1) F, W, Sp, Su Honors also.
General biology course designed for biological science majors, emphasizing the scientific method, cell theory, biochemical unity, the Central Dogma, bioenergetics, reproduction, and evolutionary theory.

150. Environmental Biology. (3:3:0) F, W
Conservation and management of natural resources concurrent with increasing socioeconomic and human population demands; factors such as soil, water, and air pollution, resources management, bioremediation, nutrient cycles, and global climate changes.

190R. College of Biology and Agriculture Student Council. (1:1:0 ea.) F, W, Sp, Su Prerequisite: application for student council position.
Active involvement on the student council for the College of Biology and Agriculture. Exploring and suggesting solutions to issues facing students in the college.

220. Biodiversity. (2:2:0) F, W, Sp Prerequisite: Biol 120.
Continuation of a general biology course designed for biological science majors. Diversity of life on earth: its origins, global distribution patterns, services and values to humankind, and the challenge of protecting it.

240. Molecular Biology. (3:3:1) F, W, Sp Prerequisite: Biol 120, Chem 105.
Fundamentals of protein and nucleic acid structure and their function in the context of the classical experiments that have informed our current models of biology at the molecular level.

241. Molecular and Cellular Biology Laboratory. (1:0:3) F, W, Sp Prerequisite: Biol 240 or concurrent enrollment.
Molecular and cellular biology techniques laboratory.

276. Genetics and Reproduction. (3:3:0) Independent Study only. Prerequisite: any biology course.
Principles of inheritance.

340. Genetics. (2:2:1) F, W, Sp ~~Su~~ Prerequisite: Biol 240.
Genetic mechanisms, their fundamental nature, interactions, and applications to human affairs. Genetics in quantitative terms. Extensive practice in problem solving.

350. Ecology. (3:3:0) F, W, Sp Prerequisite: Biol 220.
Distribution and abundance of organisms and their interactions with the physical and biotic components of the earth.

360. Cell Biology. (3:3:1) F, W, Su Prerequisite: Biol 240.
Fundamentals of cell structure and function with reference to analytical methods used by cell biologists. Practice in designing, executing, and interpreting relevant experiments.

399R. Academic Internship. (1–6:0:Arr. ea.) F, W, Sp, Su Prerequisite: mentor's consent.
Approved experiential learning.

420. Evolutionary Biology. (2:2:0) F, W, Sp Prerequisite: Biol 240, 340.
Intensive examination of evolution as the conceptual cornerstone of biology.

421. Evolutionary Biology Laboratory. (1:0:3) F, W, Sp Prerequisite: Biol 240, 340; Biol 420 or concurrent enrollment.
Methodology and evidence used in evolutionary biology: comparative anatomy, DNA and protein techniques, radiometric and non-radiometric dating, fossil data, etc.

489R. Senior Library Thesis. (1–6:0:Arr. ea.) F, W, Sp, Su Prerequisite: prospectus approval by Biology Office.
Mentored library study that extensively explores relevant questions determined by an approved faculty mentor.

490R. Special Problems. (1–6:0:Arr. ea.) F, W, Sp, Su Prerequisite: Biology Office consent.

494R. Mentored Research. (1–6:0:Arr. ea.) F, W, Sp, Su Prerequisite: mentor's consent.

499R. Senior Honors Thesis. (1–6:0:Arr. ea.) F, W, Sp, Su Prerequisite: mentor's consent.
Topic to be cleared with Honors Program and Biology Office.

500-Level Graduate Courses (available to advanced undergraduates)

503. Research Orientation. (1:1:0) F
Introduction to graduate school and research techniques.

Botany and Range Science

See Integrative Biology and Plant and Animal Sciences sections of this catalog.

Bulgarian

See Germanic and Slavic Languages.

Burmese

See Center for Language Studies.

Business

See Marriott School of Management.

Cakchiquel

See Center for Language Studies.

Cambodian

See Center for Language Studies.