

## BIOLOGICAL SCIENCE IN THE COLLEGE OF AGRICULTURE AND LIFE SCIENCES

<https://www.uvm.edu/biologicalscience>

The Biological Science program offers a Bachelor of Science degree in Biological Science administered through the College of Agriculture and Life Sciences (CALs) but drawing from the rich spectrum of courses and faculty found in CALs, the College of Arts and Sciences, the Rubenstein School of Environment and Natural Resources, and the Larner College of Medicine.

### CALS BIOLOGICAL SCIENCE MAJOR

Many of the most exciting developments with the potential to benefit society are in biological science. For example, consider how often the fields of biotechnology, medicine, ecology, and genetics are mentioned in the daily news. For students concerned about contemporary issues and who love the sciences, the Bachelor of Science program in Biological Science (BISC) offers the flexibility, rigor and comprehensiveness to prepare for a dynamic and challenging career. Veterinarian, marine biologist, physician, lab technician – these are among the several hundred careers in which CALs graduates are employed. Many use their degree as a professional stepping stone to medical, veterinary or graduate school.

BISC is the generic Bachelor of Science in Biological Science. Flexibility and quality are its biggest attractions. As a cross-college integrated major, BISC draws its expertise of faculty from several departments in the College of Agriculture and Life Sciences, the Department of Biology in the College of Arts and Science, and from other parts of the university, including the Larner College of Medicine. BISC students take two years of fundamental course work: mathematics, chemistry, introductory biology, genetics, ecology and evolution, and cell and molecular biology. During the junior and senior years, students study physics, statistics, advanced biology, and often do internships and undergraduate research working one-on-one with a professor in the student's area of interest. Students use their advanced electives to develop a rich expertise in biology or to concentrate in specialized areas such as genetics, plant biology, biochemistry, nutrition, and microbiology. Others expand their solid foundation by adding a second major or a minor in a complementary field selected from the offerings in CALs or CAS.

The wealth of faculty among the diverse biological sciences allows students to gain personal attention engaging with a professor in undergraduate research in the student's chosen field of interest. Students are encouraged to participate in the lab or field research of a UVM professor, chosen from the full range of life science disciplines at UVM. UVM has extensive teaching and research facilities, e.g., state-of-the-art laboratories and greenhouses, protected Natural Areas (from alpine tundra to Lake Champlain), Proctor Maple Research Center, Horticultural Farm, Morgan Horse Farm and Miller Research Center. Students find opportunities in biotechnology splicing genes and working on HIV; others examine how one gene may affect a cancer patient's sensitivity to chemotherapy drugs. One

student contributed to research on how drug-eluting stents affect the potential for blood clots. Another biological science student worked on a project studying how pH affects phosphorus level in streams; while another, in a biomedical engineering lab, helped design a way to simulate skiing injuries (the data to be used to manufacture a safer ski boot).

Internships, a path for students to get experience in the working world while still in college, are of growing importance on a graduate's resume. In the BISC major, a broad range of opportunities are offered to the students.

### MAJORS

#### BIOLOGICAL SCIENCE MAJOR

Biological Science B.S.

#### Courses

##### **BCOR 1400. Exploring Biology 1. 0 or 4 Credits.**

Exploring biology from cells to organisms. Topics include origins of life, ancestral organisms, uni- and multi- cellular energetics, evolution of respiration and metabolism, and the genetic code. Credit not awarded for both BCOR 1400 and BIOL 1400 or BCOR 1425. Catamount Core: N2.

##### **BCOR 1425. Accelerated Biology. 0-4 Credits.**

Selected topics from the full year of introductory biology, compressed into one semester. For students with demonstrated mastery of basic biology (e.g., AP credit). Permission required. Credit not awarded for both BCOR 1425 and BCOR 1400 or BIOL 1400. Pre/co-requisite: CHEM 1400, CHEM 1405, or CHEM 1410. Catamount Core: N2.

##### **BCOR 1450. Exploring Biology 2. 0 or 4 Credits.**

An evolutionary perspective to exploring biology. Topics include: patterns of inheritance, Darwinian evolution, evolution of biodiversity, ecology of organisms, human effects on biological systems. Credit not awarded for both BCOR 1450 and BIOL 1450. Catamount Core: N2.

##### **BCOR 1990. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

##### **BCOR 2100. Ecology and Evolution. 0 or 4 Credits.**

Ecosystem and community structure, population growth, species interactions and niche dynamics, population and chromosomal genetics, speciation in fossil records, ecology of animal behavior, applied ecology. Prerequisites: BCOR 1400, BIOL 1400, or BIOL 1000; BCOR 1450, BIOL 1450, BIOL 1005, or BCOR 1425; MATH 1212 or MATH 1234. Catamount Core: N2, SU.

##### **BCOR 2300. Genetics. 0 or 3 Credits.**

The basis of inheritance, covering topics from classical genetics to modern molecular studies. Analysis of genetic data emphasized, from prokaryotic, animal, and plant systems. Credit not awarded for both BCOR 2300 and ASCI 2160. Prerequisites: BCOR 1400, BIOL 1400, or BIOL 1000; BCOR 1450, BIOL 1450, BIOL 1005, or BCOR 1425; CHEM 1100, CHEM 1400, CHEM 1405, or CHEM 1410. Catamount Core: N1.

**BCOR 2500. Molecular & Cell Biology w/lab. 0 or 4 Credits.**

Explores the fundamental processes of life. Topics include cellular metabolism; structure and function of organelles; cell cycle; signal transduction; biology of cancer. CHEM 2580, BCOR 2300 recommended. Credit not awarded for both BCOR 2500 and BCOR 2505. Prerequisites: BCOR 1400, BIOL 1400, or BIOL 1000; BCOR 1450, BIOL 1450, BIOL 1005, or BCOR 1425; CHEM 1400, CHEM 1405, or CHEM 1410; CHEM 1450, CHEM 1455, or CHEM 1460. Catamount Core: N2.

**BCOR 2505. Molecular & Cell Biology. 3 Credits.**

Explores the fundamental processes of life. Topics include cellular metabolism; structure and function of organelles; cell cycle; signal transduction; biology of cancer. CHEM 2580, BCOR 2300 recommended. Credit not awarded for both BCOR 2505 and BCOR 2500. Prerequisites: BCOR 1400, BIOL 1400, or BIOL 1000; BCOR 1450, BIOL 1450, BIOL 1005, or BCOR 1425; CHEM 1400, CHEM 1405, or CHEM 1410; CHEM 1450, CHEM 1455, or CHEM 1460. Catamount Core: N1.

**BCOR 2990. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**BCOR 2995. Undergraduate Research. 1-18 Credits.**

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

**BCOR 3000. Biology in Practice. 1 Credit.**

Introduction to a broad array of biological disciplines through attending seminars in the life sciences. The course will introduce students to hypothesis testing and data analysis and interpretation of results, as well as scientific presentation through attending weekly seminars, reading related scientific literature, and participating in class discussions. Prerequisites: (BCOR 2300, BCOR 2100) or (BCOR 2300, BCOR 2500) or (BCOR 2100, BCOR 2500) or (BCOR 2300, NSCI 2105).

**BCOR 3990. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**BCOR 3991. Internship. 1-18 Credits.**

On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

**BCOR 3993. Independent Study. 1-18 Credits.**

A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

**BCOR 3995. Undergraduate Research. 1-18 Credits.**

Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

**BCOR 4990. Special Topics. 1-18 Credits.**

See Schedule of Courses for specific titles.

**BCOR 4994. Teaching Assistantship. 1-3 Credits.**

Undergraduate student service as a teaching assistant, usually in an introductory-level course in the discipline, for which credit is awarded. Offered at department discretion.