

# Bachelor of Science Biology

## INFORMATION

Biology is a diverse discipline, ranging from the basic biochemistry of living cells to the functioning of entire ecosystems. Many biological scientists work in research and development in such areas as: researching solutions to human disease; studying living organisms including viruses, bacteria, and other infectious agents; finding solutions to preserve and repair the natural environment; and other areas.

Biology majors learn the concepts and facts of modern biology and receive training in current laboratory skills. The biology program at Cleveland State University provides training in the fundamentals of all the major areas of biology, while at the same time allowing students some freedom to tailor an individual plan of study with a faculty advisor.

## CAREER OPPORTUNITIES

Graduates with bachelor's degrees in biology are employed in a great variety of jobs, such as entry-level technicians in hospitals and research centers, technical sales and service representatives, high school teachers of biology/science (licensure required), and environmental site assessment scientists.

Bachelor graduates also pursue advanced degrees to receive doctorates in medicine, dentistry, and veterinary science; or pursue master's and Ph.D. degrees in biology or a related science. Master's degree graduates assume positions of greater technical and supervisory responsibility in laboratories and industry and work in biology research. Doctoral (Ph.D.) graduates assume university faculty positions teaching and directing research, direct research in government labs, or direct research in high level positions in industry.

## PROGRAMS

### **BACHELOR OF SCIENCE (B.S.) IN BIOLOGY:**

**General Track:** Offers flexibility in choosing courses in the biology major.

**Pre-Professional Studies Track:** For pre-medical, pre-veterinary and pre-dental students. Includes designated courses in subject areas covered on aptitude exams that are required by most professional schools.

**Secondary Teacher Licensure Track:** Available for students interested in high school teaching. Contact the biology advisor for the science course requirements and the Education Student Service Center for the education course requirements.

### **BACHELOR OF SCIENCE (B.S.) IN BIOLOGY-MEDICAL**

**TECHNOLOGY** (with an affiliated school of medical technology):

For students interested in obtaining positions in clinical laboratories as medical technologists. See the medical technology major sheet for more information.

### **BACHELOR OF SCIENCE (B.S.) IN BIOLOGY/DOCTORATE OF**

**PODIATRIC MEDICINE:** Three years of biology classes are taken at Cleveland State University in preparation for admission to the Ohio College of Podiatric Medicine (OCPM) in the four-year Doctor of Podiatric Medicine (DPM) degree program. Admission to OCPM is competitive and is not guaranteed. With successful completion of the program, a student will receive a B.S. degree from Cleveland State University and a DPM from OCPM. For more information, see the Podiatric Medicine program sheet.

An Honors Program is also available for students in any track/program (except

the Secondary Teacher Licensure). To be eligible, a student must maintain a cumulative GPA of at least 3.2 in courses required for the B.S. in biology and a 3.0 GPA overall. This junior/senior year program requires eight total credit hours of honors research, honors seminar, and honors thesis and defense. A Biotechnology Certificate program is also offered for biology majors. This interdisciplinary program prepares students for positions in the biotechnology industry, working in the development of new products and quality control. A post-baccalaureate Biotechnology Certificate option is also available.

Engaged learning experiences (for all programs) include research experience with nationally recognized Cleveland State University faculty, who have obtained prestigious federal grants, and co-op and internship opportunities. Most courses are taught by doctoral faculty. A biology minor requires 16 credit hours of specified biology courses. Student organizations include the American Medical School Association/Cleveland State University Chapter; the Biology, Geology, Environmental Science Student Organization; and the Student Environmental Movement. Many courses are offered in the evenings. All students receive individual advising.

**For more information, contact:  
College of Science**

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Website:

<http://www.csuohio.edu/sciences/dept/biology/index.html>

# Bachelor of Science Biology

**Requirements of the College of Science:** A minimum of 128 credit hours is required for a Bachelor of Science (B.S.) degree, of which 42 semester credit hours must be earned in 300- and/or 400-level courses. Introduction to University Life (1 credit hour) is required for all newly admitted freshmen (not required for transfer students).

**General Education Requirements:** All degree-seeking students are required to meet general education requirements. Students are responsible for ensuring that courses chosen satisfy these requirements and are encouraged to consult with their academic advisor. A comprehensive description of the requirements is found at <http://www.csuohio.edu/academic/gened/>.

**Required Courses for the B.S. in Biology (General and Pre-Professional Tracks)** (credit hours in parentheses):  
*To qualify for graduation, all Biology majors must have a cumulative GPA of not less than 2.00 across all biology courses used to fulfill the major-field requirements.*

## Required Biology Core Courses (25 credit hours)

### EACH of the following courses:

- BIO 200/201 Introductory Biology I and Lab (4)
- BIO 202/203 Introductory Biology II and Lab (4)
- BIO 492 or 495 Seminar (1)
- BIO 499 Exit Evaluation (0)

### TWO of the following courses:

- BIO 300/301 Plant Biology and Lab (4)
- BIO 302/303 Animal Biology and Lab (4)
- BIO 304/305 Population Biology and Evolution and Lab (4)

### TWO of the following courses:

- BIO 306 Biochemistry and Molecular Biology (4)
- BIO 308/309 Cell Biology and Lab (4)
- BIO 310/311 Genetics and Recitation (4)

## Required Chemistry Courses (16 credit hours):

- CHM 261/266 General Chemistry I and Lab (5)
- CHM 262/267 (or 268) General Chemistry II and Lab (5)
- CHM 331/336 Organic Chemistry I and Lab (6)

## Required Physics Courses\* (8 credit hours):

- PHY 231 College Physics I — Biomedical Applications (4)
- PHY 232 College Physics II — Biomedical Applications (4)
- \*PHY 221/222 may be used as a substitute

## Required Mathematics or Statistics Course, ONE of the Following (4 credit hours):

- MTH 181 Calculus I (4)
- MTH 147 Statistical Concepts (4)
- ANT 305 Quantitative Anthropology (4)
- PSY 311 Behavioral Science Statistics (4)
- SOC 354 Quantitative Sociological Research (4)

## AND a minimum of 19 Credit Hours of Electives

- Biology courses numbered 300 to 311 and not used as biology core courses can be used as biology electives.
- Both BIO 390 and BIO 391 may be used once each as a biology elective course.
- Biology courses numbered 401 to 497 with three restrictions:
  1. Only one course numbered 401 to 497 that does not have a 300-level course as a prerequisite may be used as a biology elective
  2. A maximum of 8 credits of the following courses may be used as biology electives: BIO 496 and BIO 497
  3. BIO 495 and 492 do not count as electives the first time taken
- EVS 454/455 Conservation Biology and Lab, HSC 381 Pathology, HSC 475 Human Gross Anatomy, and HSC 476 Neuroscience Systems (students may not use both HSC 476 and BIO 426 as electives); CHE 366; MTH 493 Special Topics in Mathematics; PHY 415 Introduction to Biological Physics
- EVS 490 Internship in Environmental Science, EVS 493 and EVS 494 Special Topics in Environmental Science may be used as biology electives with permission of the biology adviser.
- Check with the biology adviser for other courses that may be used as biology electives.

## Pre-Professional Studies Track:

Requirements as listed above for B.S. in Biology, including BIO 306 and BIO 308/309.

## Suggested Biology Electives

- BIO 310/311 Genetics and Recitation (4)
- BIO 412/413 Elements of Immunology and Lab (4)
- BIO 416/417 Microbiology and Lab (5)
- BIO 418/419 Histology (4)
- BIO 424/425 Principles of Animal Physiology and Lab (4)
- BIO 428 Endocrinology (3)

## Additional Courses Required by Medical Schools

- CHM 332/337 (or 338) Organic Chemistry II and Lab (6)

## Suggested Additional Courses

- Economics - one course
- Psychology - one course

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