

Biology

Biology is the science that studies the processes fundamental to all forms of life. Biology strives to answer questions such as: How do biochemical processes control a cell's behavior? How do organisms grow and reproduce? How do pollutants threaten certain life forms? How can human life be sustained and lengthened by medical advances?

The biology major is designed to expose students to a broad base of biological knowledge, to provide depth of experience in advanced topics, and to develop competence in scientific disciplines that are supportive of the life sciences (mathematics, physics, and chemistry). The biology major is a stepping stone from which students may go into research, various health professions, teaching, business, or service in government or independent agencies.

On completing the biology major, students will be able to:

- explain major biological concepts at all levels within the discipline and discuss how these are connected with various areas of the biological and physical sciences.
- demonstrate problem solving, analytical, and communication skills that will provide fluency within and command of the discipline, and that will provide the foundation for lifelong learning and career development.
- value biology as an integral part of society and everyday life.

Pursuing Biology at Ohio State

High school students planning to major in biology are advised to acquire a strong background in math and science (biology, chemistry, and physics). Enriched, advanced, or honors courses, courses with an associated laboratory, and research experience are encouraged. Good written and oral communication skills are also important.

All Ohio State freshman applicants are considered within a competitive admission process for the Columbus campus. The primary criteria for admission are the completion of the applicant's high school college preparatory program, performance in that program as indicated by class rank and/or grade-point average, and performance on either the ACT or SAT. Upon admission to the university, students can declare a major in biology within the Arts and Sciences. Interested students should contact the undergraduate advisor for biology and an Undergraduate Student Academic Services (USAS) counselor.

Biology Requirements

The biology major consists of a minimum of 45 credit hours of biological sciences courses above the 300 level. Three of the courses must be laboratory courses or must include a laboratory

component. The course work for the biology major comprises three components:

1. **Core requirements**
Biology 401 and 402
Biology 320 or an equivalent research seminar
2. **Specialization options**
Education in the life sciences
Forensic biology
Pre-health professions
3. **Electives in the major**

All of these courses are chosen in consultation with a biology advisor to meet the individual students' interests and needs. A full description of the biology major is available from the Center for Life Sciences Education.

Not included in the biology major, but required by it, are courses that provide a basic understanding of the sciences upon which biological sciences are built. All biology majors complete mathematics through integral calculus, one year of general chemistry, two quarters of organic chemistry and laboratory, one year of general physics, and two quarters of general biology.

These basic math and science requirements of the biology major are nearly identical with the requirements of pre-medicine, pre-optometry, pre-dentistry, and pre-veterinary medicine. Biology majors are among the most broadly educated in the sciences.

Co-Curricular Opportunities

Undergraduate research

Because no other learning experience can match the value of a hands-on research project, students in the biology major are encouraged to engage in substantial undergraduate research opportunities. Such opportunities allow students to develop their scientific curiosity and to discover whether a career in research is a good fit. Biology students may choose to work with a faculty member in the biological sciences or they may work in labs in other colleges. Information about choosing a laboratory for undergraduate research is available at the Office for Undergraduate Research or at biology.osu.edu.

Student organizations

Five departmental undergraduate student clubs and an honorary student organization enhance learning opportunities and the quality of the undergraduate experience for students in the biological sciences. These clubs provide opportunities for undergraduate students to interact with faculty, to discuss careers and research areas with scientists from the Ohio State campus and beyond, and to participate in service activities.

For more information, check these web sites:

Biology: biology.osu.edu

College of Biological Sciences: biosci.osu.edu

Ohio State: osu.edu

Admissions: undergrad.osu.edu

Multicultural Center: multiculturalcenter.osu.edu

First Year Experience Program: fye.osu.edu

Curriculum Sample

This is a sample list of classes a student will take to pursue a degree Biology with a specialization in pre-health professions. Because university students need more than a narrow education in biology, they also will take classes to complete the General Education Curriculum (GEC). The GEC will allow the students to develop fundamental skills essential to collegiate success and success in a career. Course work options satisfying the GEC often come from a variety of academic areas of study, allowing students to tailor their GEC toward their interests. Note: This sample represents one of many possible paths to a degree in Biology. Consult the web site of the Center for Life Sciences Education, biology.osu.edu, for further information about the Biology curriculum.

Freshman Year:

Biological Sciences survey	1
General Biology	10
General Chemistry	15
Math (pre-calculus and calculus)	5–15
GEC (first writing course)	5
GEC (foreign language)	10
Freshman Seminar	1
Total hours	47–57

Sophomore Year:

Integrated Biology	10
Biological Inquiry	3
Organic Chemistry	8
Organic Chemistry Laboratory	6
General Genetics	5
GEC (second writing course)	5
GEC (foreign language)	5
GEC (arts and humanities)	5
GEC (social sciences)	5
Total hours	52

Junior Year:

Evolution	5
Animal Form and Function	4
Basic and Practical Microbiology	5
Cell Biology	3
General Physics	15
GEC (history)	5
GEC (social science)	5
GEC (additional breadth)	5
Electives	2
Total hours	49

Senior Year:

Major Elective (Introductory Anatomy)	6
Major Elective (Introduction to Biological Chemistry)	5
Major Elective (Vertebrate Histology)	5
GEC (history)	5
GEC (arts and humanities)	5
GEC (social science)	5
Undergraduate Research in Biology	5–15
Total hours	35–46

Stone Laboratory

Biology students may take courses at Stone Laboratory, the university's "Island Campus." Located on Gibraltar Island in Put-in-Bay on Lake Erie, this freshwater biological field station and research laboratory offers introductory and upper-level courses suitable for undergraduate students in biological sciences.

Honors & Scholars Programs

The Honors Program in the Colleges of the Arts and Sciences provides high-ability students opportunities to pursue challenging academic programs. Honors students in the biological sciences are encouraged to meet with their advisors on a regular basis and to construct an enhanced curriculum that includes honors courses and upper-division courses to meet general requirements, rigorous sequences, honors seminars, and a strong major, including a significant research experience.

Scholars programs feature residential communities for students who share academic interests and career goals. There are two Scholars programs of interest to biology majors: the Biological Sciences Scholars Program, which emphasizes research, individualized advising, and significant lab and field experience; and the Health Sciences Scholars Program, which prepares students for careers in health sciences and health care.

Career Prospects in Biology

Biology students often choose careers as research scientists or college professors. For these careers, students must first obtain a PhD degree. Most PhD students, as part of their training, serve as research and teaching assistants and thereby earn a large part of their living and educational expenses while they are in graduate school. In the private sector, a master's degree may be sufficient for a research or product-development position. Some biology majors, particularly those with research experience, find research assistant positions directly after obtaining their bachelor's degree.

Many biology students go on to careers in medicine or some other health profession. While a major in the biological sciences is not a requirement for medical school (or other professional schools in the health sciences), it has many advantages, with its exposure to the basic principles of life's processes and the theoretical underpinnings of sophisticated medical procedures.

An undergraduate major in the biological sciences does not limit one's options to careers in medicine or biological research. It is excellent preparation for a career in education at the level of K-12. Some students move into other science careers such as business (e.g., pharmaceutical sales), or they obtain jobs in nature centers, parks and recreation, or government. Each year, many biology students choose to use their science background and the training they have received in analytical thinking and communication in careers that best suit their talents and interests, for example in business law, or journalism,

Salaries are commensurate with level of education and prior job experiences. Salaries in general are dependent upon a variety of economic factors and change with market trends.

Revised November 2009. For the most up-to-date information on the biology program, please visit biology.osu.edu.

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