

# Biology

**B**iology is the science that studies the processes fundamental to all forms of life. Biology strives to answer such questions as: What is life and when does it begin? How do organisms grow and reproduce? How and why do pollutants threaten certain life forms? And how can human life be sustained and lengthened by medical advances?

The biology major is designed to ensure exposure 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 one may go into research, various health professions, teaching, business, or service in government or independent agencies.

## 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 College of Biological 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 nine biological sciences courses above the introductory level. These courses are normally College of Biological Sciences courses, which also qualify as major courses in the department in which they are offered. Three of the courses must be laboratory courses. The biology major course work must be distributed over three areas:

- A "core" consisting of five or more approved courses covering the molecular, genetic, cellular, organismal, and evolution/ecology areas of biology
- A specialty area of three or more additional courses concentrated in a biological science department or single field of biology
- Research and/or other course(s) in biology to complete the major

All of these courses are chosen in consultation with a biology advisor to meet the individual student's interests and needs. A full description of the biology major is available from the College of Biological Sciences.

Not included in the biology major, but required by it, are courses that yield a basic understanding of the sciences upon which biological sciences are built. All biology majors complete math through Calculus II, 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

No other learning experience can match the value of a "hands-on" research project. Students in the College of Biological Sciences are encouraged to engage in meaningful 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 a faculty member in the College of Biological Sciences with whom to work, or they may work in labs in other colleges, including the College of Medicine and Public Health. Information about choosing an undergraduate research laboratory is available on the college web page at [www.biosci.ohio-state.edu/undergrad/undergrad-research.php](http://www.biosci.ohio-state.edu/undergrad/undergrad-research.php).

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

Biology students may take courses at Ohio State University's "Island Campus," Stone Laboratory. Located on Gibraltar Island in Put-in-Bay harbor 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 College of Biological Sciences are encouraged to meet with their advisor on a regular basis and to construct an enhanced curriculum that includes

**For more information, check these web sites:**

**Biology:** [biology.osu.edu/biology-major](http://biology.osu.edu/biology-major)

**College of Biological Sciences:** [www.biosci.ohio-state.edu](http://www.biosci.ohio-state.edu)

**Ohio State:** [www.osu.edu](http://www.osu.edu)

**Admissions:** [undergrad.osu.edu](http://undergrad.osu.edu)

**Multicultural Center:** [multiculturalcenter.osu.edu](http://multiculturalcenter.osu.edu)

**First Year Experience Program:** [fye.osu.edu](http://fye.osu.edu)

## Curriculum Sample

This is a sample list of classes a student will take to pursue a Biology major with a molecular genetics specialty. Since university students need more than specific education in a narrow field, they also will take classes to complete the General Education Curriculum (GEC). The GEC will allow students to develop the fundamental skills essential to collegiate success across major programs. 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 college web site, [www.biosci.ohio-state.edu](http://www.biosci.ohio-state.edu), for further information about the Biology curriculum.

### Freshman Year:

Biological Sciences Survey	1
General Biology	5
General Chemistry	15
Math (pre-calculus and calculus)	15
GEC (first writing course)	5
GEC (foreign language)	10
Freshman Seminar	1
<b>Total hours</b>	<b>52</b>

### Sophomore Year:

General Biology	5
Microbiology (core)	5
Organic Chemistry	12
GEC (foreign language)	10
GEC (arts and humanities)	5
GEC (social sciences)	5
GEC (second writing)	5
<b>Total hours</b>	<b>47</b>

### Junior Year:

Biochemistry (core)	5
Genetics (core)	5
Evolution/Ecology (core)	5
Organismal Biology (core)	5
Physics	15
GEC (history)	10
Electives	4
<b>Total hours</b>	<b>49</b>

### Senior Year:

Genes and Development	3
Eukaryotic Cell and Developmental Biology Laboratory	5
The Genetical Basis of Evolution	5
GEC (arts and humanities)	10
GEC (social sciences)	10
Electives	5
Other biology courses and research	7
<b>Total hours</b>	<b>45</b>

honors courses, upper-division courses to meet general requirements, rigorous sequences, honors seminars, and a strong major, including a significant research experience.

The Ohio State Scholars Programs feature residential communities for students who share academic interests and career goals. Two of the Scholars programs of interest to biology majors are the Biological Sciences and Health Sciences Scholars Programs. The Biological Sciences Scholars Program emphasizes research, with individualized advising and significant lab and field experience. The Health Sciences Scholars Program is focused on preparing 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 Ph.D. degree. Most Ph.D. 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 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. Some students move into other science careers such as business (e.g. pharmaceutical sales), teaching, or jobs in nature centers or government. Each year, many biology students choose to use their science background and the training they have received in analytical thinking in careers that best suit their talents and interests, for example in business or law.

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.

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## Contact information:

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