



Jones Hall

Biological Sciences

As we enter the 21st century, we face numerous global challenges, the solutions to which depend upon an understanding of the biological and ecological sciences. We struggle with issues of overpopulation; hunger; diminishing natural resources; declining biodiversity and endangered species; effects of pesticides, air and water pollution, and disease. Resolution of these problems will require the collaborative efforts of biologists, environmentalists, politicians, and informed citizens.

The Department of Biological Sciences at Youngstown State University is focused to provide the basic knowledge, understanding, and skills needed to meet the pressing challenges that threaten our health and environment and, ultimately, the quality of life.

Employment Opportunities

A career in biology covers a variety of fields requiring relatively broad training. As tomorrow's biologist, you will deal with pollution, population increase, treatment and control of plant and animal disease, and environmental problems through teaching and research.

The explosion of advancements in microbiology over the last 30 years has created enormous opportunities for life scientists in the area of biotechnology. Presently, biotechnology comprises a large segment of the economy, from agribusiness to pharmaceuticals to developments in materials science.

A broad range of career opportunities also exists in agriculture, animal husbandry, ecology, forestry, wildlife management, genetics, medical science, physical therapy, and veterinary medicine. Environmental areas relating to ecology and the management of growing resources are expanding fields. Zoologists are employed in government, conservation organizations, and museums.

With a background in biology, you might pursue one of the following careers, some of which require a graduate degree or other professional training:

- Agricultural research service
- Animal technician
- Biochemical pharmacology

- Biologist
- Biochemist
- Bioengineering
- Botanist
- Dentist
- Doctor of Medicine (M.D.)
- Doctor of Osteopathic Medicine (D.O.)
- Entomologist
- Fish/wildlife service
- Forensic science
- Forest ranger
- Forester
- Game warden
- Government regulatory agencies
- Health care consultant
- Horticulturist
- Immunologist
- Lab technician
- Landscape architect
- Medical researcher
- Medical secretary
- Medical transcriptionist
- Microbiologist
- Molecular biology industries
- Occupational therapist
- Oceanography
- Optometrist
- Pharmaceutical and health care industries
- Pharmacist
- Pharmacologist
- Physical therapist
- Physician assistant
- Physician/surgeon
- Patent law
- Professor
- Research scientist
- Teacher
- Veterinarian
- Zoologist

The future will see a great expansion of the scientific and engineering workforce, especially in the life sciences. Projections indicate that the proportion of undergraduates receiving bachelor's degrees in science and engineering will decrease over the next five decades. The decrease in worker supply, coupled with an increase in need for these skills, will create heavy demand at all levels of society for people with scientific skills and education. They will command excellent salaries and career-advancement potential. Current starting salaries (\$25,000 to \$35,000 for bachelor's degree, \$30,000 to \$50,000 for master's) will increase substantially in the next decade to attract the brightest people to the job market.

Degree Options

The Department of Biological Sciences at Youngstown State University offers the Bachelor of Science (B.S.) degree for undergraduates and advanced training for graduate students leading to the Master of Science (M.S.) degree.

The Bachelor of Science (B.S.) degree program is designed to prepare students for entry into one of the many biological sciences related careers and/or prepare students planning to continue study toward a professional or postgraduate degree. Extensive preparation is required in biology, physics, organic chemistry, introductory statistics, and calculus. The majority of B.S. degree students in biological sciences easily minor in chemistry.

The pre-forestry and related science program allows you to attend YSU for two years and then complete undergraduate professional courses at any of the forestry schools in the U.S. The pre-forestry program is tailored to the requirements of the chosen school of forestry, so you should discuss the program and classes with a YSU pre-forestry advisor.

Faculty

The fifteen full-time faculty in the Department of Biological Sciences are dedicated to providing a quality educational program at the undergraduate level. The department is distinctive and notable in its ability to provide a broad-based curriculum for majors and non-majors and to prepare and train students in the current and expanding technologies of the biological sciences.

Professors within the Department of Biological Sciences provide a wide range of specializations, including: terrestrial and aquatic ecology, physiology, anatomy, microbiology, genetics, biotechnology, molecular and cell biology, immunology, neurobiology and pharmacology.

Numerous opportunities exist for qualified and interested students to participate in faculty research, enabling them to get hands-on experience in their area of interest. Research interests of the faculty include: genetic control mechanisms in fungi, immune system function, insect ecology and behavior, the study of wetland habitat community structure, regulation and activity of the actin cytoskeleton, analysis of neuronal function, and the role of diet in pain management.

YSU maintains a faculty-student ratio of 1:19, among the lowest of state-affiliated universities in Ohio.

Facilities

The Department of Biological Sciences is located in Ward Beecher Hall, which houses lecture rooms, instructional and research labs, a large herbarium, a greenhouse, and cell culture facilities. Modern classroom and research facilities in Cushwa Hall facilitate the study of microbiology and animal physiology.

The department also has access to the University's 118-acre Trumbull Arboretum, and McGuffey Farm, where individual and group field studies are carried out.

Many types of sophisticated instruments may help you in your studies, including computer-assisted data acquisition and analysis systems, microspectrometers with digital readout and a fluorescent antibody unit, a scintillation spectrometer, and DNA sequencer. Also available are high-pressure liquid chromatography and gas chromatographic equipment, PCR instruments, mass spectrometer, high-speed refrigerated centrifuges, ultraviolet densitometers, ultraviolet optical units, and other highly technical instrumentation. A rapidly growing collection of library holdings in both basic and advanced work is available at Maag Library.

Outside the Classroom

If you are a qualified student, you have opportunities to serve as a laboratory assistant for faculty members. As a research and instructional assistant, you will gain valuable insights into the field as you supplement your income. You may also become involved in individual and group research with faculty members. Some research topics include:

- mechanisms of disease
- animal ecology
- physiology and anatomy
- cellular physiology
- neurobiology
- cytogenetics

(see following page)



To obtain the Undergraduate Admissions and Financial Aid Application and/or a copy of the current Undergraduate Bulletin, please contact the Office of Admissions at:

Telephone: (877) 468-6978 330-941-2000 TDD: 330-941-1564 Fax: 330-941-3674 E-mail: enroll@ysu.edu

The Office of Admissions is open Monday and Thursday, 8:00 a.m. to 6:00 p.m., and Tuesday, Wednesday, and Friday, 8 a.m. to 5 p.m. The Office is also open every other Saturday from 9 a.m. to noon, except on holiday weekends and during term breaks

- taxonomy and systematics
- environmental assessments
- immunology
- molecular biology and genetics
- behavioral pharmacology
- wildlife biology

Curriculum Overview

For the Bachelor of Science degree in biological science:

Required courses

General Biology: Molecules and Cells
 General Biology: Organisms and Ecology
 Capstone course

Core courses (one course must be taken from two of the following groups)

Group A—either Cell Biology: Fine Structure **or** Genetics
 Group B—Human Physiology
 Group C—either Plant Diversity **or** Animal Diversity

Sample electives

Microbiology
 Clinical Immunology
 Mammalian Anatomy
 Ornithology
 Aquatic Biology
 Entomology
 Field Botany
 Evolutionary Ecology
 Vertebrate Histology
 Field Ecology
 Developmental Biology

Additional required coursework in the sciences

General Chemistry I and II
 Organic Chemistry I and II
 Biochemistry
 Fundamentals of Physics I and II and Labs
 Applied Calculus I **or** Calculus I
 Statistics

For the Bachelor of Arts degree:

Required courses

General Biology: Molecules and Cells
 General Biology: Organisms and Ecology
 Capstone course

Core courses (one course must be taken from two of the following groups)

Group A—either Cell Biology: Fine Structure **or** Genetics
 Group B—Human Physiology
 Group C—either Animal Diversity **or** Plant Diversity

Sample electives

Microbiology
 Clinical Immunology
 Mammalian Anatomy
 Ornithology
 Aquatic Biology
 Entomology
 Field Botany
 Evolutionary Ecology
 Vertebrate Histology
 Field Ecology
 Developmental Biology

Additional required coursework in the sciences

General Chemistry I and II

For more information about this program, go to

<http://www.as.ysu.edu/~biology/>



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