

BIOLOGICAL SCIENCES



COLLEGE OF ARTS AND SCIENCES

Biology is a diverse and vigorous science, covering all aspects of life from the smallest part of a single cell to the global biosphere. Our faculty engage in research ranging from neurological systems to aquatic ecology. The Department of Biological Sciences provides undergraduate majors and graduate students programs that meet the educational and technological demands of many professions.

DEGREE PROGRAMS

B.A. BIOLOGY

The Bachelor of Arts in biology is designed for the student who is interested in biological sciences, but also wants a degree with a strong liberal arts component. This program provides a basic background in biology while offering the opportunity to take a wider range of classes. Graduates with this degree can enter directly into the workforce or pursue graduate/professional studies.

B.S. BIOLOGY

Within the Bachelor of Science in biology degree, students select from one of three concentrations: organismal biology, molecular and cellular biology, or pre-medicine/pre-osteopathy/pre-dentistry. For each, the focus is different, but the requirements are designed to meet the needs for immediate employment or further education. Graduates of this program are prepared for continued studies in schools of medicine, dentistry, pharmacy or other types of professional healthcare.

B.S. ZOOLOGY

The Bachelor of Science in zoology prepares students for work in all fields of zoology and is designed for those interested in veterinary medicine, work in zoological parks or employment with federal, state and local agencies.

B.S. BOTANY

With a Bachelor of Science in botany, students may choose to further their education with a graduate program or seek employment with federal, state and local agencies. Employment is possible in fields related to the scientific and economic importance of plants, including research, agriculture and environmental consulting.

B.S. ENVIRONMENTAL AND CONSERVATION BIOLOGY

The Bachelor of Science in environmental and conservation biology major is designed for students interested in a career in environmental sciences. This degree provides a depth of educational experience in biology, as well as in the supporting fields of geology, geography, chemistry and mathematics. Students select one of two concentrations: conservation biology or environmental policy and management.

The conservation biology concentration is designed for students who plan to enter careers in government, private research agencies or universities. Students who select this program gain a strong background in applied ecology, restoration ecology and habitat management strategies used to sustain biological diversity.

The environmental policy and management concentration prepares students for a career at government agencies, and nonprofit or for-profit companies. Students in this program are able to address environmental issues by learning about the development and implementation of habitat management methods and public policies that promote the sustainable use of natural resources.

B.S. MEDICAL TECHNOLOGY

Medical technologists are trained to perform complex chemical, microscopic and microbiological procedures. Students majoring in medical technology combine three years (97 semester hours) of study at Kent State with 12 months of professional training at an approved hospital. Most medical technologists find employment in hospital laboratories, independent clinical laboratories or public health agencies.

B.S. BIOTECHNOLOGY

The Bachelor of Science in biotechnology is a joint program between chemistry and biological sciences. Biotechnologists are trained to use biological systems to make or modify products or processes for specific use. Graduates can expect to find employment in research and development, bioinformatics, quality control and assurance, and manufacturing and production.

ADDITIONAL COURSEWORK

Because of biology's analytical nature, biological science students must also gain basic proficiency in chemistry and mathematics. In addition, all students pursuing a bachelor's degree at Kent State complete a series of Kent Core requirements. All majors in the College of Arts and Sciences take courses in the humanities, fine arts and social science. Kent State stresses the ability to write well as a fundamental requirement for most professions and requires that all students complete a course in their chosen major where writing skills are emphasized.

CAREER OPPORTUNITIES

The field of biology is today's fastest growing area of the biosciences. It is a diverse science, covering all aspects of life from the smallest part of a single cell to the global biosphere. At Kent State, we invite you to join our faculty in doing research at all these levels. Biology graduates find employment with colleges and universities, medical schools and hospitals, research organizations, federal or state agencies, museums or zoos, etc. Biologists also obtain jobs in manufacturing, research and sales in the pharmaceutical industry, or with biotechnology companies and other industries. The federal government is a major employer of biologists (for example, the Environmental Protection Agency, Department of Interior and the Food and Drug Administration). Graduates with a B.S. in biology with additional coursework and training may also find careers in areas such as environmental policy and science writing.

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SAMPLE CURRICULUM Bachelor of Science in Biology

Fall Semester Year 1	Fall Semester Year 2	Fall Semester Year 3	Fall Semester Year 4
Biological Diversity (4)	Basic Organic Chemistry (4)	Biology, Chemistry or Physics Elective (3)	Organic Evolution (3)
General Chemistry I (4)	Organic Chemistry Lab (1)	Biology, Chemistry or Physics Elective (3)	Biology, Chemistry or Physics Elective (4)
General Chemistry Lab I (1)	Organismal Core Course (4)	Biology, Chemistry or Physics Elective (3)	Biology, Chemistry or Physics Elective (3)
Kent Core (English I) (3)	Kent Core (English II) (3)	Basic Prob. and Statistics or Analytical Geo and Cal III (3-5)	Writing in Biology (1)
Kent Core (3)	Kent Core (3)	Elem. Foreign Language (4)	Kent Core (3)
First-Year Experience (1)			
Spring Semester Year 1	Spring Semester Year 2	Spring Semester Year 3	Spring Semester Year 4
Biological Foundations (4)	Elements of Genetics (3)	Organismal Core Course (4)	Biology, Chemistry or Physics Elective (3)
General Chemistry II (4)		Biology, Chemistry or Physics Elective (3)	General Electives (Upper Division) (3)
General Chemistry Lab II (1)	*Analytic Geometry & Calc I (5)	Biology, Chemistry or Physics Elective (4)	General Electives (Upper Division) (3)
Kent Core (3)	Biology, Chemistry or Physics Elective (4)	Elem. Foreign Language II (4)	General Electives (Upper Division) (3)
Kent Core (3)	Kent Core (3)		General Electives (Upper Division) (3)

*Differences in placement in math courses may require additional coursework in math prior to the spring semester of the second year of enrollment.

** Other concentrations within the B.S. biology degree require different numbers of concentration core courses and biology electives.

UNDERGRADUATE RESEARCH OPPORTUNITIES

Students may receive academic credit for research and hands-on experience by registering for Individual Investigation and/or Internship.

INDIVIDUAL INVESTIGATION Undergraduate students are encouraged to enroll in individual investigations with faculty and experience aspects of research in the laboratory or in the field. All faculty in the Department of Biological Sciences have specific research programs and expertise that represents a broad spectrum of specializations. Specific areas of strength are in neuro-biology, physiology, cell and molecular biology, micro-biology, ecology and evolutionary biology.

INTERNSHIPS

Internships are an opportunity to gain practical career experience at an off-campus site. Students have taken internships in veterinary clinics, hospitals, environmental consulting firms, zoos and national parks.

SPECIAL FACILITIES

CELL BIOLOGY TEACHING AND RESEARCH FACILITY

The Biological Sciences Department houses equipment available for microscopy (confocal and fluorescence), cell culture and molecular biology (including Real Time PCR, Microarray analysis and DNA sequencing). The facilities are used by our undergraduates and graduates for classwork and research.

THE UNIVERSITY HERBARIUM

Containing 50,000 plant specimens, the University Herbarium is one of Ohio's major scientific museums. The collection is unparalleled in its specialization: contemporary records of Ohio Plants.

GREENHOUSE

The Herrick Conservatory maintains more than 1,400 species of plants from around the world and supports research on Lobelia, drought tolerant grain crops and native Ohio trees. The conservatory also offers display areas designed and installed by Kent State biology students including a small pond with fish, turtles and frogs.

THE ART AND MARGARET HERRICK MEMORIAL AQUATIC ECOLOGY RESEARCH FACILITY

The Aquatic Ecology Research Facility includes 10 independently flooded wetland basins. The wetlands are used to conduct population and community-level experiments under natural environmental conditions. The facility is one of the very few of these replicated experimental wetlands in the country.

3-D IMMERSIVE DEVELOPMENT FACILITY AND CLASSROOM

Kent State science departments have developed a strong initiative in 3-D and 4-D visualization, especially of biological materials. We have established a stereoscopic immersive classroom for the display of 3-D and 4-D data

sets. The facility is unique in the state of Ohio and forms both a research and educational tool for the multiple scientific disciplines.

Department of Biological Sciences

256 Cunningham Hall
PHONE: 330-672-3613
EMAIL: kentbiology@kent.edu
www.kent.edu/biology

Admissions Office

Kent State University
P.O. Box 5190
Kent, OH 44242-0001
330-672-2444
1-800-988-KENT
www.kent.edu/admissions

For information on all of Kent State's degrees and majors, go online to www.kent.edu/gps