

BIOLOGY



Interested in the science that makes the world and all its organisms work? Millersville University's biology programs provide in-depth training in the principles and methodologies of biology within the framework of a broad liberal arts education.

DEGREES/CONCENTRATIONS

BACHELOR OF SCIENCE (B.S.) IN BIOLOGY – Builds a strong background for admission to graduate or professional school, or for employment in the field upon graduation. Tailor your own program by selecting a number of courses in a specific area of biology or choose from the 10 options in biology sub-disciplines below:

- **Animal Behavior** – Provides training in the biological mechanisms and evolutionary functions of behavior in preparation for a career in applied animal behavior or graduate study.
- **Botany** – Concentrates on the study of plants while obtaining a broad background in biology. This option prepares students for professions in horticulture or plant sciences and advanced graduate study in botany.
- **Environmental Biology** – Designed to prepare students for a career in managing and conserving natural resources and ecosystems. Students gain experience for jobs in government agencies, industry and nonprofit organizations and for graduate school dealing with issues such as pollution remediation, wildlife ecology, land preservation and wetland restoration.
- **Marine Biology** – Provides broad training in marine biology and prepares students for marine related careers by emphasizing field experiences through courses offered at marine field stations such as the Chincoteague Bay Field Station at Wallops Island, Virginia.
- **Medical Technology (Clinical/Medical Laboratory Science)** – After completing three years of the undergraduate program, students are eligible to apply to an accredited hospital-based medical technology program for one year of clinical laboratory experience. Graduates receive a bachelor's degree and are eligible to sit for the national certification examination.
- **Molecular Biology/Biotechnology** – Concentration in genetics and cell and molecular biology. Students are trained in a variety of laboratory methods and gain the theoretical understanding and technical expertise needed to be competitive in industry and graduate school.
- **Nuclear Medicine Technology** – Students complete three years of study at Millersville and then apply to an accredited hospital-based program for one year of clinical training. Upon completion, students are prepared to take a national examination which, if passed, grants board certification in nuclear medicine technology.

- **Respiratory Therapy** – Consists of three years study at Millersville followed by a 16-month clinical training at UPMC Lititz. At completion, students are awarded a B.S. in biology, respiratorytherapy option and are eligible to sit for the entry-level national certification examination, and when passed, the advanced national certification examination.
- **Pre-Medical Professions** – Designed to prepare students interested in attending post-baccalaureate medical, dental, veterinary, pharmacy and physician assistant programs.
- **Pre-Optometry** – 3/4 B.S./O.D. – Students complete the first three years of their undergraduate education at Millersville. If admitted to the Pennsylvania College of Optometry (PCO), they are awarded a bachelor's degree in biology after the first year. After successful completion of PCO's four-year program, students receive a Doctor of Optometry degree from PCO.
- **Pre-Podiatry** – 3/4 B.S./D.P.M. – A cooperative program between Millersville and the Temple University School of Podiatric Medicine allows students to transfer to the professional school after satisfactorily completing three years at MU. After one year, a B.S. in biology is awarded, and after four years of successful study at the podiatric school, the student earns a Doctor of Podiatric Medicine degree from Temple University.

BACHELOR OF SCIENCE (B.S.) IN ALLIED HEALTH TECHNOLOGY

The Biology Department offers several programs in which the coursework is more focused on human biology and there is a clinical component. These include a 3+2 program that leads to the master's degree in athletic training and a 4-year program in sports medicine that prepares students for graduate and professional studies.

MINOR: Biology and Molecular Biology/Biotechnology

Become a Biology Teacher

BACHELOR OF SCIENCE IN SECONDARY EDUCATION (B.S.E.) – CERTIFICATION IN BIOLOGY – Combine your interests in biology and teaching with this four-year program, which offers broad training in the physical and biological sciences and extensive coursework in professional education.



FACULTY

The faculty of Millersville's Department of Biology has earned doctorates from some of the nation's finest universities and are respected scholars in their areas of specialization. Biology majors benefit from the favorable student-faculty teaching ratio and from personal interaction with professors devoted to excellence in both teaching and learning.

STUDENT-FACULTY RESEARCH

Students are encouraged to participate in student-faculty research projects. As an undergraduate biology student at Millersville, you have unparalleled research opportunities to work closely with faculty and use well-equipped laboratories devoted to molecular and cell biology, endocrinology, neurobiology, microbiology, physiology, ecology, animal behavior and marine biology.

ABOUT OUR GRADUATES

Our graduates are prepared to enter various fields within biology, including ecology, allied health services, marine biology, molecular biology, botany and teaching at the secondary level. Furthermore, our graduates are especially well prepared to pursue advanced study at the master's degree or Ph.D. levels, or to enter medical, dental, veterinary or other professional schools. Alumni have gone on to graduate study at a variety of institutions including Yale, Harvard, Johns Hopkins, University of Pennsylvania, University of Colorado, University of Delaware and Cornell.

FACILITIES

Biological Preserve – An on-campus, 15-acre woodland with trails and streams situated along the Conestoga River just a few minutes' walk from class offering students and faculty the opportunity to study the biodiversity and ecology of woodland and riparian ecosystems.

Molecular Biology and Genetics Laboratories and Equipment Rooms – These labs and equipment rooms offer a variety of equipment for students to acquire skills in laboratory techniques widely used in the fields of genetics and molecular biology. Computers and software are available for DNA sequence analysis, evaluating potential primers and probes and accessing genomic databases. An automated DNA analyzer and sequencer is used in the classroom and for student research.

Cell Culture Facility – Provides sterile hoods, inverted phase microscopes, carbon dioxide incubators, autoclaves and cryogenic preservation equipment needed for the maintenance and storage of cultured animal and plant cells and tissues.

Microscopy Facilities – The microscopy facilities include a scanning electron microscope as well as fluorescent compound, stereo and inverted microscopes. All of these have digital imaging technology for generating high-resolution images of microscopic and embryonic structures.

Plant Systematics Facilities – Consist of a modern 24' x 36' herbarium, botanical library, a state-of-the-art computing and graphics facility, research laboratory, and curator's office. The herbarium collection consists of over 15,000 preserved specimens, some dating back to the mid-1800s. Learn more at <http://herbarium.millersville.edu>.

Research Pond – A large, fresh water research pond on campus is used for teaching and is available for student research projects.

Field Stations – The Chincoteague Bay Field Station (formerly known as the Marine Science Consortium) at Wallops Island, Virginia, offers fully-equipped labs, classrooms, research vessels and equipment for coursework and research in marine and coastal biology. A 15-member consortium of universities promotes teaching and research in marine and environmental sciences.

Histological Laboratory – Fully equipped for histochemical and paraffin microtechnique. Equipment includes paraffin embedding stations and rotary microtomes for producing histologic sections and a cryostat for making frozen sections.

Botanical Glasshouse Facilities – Four greenhouses provide diverse environments and allow for a more diverse collection of plants, from corn and soybeans to aloes, avocados, bananas, cacti, cycads, mangos and palms. Plants grown in these houses are in research and the classroom. Besides the greenhouses, there are large growth chambers where light, temperature and moisture can be manipulated for experiments.

CLUBS & ACTIVITIES

Clubs and student organizations provide opportunities to expand your scientific horizons through guest lecturers, presentations by visiting scientists, frequent field trips to industrial laboratories, hospitals, research facilities and attendance at regional and national conferences.

Aesculapian Society – Cultivates scholarly excellence in the field of health-related sciences and is open to all students interested in careers in medicine, dentistry, podiatry and allied health professions.

Biology Club – Activities of this club are numerous and include speakers from other institutions, career seminars and field trips to greenhouses, zoos, primate laboratories, government experimental stations, biotechnology facilities, aquaria, arboreta and gardens.

Conestoga Club – Educates the community about local natural environments by leading hikes and encouraging people to take self-guided tours. Restoration of native wildflowers and other vegetation is another club project.

Entomology Club – Promotes entomological learning through field experiences in the Everglades, the Osa Peninsula in Costa Rica, the Great Smoky Mountains and the Florida Keys, by conducting entoblotz (entomological) surveys for the Lancaster Conservancy's Holtwood Nature Preserve and by constructing insect hotels for the organic gardening operation of Homefields, Inc.

Millersville University Society for Respiratory Care Practitioners – Serves students who have interest in respiratory care practice.

Ocean Sciences Club – Invited speakers talk about their research, graduate schools and career opportunities. Field trips include beach cleanups along the Delaware shore, visits to the Baltimore Aquarium and the Smithsonian Institute, as well as boat trips on the Chesapeake Bay.