

Microbiology

College of Science



WHAT IS MICROBIOLOGY?

Microbiology, the study of microorganisms, is of major importance to our lives. Our in-depth understanding of the molecular basis of life has, to a large degree, come from the study of microbial systems. The important role of microorganisms as disease agents and in cycling nutrients in the environment ties the study of microbiology closely to both medicine and agriculture. Microbiology also impacts the areas of bioremediation, alternative fuels, and astrobiology.

Modern biotechnology has its roots in applications of microbiology, supplying us with antibiotics, insulin, interferon, human growth hormone, and a host of other medical and research products previously available only in trace amounts. Microbiology stresses experimental rather than descriptive approaches to research, which is why the science of microbiology is vigorous, growing rapidly, and appealing to students. As we learn more about microbial life forms, we can apply this knowledge to advance the sciences of medicine and technology, making the world a better place.

The bachelor of science degree from SIU's Department of Microbiology will prepare you to enter into rapidly expanding careers in microbiology research with practical applications in business, industry, and medicine.

WHAT WE OFFER

SIU's major in microbiology is the only program in Illinois. From a wealth of specialized courses, you can choose those that particularly suit your individual academic and career interests. At other colleges, microbiology courses are often taught as a part of the other biological sciences, resulting in a more generalized—and less rewarding—study of the field. Microbiology at SIU offers a directed, integrated, specialized program based on the latest and most relevant information in the field.



CURRICULUM

In addition to the University Core Curriculum required of all students pursuing a bachelor's degree at SIU, students majoring in microbiology will take a combination of courses in basic science and mathematics as well as the specialized courses from the department. Much of the practicing microbiologist's time is devoted to the study of problems involving biochemistry and genetics. To be best prepared for these areas, our students take two years of college chemistry and a one-year sequence in biology. Completing the requirements of the microbiology major also satisfy the requirements for a minor in chemistry. This "microbiology major / chemistry minor" positions graduates for jobs in the pharmaceutical and related industries, for entry into professional, medical, and dental schools, and for admission to graduate programs in microbiology and other areas of molecular biology.

Solving microbiological problems requires mastery of simple quantitative relationships and the use of complex optical or electronic equipment. Therefore, mathematics and one year of college physics are important components of the degree program requirements. Six credit hours of supportive skills (computer science, technical writing, statistics, or foreign language) must also be taken to fulfill the College of Science requirement.

The remainder of the microbiology major consists of microbiology courses. Following a two-semester sequence of introductory microbiology and molecular biology, you may build your major in the various areas of our faculty's expertise: molecular biology and genetics, biotechnology, microbial physiology/biochemistry, microbial diversity, microbial ecology, medical microbiology, and immunology. You will take lecture courses and two semester-long core laboratory courses to develop a strong background in both the theoretical and the practical aspects of microbiology. One of the strengths of our program is that students can earn credit in the major by participating in undergraduate research, working with individual faculty members, engaging in goal-oriented research projects, and obtaining valuable laboratory experience outside of the classroom.

Students interested in a career in medicine or dentistry often discover that an undergraduate major in microbiology is excellent preparation for professional school. Microbiology's foundation in chemistry and molecular biology is especially helpful in preparing students for the competitive professional school application process. Many of our microbiology graduates have gone on to public and private professional schools in Illinois and other states.

A minor is offered in microbiology for those whose major interest may be in another discipline, most frequently chemistry or biological sciences.



Know No Bounds



SIU Southern Illinois University
CARBONDALE



FACULTY

With a student-to-faculty ratio of fewer than 6 to 1, microbiology majors at SIUC get plenty of personal attention from their professors. From your introduction to microbiology to your final upperdivision microbiology courses, you will be taught by professors who are actively engaged in research and who bring the excitement of their work directly into the classroom. Faculty members in microbiology consistently receive federal grants to fund research. These grants allow undergraduates to participate in a variety of research projects and also provide paid student-work positions

GRADUATE AND PROFESSIONAL OPPORTUNITIES

While your immediate goal may be a bachelor's degree and a job, at some point you may decide that you want or need advanced education. Increasingly, for advancement in microbiology careers, a graduate degree is necessary. SIU offers master's and doctoral degrees in microbiology, physiology, chemistry, plant biology, and zoology; master's degrees in plant and soil science and animal science; and professional degrees from the SIU schools of law and medicine. These programs benefit undergraduates because they attract excellent faculty who teach the undergraduate curriculum.

CAREERS IN MICROBIOLOGY

Opportunities for graduates holding a bachelor's degree in microbiology are numerous and varied in areas such as research and development, applied microbiology, and education.

Careers in research and development and in quality control are available in many different settings. Pharmaceutical companies use the skills of microbiologists to help them discover and produce antibiotics and other therapeutic drugs, such as vaccines, to prevent infectious diseases. Some of our graduates are employed by firms such as Eli Lilly, Abbott, and Lederle Laboratories. Microbiologists working in food and beverage companies monitor microbial fermentation processes that result in the production of beer and wine, cheeses, pickles, sauerkraut, and thousands of other consumer products. Some of our graduates have chosen food industry careers with such companies as Kraft Foods and Anheuser Busch. The exciting field of biotechnology employs microbiologists for research directed toward making useful products and drugs and toward the beneficial alteration of the genetic makeup of food crops and farm animals to help increase yields and reduce disease. Recent graduates of our program are manipulating genes in the research laboratories of GlaxoSmithKline and Monsanto. University and medical school research laboratories also hire recent graduates as technicians for basic research in all aspects of microbiology, biology, and molecular biology. Careers in applied microbiology include positions with hospital, clinical, veterinary, public health, and university medical microbiology laboratories. In an agricultural setting, microbiologists are employed with various governmental agencies, such as the U.S. Department of Agriculture. Many of today's agricultural practices have been developed through

ADDITIONAL RESOURCES

UNDERGRADUATE RESEARCH: Juniors and seniors in microbiology can enroll in Undergraduate Research Participation (MICR 490), a course that offers hands on experience in the research setting of a faculty member's laboratory. Undergraduate research can be a superb learning experience for a student interested in pursuing research problems, and an excellent addition to a résumé. Opportunities for specialized training in microbial biochemistry, genetics, ecology and diversity, as well as in immunology, molecular biology, and biotechnology are available. Paid student employment is also available in our research laboratories.

FACILITIES: SIU has a central facility for electron microscopy, a modern vivarium for housing animals for scientific research, and a large computer network accessible to undergraduates for academic or research needs.

MORRIS LIBRARY: Morris Library, the University's main library, will be an important resource for you. It holds more than 2.6 million volumes, 3.6 million microform units, and more than 36,000 current periodicals and serials. You will have access to I-Share (the statewide automated system) as well as a wide array of databases and other electronic data files. Our library offers a wide range of services, including reference assistance, instructional and technical support, distance learning, and geographic information systems (GIS).

WHY STUDY AT SIU?

- We offer specialized microbiology courses to help you prepare for your individual academic and career interests.
- SIU offers more than 125 majors, specializations and minors. You may find many related courses to help you design a well-rounded degree program.
- Our microbiology program is excellent preparation for the competitive professional school application process.
- The Microbiology Student Organization organizes scientific and social activities to bring about a better understanding of the field of microbiology.
- SIU offers master's and doctoral degrees in microbiology and related fields, and professional degrees in law and medicine.
- The College of Science and the microbiology department offer scholarships. Our department offers four scholarships each year: the Maurice Ogur Memorial Prize, the Microbiology Alumni Achievement Award, the Student Leadership Award, and the Microbiology Faculty Scholarship.



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