

## Biotechnology

College of Science, Engineering & Technology  
Department of Biological Sciences  
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Web site: [www.mnsu.edu/dept/biology](http://www.mnsu.edu/dept/biology)

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Biotechnology is the application of recent developments in technology to manipulate the genetic and biochemical characteristics of an organism so that the organism or its metabolites can be economically produced for our benefit. In practice it requires the selection and genetic improvement of an organism for a specific purpose. Organisms may be used to synthesize a desirable product or degrade unwanted materials. The industrialization of this technology is dependent on the development of methods for scaling up processes developed in the laboratory.

Students interested in biotechnology could find careers in a wide variety of industrial applications. Examples of industries that use biotechnology are antibiotic and pharmaceutical; food; energy; agricultural pesticides; herbicides; fertilizers; growth chemicals and breeding programs; industrial chemicals, biocatalysts and diagnostics.

The biotechnologist works with research scientists on the development of processes in the laboratory and with engineers to transfer and scale up laboratory processes for large scale production required by industry. Because of the interdisciplinary nature of biotechnology, biotechnologists must have a strong background in the analytical and quantitative areas of science. In addition, the biotechnologist must be familiar with the theory and practice of genetic engineering and biochemical processes.

Admission to Major is granted by the department. Admission requirements are 32 earned semester credit hours including BIOL 105W and 106, with a grade of a "C" or better in both BIOL 105W and 106; and a minimum cumulative GPA of 2.0.

BIOL	456	Biotechnology Project/Laboratory I (3)
BIOL	457	Biotechnology Project/Laboratory II (3) OR
BIOL	497	Internship (6)

Required Minor: None.

### POLICIES/INFORMATION

**P/N Grading Policy.** All courses must be taken for letter grades. Any exception to this policy must be approved by the chairperson of the department.

Refer to the College regarding required advising for students on academic probation.

**GPA Policy.** A minimum GPA of 2.0 must be maintained in biological sciences.

Several biology scholarships are available for entering freshmen and currently enrolled Minnesota State Mankato students who meet the requirements. Application deadline is March 31 of each year.

The Department of Biological Sciences offers a well-balanced summer school program. For details concerning the courses being offered consult the summer bulletin.

### BIOTECHNOLOGY BS

Required General Education (13 credits):

MATH	121	Calculus I (4)
PHYS	211	Principles of Physics I (4)
CHEM	201	General Chemistry I (5)

Required Support Courses (26 credits):

MATH	122	Calculus II (4)
PHYS	212	Principles of Physics II (4)
CHEM	202	General Chemistry II (5)
CHEM	305	Analytical Chemistry (4)
CHEM	320	Organic Chemistry I (5)
CHEM	460	Biochemistry I (3)
CHEM	465	Biochemical Techniques I (1)

Recommended Support Courses (5 credits):

CHEM	461	Biochemistry II (3)
CHEM	466	Biochemical Techniques II (2)

Required for Major (Core, 52 credits):

BIOL	105W	General Biology I (4)
BIOL	106	General Biology II (4)
BIOL	211	Genetics (3)
BIOL	270	Microbiology (4)
BIOL	320	Cell Biology (4)
BIOL	451	Plant Biotechnology (3)
BIOL	452	Biological Instrumentation (3)
BIOL	453	Biological Engineering Analysis I (4)
BIOL	454	Biological Engineering Analysis II (4)
BIOL	474	Immunology (4)
BIOL	476	Microbial Physiology and Genetics (5)
BIOL	479	Molecular Biology (4)

The biotechnology major requires a 6 credit project. This may be taken as: