

BIOTECHNOLOGY

Biotechnology

College of Science, Engineering & Technology
Department of Biological Sciences
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Website: www.cset.mnsu.edu/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 105 and BIOL 106, with a grade of a "C" or better in both BIOL 105 and BIOL 106; and a minimum cumulative GPA of 2.0.

BIOTECHNOLOGY BS

Required General Education

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

Prerequisites to the Major

BIOL	105	General Biology I (4)
BIOL	106	General Biology II (4)
BIOL	211	Genetics (4)

Major Common Core

BIOL	270	Microbiology (4)
BIOL	320	Cell Biology (4)
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)
CHEM	202	General Chemistry II (5)
CHEM	320	Organic Chemistry I (5)
CHEM	360	Principles of Biochemistry (4)
PHYS	212	Principles of Physics II (4)

Major Restricted Electives

For those students planning on graduate or professional school, CHEM 305 Analytical Chemistry and MATH 122 Calculus II are strongly recommended. BIOL 451 Plant Biotechnology is strongly recommended for a student who plans to work in the agricultural biotechnology. Additional Math/Statistics

(Choose 3-4 credits)

HLTH	475	Biostatistics (3)
MATH	122	Calculus II (4)
STAT	154	Elementary Statistics (3)

Capstone Experience (Choose 6 credits from the following)

Choose in consultation with your advisor.

BIOL	456	Biotechnology Project/Laboratory I (3)
BIOL	457	Biotechnology Project/Laboratory II (3)
BIOL	497	Internship I (1-12)
BIOL	498	Internship II (1-12)
BIOL	499	Individual Study (1-4)

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 first year students and currently enrolled Minnesota State Mankato students who meet the requirements.

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