

## BIOTECHNOLOGY

### Biotechnology

College of Science, Engineering & Technology  
Department of Biological Sciences  
242 Trafton Science Center S • 507-389-5731  
Web site: [www.cset.mnsu.edu/biology/](http://www.cset.mnsu.edu/biology/)

Director: Gregg Marg, Ph.D.

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 (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, 53 credits):

BIOL 105 General Biology I (4)  
BIOL 106 General Biology II (4)  
BIOL 211 Genetics (4)  
BIOL 270 Microbiology (4)  
BIOL 320 Cell Biology (4)  
BIOL 451 Plant Biotechnology (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)

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

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.

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