

## **MICROBIOLOGY**

Microbiology is a fundamental biological science concerned with bacteria, viruses and other microbes. Some of the most important scientific discoveries have been made by microbiologists. Since 1910, approximately one-third of the Nobel Prizes in medicine and physiology have been awarded to microbiologists. The discipline covers a wide spectrum of specialized interest areas that show how microbes affect human and animal health, our environment, food technology and safety, and the biotechnology industry. Microbiology prepares students for a wide range of important career opportunities.

### **The Program**

In recent years, the field of microbiology has had a major impact upon virtually all other scientific disciplines. For this reason, students who choose to major in microbiology often minor in biotechnology, chemistry or food safety. Students who choose to major in other fields may find it advantageous to minor in microbiology.

### **Career Opportunities**

A career in microbiology offers many opportunities. The microbiology major is an excellent preparation for professional school (such as veterinary and human medicine) and graduate school, due to its emphasis on the pathogenesis of infectious disease, molecular biology, sterile techniques and laboratory skills. Graduates also may seek employment in the health sciences, biomedical industries, biotechnology, agricultural biosystems, food industries, pharmaceutical industries and government agencies. In these careers, graduates may identify new emerging diseases; develop diagnostic tests, new medicines and vaccines; work in departments of public health or hospital laboratories to ensure a safe food supply; or work in academic or private research laboratories. Microbiologists work in government agencies such as the National Institutes of Health and the Environmental Protection Agency. Many microbiologists are teachers and professors.

### **The Faculty And Facilities**

The teaching faculty offer expertise and experience in nearly all areas of microbiology. Additionally, faculty are active researchers and devoted research mentors. Our undergraduates frequently have opportunities to perform cutting edge research in nationally-funded laboratories.

The Department of Veterinary and Microbiological Sciences is located in Van Es Hall. The modern teaching and research laboratories are especially spacious, well-equipped and pleasant.

### **High School Preparation**

Students will find courses in science and mathematics, such as algebra, biology, physics and chemistry, to be very helpful in preparing for a major in microbiology.

### **The Curriculum**

During the first year, students in microbiology take basic college courses in English, chemistry, biology or zoology and mathematics. The curriculum over the next three years includes advanced courses in microbiology and the life sciences. These courses include

pathogenic microbiology, virology, immunology, parasitology, microbial genetics, food microbiology, microbial ecology and bacterial physiology. The department also offers courses in epidemiology, animal disease, and food safety to enhance our students' understanding of applied microbiology and infectious disease.

Qualified upper class students majoring in microbiology may pursue individualized study and research under the supervision of one of the faculty members.

### **For Further Information**

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<b>Sample Curriculum</b>	
<b>Credits</b>	<b>General Education Requirements</b>
	Communication
3	COMM 110 - Fundamentals of Public Speaking
3	ENGL 110 - College Composition I
3	ENGL 120 - College Composition II
3	Upper Division Writing
	Quantitative Reasoning
3	STAT 330 - Introductory Statistics
	Science & Technology
4	CHEM 121, 121L - General Chemistry I and Lab
4	CHEM 122, 122L - General Chemistry II and Lab
4	PHYS 211, 211L - College Physics I and Lab
6	Humanities & Fine Arts
6	Social & Behavioral Sciences
2	Wellness
-	- Cultural Diversity
-	- Global Perspective
<b>39</b>	<b>TOTAL</b>
<b>Credits</b>	<b>Major Requirements</b>
5	MICR 350, 350L - General Microbiology and Lab
5	MICR 352, 352L - General Microbiology II and Lab
3	MICR 354 - Scientific Writing
3	MICR 480 - Bacterial Physiology
3	MICR 482 - Bacterial Genetics and Phage
3	MICR 486 - Capstone Experience
21	Microbiology Electives
<b>43</b>	<b>TOTAL</b>
<b>Credits</b>	<b>Related Requirements</b>
4	BIOC 460, 460L - Foundations of Biochemistry and Molecular Biology I and Lab
3	BIOC 461 - Foundations of Biochemistry and Molecular Biology II
4	BIOL 150, 150L - General Biology I and Lab
4	BIOL 151, 151L - General Biology II and Lab
4	CHEM 341, 341L - Organic Chemistry I and Lab
3	CHEM 342 - Organic Chemistry II
3-4	MATH 105 - Trigonometry or MATH 107 - Precalculus or MATH 146 - Applied Calculus I
4	PHYS 212, 212L - College Physics II and Lab
4	PLSC 315, 315L - Genetics and Lab
16-18	Electives
<b>49-52</b>	<b>TOTAL</b>
<b>128</b>	<b>Minimum Degree Credits to Graduate</b>

This sample curriculum is not intended to serve as a curriculum guide for current students, but rather an example of course offerings for prospective students. For the curriculum requirements in effect at the time of entrance into a program, consult with an academic advisor or with the Office of Registration and Records.

<https://bulletin.ndsu.edu/undergraduate/programs/>

### **Transferring Credits**

View NDSU equivalencies of transfer courses at:

[www.ndsu.edu/transfer/equivalencies](http://www.ndsu.edu/transfer/equivalencies)