

# Microbiology

Microbiology is a fundamental biological science which offers a variety of challenges and opportunities. Microbiologists have made some of the most important scientific discoveries in this century. 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 illustrate how microbes affect human and animal health, our environment, food safety, food technology, and the biotechnology industry. In recent years, the field of microbiology has had a major impact upon virtually all other scientific disciplines. For this reason, even students who choose to major in other fields may benefit from a minor in microbiology.

Students majoring in microbiology are well prepared to enter graduate school, veterinary school, and medical school, or to establish careers in food or pharmaceutical industries, hospitals, public health agencies, universities, research laboratories, and other biomedical industries.

## Major Requirements

### Major: Microbiology

Degree Type: B.S.

Required Degree Credits to Graduate: 128

### General Education Requirements

#### First Year Experience (F):

AGRI 189	Skills for Academic Success (Students transferring in 24 or more credits do not need to take AGRI 189.)	1
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#### Communication (C):

ENGL 110	College Composition I	3
ENGL 120	College Composition II	3
MICR 354	Scientific Writing	3
COMM 110	Fundamentals of Public Speaking	3

#### Quantitative Reasoning (R):

STAT 330	Introductory Statistics	3
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#### Science & Technology (S):

CHEM 121 & 121L	General Chemistry I and General Chemistry I Laboratory (or higher)	4
CHEM 122	General Chemistry II (or higher)	3
PHYS 211	College Physics I (or higher)	3

<b>Humanities &amp; Fine Arts (A): Select from current general education list</b>		6
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<b>Social &amp; Behavioral Sciences (B): Select from current general education list</b>		6
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<b>Wellness (W): Select from current general education list</b>		2
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**Cultural Diversity (D): Select from current general education list**

**Global Perspectives (G): Select from current general education list**

<b>Total Credits</b>		<b>40</b>
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## Major Requirements

A grade of 'C' or better is required for the Microbiology Core and Elective Credit requirements.

<b>General Education Requirements</b>		<b>40</b>
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#### Required Core Courses for Microbiology

MICR 350 & 350L	General Microbiology and General Microbiology Lab	5
MICR 352	General Microbiology II	3
MICR 450 & 450L	Infectious Disease Pathogenesis and Infectious Disease Pathogenesis Laboratory	5
MICR 470	Basic Immunology	3
MICR 471	Immunology and Serology Laboratory	2
MICR 475	Animal Virology	3
MICR 480	Bacterial Physiology	3
MICR 482	Bacterial Genetics & Phage	3
MICR 486	Capstone Experience in Microbiology	3

Elective Credit: Select 6 credits from the following:		6
BIOC 487	Molecular Biology of Gene Expression	
MICR 352L	General Microbiology Lab II	
MICR 463	Clinical Parasitology	
MICR 379	Study Tour Abroad	
MICR 445	Animal Cell Culture Techniques	
MICR 452	Microbial Ecology	
MICR 453	Food Microbiology	
MICR 472	Clinical Immunology	
MICR 474	Epidemiology	
MLS 435	Hematology	
PPTH 460	Fungal Biology	
No more than 3 of the elective credits may come from the following:		
MICR 491	Seminar	
MICR 494	Individual Study	
MICR 496	Field Experience	
MICR 499	Special Topics	
MICR 370-MICR 399		
MICR 491-MICR 499		
Related Requirements		
AGRI/ANSC/VETS 150	Agriculture Orientation (Students transferring in 24 or more credits do not need to take AGRI 150.)	1
BIOC 460 & 460L	Foundations of Biochemistry and Molecular Biology I and Foundations of Biochemistry I Laboratory	4
BIOC 461	Foundations of Biochemistry and Molecular Biology II	3
BIOL 150 & 150L	General Biology I and General Biology I Laboratory	4
CHEM 122L	General Chemistry II Laboratory	1
CHEM 341 & 341L	Organic Chemistry I and Organic Chemistry I Laboratory	4
CHEM 342	Organic Chemistry II	3
Select one of the following or higher level math:		4-6
MATH 146	Applied Calculus I	
MATH 103 & MATH 105	College Algebra and Trigonometry	
MATH 107	Precalculus	
PHYS 211L	College Physics I Laboratory (or higher)	1
PHYS 212 & 212L	College Physics II and College Physics II Laboratory (or higher)	4
PLSC 315 & 315L	Genetics and Genetics Laboratory	4
BIOL/BOT/ZOO	Elective	3
<b>Degree Requirements: Potential of 16-18 credits to reach 128.</b>		<b>16-18</b>
<b>Total Credits</b>		<b>128</b>

## Degree Requirements and Notes

- A cumulative 2.50 GPA is required for graduation.

## Minor Requirements

### Microbiology Minor

#### Minor Requirements

Required Credits: 16

#### Required Courses

MICR 350 & 350L	General Microbiology and General Microbiology Lab	5
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**Elective Courses: Select 11 credits from the following:** 11

No more than 3 of the elective credits may come from MICR 490-499.		
BIOC 487	Molecular Biology of Gene Expression	
MLS 435	Hematology	
MICR 379	Study Tour Abroad	
MICR 445	Animal Cell Culture Techniques	
MICR 452	Microbial Ecology	
MICR 453	Food Microbiology	
MICR 460 & 460L	Pathogenic Microbiology and Pathogenic Microbiology Laboratory	
MICR 463	Clinical Parasitology	
MICR 470	Basic Immunology	
MICR 471	Immunology and Serology Laboratory	
MICR 472	Clinical Immunology	
MICR 474	Epidemiology (see SAFE)	
MICR 475	Animal Virology	
MICR 480	Bacterial Physiology	
MICR 481	Microbial Genomics with Computational Laboratory	
MICR 482	Bacterial Genetics & Phage	
MICR 491	Seminar	
MICR 494	Individual Study	
MICR 496	Field Experience	
MICR 499	Special Topics	
PPTH 460	Fungal Biology	

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**Total Credits** 16

### Minor Requirements and Notes

- A minimum of 8 credits must be taken at NDSU.
- Students must earn a 2.50 minimum GPA for the minor with a grade of 'C' or better in the courses used to satisfy the minor requirements.