

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.

Minimum Degree Credits to Graduate: 128

General Education Requirements for Baccalaureate Degree

- A list of approved general education courses is available here (<http://bulletin.ndsu.edu/past-bulletin-archive/2017-18/academic-policies/undergraduate-policies/general-education/#genedcoursestext>).
- General education courses may be used to satisfy requirements for both general education and the major, minor, and program emphases, where applicable. Students should carefully review the major, minor, and program emphases requirements for minimum grade restrictions, should they apply.

Code	Title	Credits
Communication (C)		12
ENGL 110	College Composition I	
ENGL 120	College Composition II	
COMM 110	Fundamentals of Public Speaking	
Upper Division Writing [†]		
Quantitative Reasoning (R) [†]		3
Science and Technology (S) [†]		10
Humanities and Fine Arts (A) [†]		6
Social and Behavioral Sciences (B) [†]		6
Wellness (W) [†]		2
Cultural Diversity (D) ^{*†}		
Global Perspectives (G) ^{*†}		
Total Credits		39

* May be satisfied by completing courses in another General Education category.

† May be satisfied with courses required in the major. Review major requirements to determine if a specific upper division writing course is required.

Major Requirements

A grade of 'C' or better is required for the microbiology core and elective requirements.

Code	Title	Credits
Required Courses for Microbiology Major		
MICR 350 & 350L	General Microbiology and General Microbiology Lab	5
MICR 352 & 352L	General Microbiology II and General Microbiology Lab II	5
MICR 354	Scientific Writing	3
MICR 480	Bacterial Physiology	3
MICR 482	Bacterial Genetics & Phage	3
MICR 486	Capstone Experience in Microbiology	3

Elective Courses for Microbiology Major - Select a minimum of 21 credits from the following: 21

Fifteen (15) of the 21 credits must have a MICR prefix. No more than 3 credits may come from courses numbered 371-399 or 491-499 to fulfill this requirement.

MICR 379 or MICR 492	Study Tour Abroad Study Abroad
MICR 394	Individual Study
MICR 445	Animal Cell Culture Techniques
MICR 450	Infectious Disease Pathogenesis
MICR 450L or MICR 460L	Infectious Disease Pathogenesis Laboratory Pathogenic Microbiology Laboratory
MICR 452	Microbial Ecology
MICR 453	Food Microbiology
MICR 463	Clinical Parasitology
MICR 470	Basic Immunology
MICR 471	Immunology and Serology Laboratory
MICR 472	Clinical Immunology
MICR 474	Epidemiology
MICR 475	Virology
MICR 481	Microbial Genomics with Computational Laboratory
MICR 491	Seminar
MICR 493	Undergraduate Research
MICR 494	Individual Study
MICR 496	Field Experience
BIOC 473	Methods of Biochemical Research
BIOC 474	Methods of Recombinant DNA Technology
BIOC 483	Cellular Signal Transduction Processes and Metabolic Regulations
BIOC 487	Molecular Biology of Gene Expression
BIOL 359	Evolution
BIOL 364	General Ecology
BIOL 481	Wetland Science
GEOG 455	Introduction to Geographic Information Systems
GEOL 460	Biogeochemistry
MLS 435	Hematology
PLSC 431	Intermediate Genetics
PPTH 460	Fungal Biology
SOIL 210	Introduction to Soil Science
SOIL 351	Soil Ecology
ZOO 370	Cell Biology

Related Requirements for the Microbiology Major

AGRI 189	Skills for Academic Success ¹	1
BIOL 150 & 150L	General Biology I and General Biology I Laboratory	4
BIOL 151 & 151L	General Biology II and General Biology II Laboratory	4
CHEM 121 & 121L	General Chemistry I and General Chemistry I Laboratory (May satisfy general education category S)	4
CHEM 122 & 122L	General Chemistry II and General Chemistry II Laboratory (May satisfy general education category S)	4
CHEM 341 & 341L	Organic Chemistry I and Organic Chemistry I Laboratory	4
CHEM 342	Organic Chemistry II	3
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
PHYS 211 & 211L	College Physics I and College Physics I Laboratory (May satisfy general education category S)	4
PHYS 212 & 212L	College Physics II and College Physics II Laboratory (or higher (May satisfy general education category S)	4
PLSC 315 & 315L	Genetics and Genetics Laboratory (May satisfy general education category S)	4
STAT 330	Introductory Statistics (May satisfy general education category R)	3
Select one of the following or higher level math:		3-4
MATH 105	Trigonometry	
MATH 107	Precalculus	
MATH 146	Applied Calculus I	

Total Credits 92

¹ AGRI189 is only required for first-time, first-year students--A first-time, first-year student is defined as a student who has not yet completed a college course as a college student. Students that are not first-time, first-year students that either transfer into the university or change their major are not required to take AGRI 189.

Degree Requirements and Notes

- A cumulative 2.50 GPA is required for graduation.

Minor Requirements

Microbiology Minor

Minor Requirements

Required Credits: 16

Code	Title	Credits
Required Courses		
MICR 350 & 350L	General Microbiology and General Microbiology Lab	5
Elective Courses: Select 11 credits from the following:		
No more than 3 credits may come from courses numbered 491-499 to fulfill this requirement.		
MICR 352	General Microbiology II	
MICR 352L	General Microbiology Lab II	
MICR 379	Study Tour Abroad	
MICR 445	Animal Cell Culture Techniques	
MICR 452	Microbial Ecology	
MICR 453	Food Microbiology	
MICR 460 or MICR 450	Pathogenic Microbiology Infectious Disease Pathogenesis	
MICR 460L or MICR 450L	Pathogenic Microbiology Laboratory Infectious Disease Pathogenesis 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	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

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.