

# Microbiology

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## Department Information

- **Department Web Site:**  
www.ndsu.edu/microbiology/ (<http://www.ndsu.edu/microbiology/>)
- **Credential Offered:**  
B.S.; Minor
- **Sample Program Guide:**  
[catalog.ndsu.edu/programs-study/undergraduate/microbiology/#planofstudytext](http://catalog.ndsu.edu/programs-study/undergraduate/microbiology/#planofstudytext) (<http://catalog.ndsu.edu/programs-study/undergraduate/microbiology/#planofstudytext>)

## Major Requirements

### Major: Microbiology

**Degree Type:** B.S.

**Minimum Degree Credits to Graduate:** 120

### University Degree Requirements

1. Satisfactory completion of all requirements of the curriculum in which one is enrolled.
2. Earn a minimum total of 120 credits in approved coursework. Some academic programs exceed this minimum.
3. Satisfactory completion of the general education requirements as specified by the university.
4. A minimum institutional GPA of 2.00 based on work taken at NDSU.
5. At least 30 credits must be NDSU resident credits. Resident credits include credits registered and paid for at NDSU.
6. At least 36 credits presented for graduation must be in courses numbered 300 or higher.
7. Students presenting transfer credit must meet the NDSU residence credits and the minimum upper level credit. Of the 30 credits earned in residence, a minimum of 15 semester credits must be in courses numbered 300 or above, and 15 semester credits must be in the student's curricula for their declared major.

For complete information, please refer to the Degree and Graduation Requirements (<http://catalog.ndsu.edu/academic-policies/undergraduate-policies/degree-and-graduation/>) section of this Bulletin.

### University General Education Requirements

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

\*

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

†

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 major requirements to determine if specific courses can also satisfy these general education categories.

- A list of university approved general education courses and administrative policies are available here (<http://catalog.ndsu.edu/academic-policies/undergraduate-policies/general-education/#genedcoursestext>).

## Major Requirements

Code	Title	Credits
<b>Microbiology Core Courses</b>		
MICR 189	Skills for Academic Success <sup>1,3</sup>	1
MICR 350 & 350L	General Microbiology and General Microbiology Lab <sup>3</sup>	5
MICR 352 & 352L	Critical Skills in Microbiology and Critical Skills in Microbiology Laboratory Research <sup>3</sup>	5
MICR 452	Microbial Ecology <sup>3,4</sup>	3
MICR 470	Basic Immunology <sup>3,4</sup>	3
MICR 475	Virology <sup>3,4</sup>	3
MICR 480	Microbial Physiology <sup>3,4</sup>	3
MICR 482	Microbial Genetics <sup>3,4</sup>	3
MICR 485 or HON 491	Capstone Experience in Microbiology I: Reflecting and Planning <sup>2,3</sup> Seminar	1
MICR 486 or HON 489	Capstone Experience in Microbiology II: Reflection and Dissemination <sup>2,3</sup> Senior Thesis	1
<b>Laboratory Course <sup>3</sup></b>		
Select one from the following:		2-3
BIOC 474	Methods of Recombinant DNA Technology	
MICR 445	Animal Cell Culture Techniques <sup>4</sup>	
MICR 460L	Microbial Pathogenesis Laboratory <sup>4</sup>	
MICR 471	Immunology and Serology Laboratory <sup>4</sup>	
<b>Capstone Experience <sup>3</sup></b>		
Capstone Experience must include a minimum of 2 credits from the following:		2
MICR 493	Undergraduate Research	
MICR 496	Field Experience	
MICR 497	FE/Coop Ed/Internship	
<b>Microbiology Electives <sup>3</sup></b>		
Select from the following:		8
MICR 379 or MICR 492	Study Tour Abroad (No more than 3 credits) Study Abroad	
MICR 394	Individual Study (No more than 3 credits)	
MICR 453	Food Microbiology <sup>4</sup>	
MICR 460	Microbial Pathogenesis <sup>4</sup>	
MICR 463	Clinical Parasitology <sup>4</sup>	
MICR 481	Microbial Genomics with Computational Laboratory <sup>4</sup>	
MICR 491	Seminar (No more than 3 credits)	
BIOC 483	Cellular Signal Transduction Processes and Metabolic Regulation <sup>4</sup>	
BIOC 487	Molecular Biology of Gene Expression	
BIOL 359	Evolution	
BIOL 370	Cell Biology	
MLS 435	Hematology	
PH 474	Epidemiology <sup>4</sup>	
PPTH 454	Diseases Of Field and Forage Crops <sup>4</sup>	
PPTH 460	Fungal Biology <sup>4</sup>	
PLSC 431	Intermediate Genetics <sup>4</sup>	
SOIL 351	Soil Ecology	
BIOC 461	Foundations of Biochemistry and Molecular Biology II	3
BIOC 460	Foundations of Biochemistry and Molecular Biology I	3

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	4
CHEM 122 & 122L	General Chemistry II and General Chemistry II Laboratory	4
CHEM 341 & 341L	Organic Chemistry I and Organic Chemistry I Laboratory	4
CHEM 342	Organic Chemistry II	3
PHYS 211 & 211L	College Physics I and College Physics I Laboratory	4
PHYS 212 & 212L	College Physics II and College Physics II Laboratory	4
PLSC 315 & 315L	Genetics and Genetics Laboratory	4
STAT 330	Introductory Statistics	3
Select one philosophy course from the following:		3
PHIL 111	Professional Responsibility and Ethics	
PHIL 210	Ethics	
PHIL 215	Contemporary Moral Issues	
PHIL 216	Business Ethics	
PHIL 225	Environmental Ethics	
PHIL 327	Ethics, Engineering, and Technology	
Select one of the following or higher level math:		3-4
MATH 105	Trigonometry	
MATH 107	Precalculus	
MATH 146	Applied Calculus I	

**Total Credits****90-91**

1

MICR189 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 MICR189.

2

Students can substitute HON 491 for Seminar and HON 489 for Senior Thesis.

3

Course requires a grade of C or better.

4

Courses offered at the 600 level can be used in the B.S./M.S. accelerated program. The 600 level courses have additional outcomes/requirements for graduate level students. When students complete and submit the Accelerated Declaration form, the courses must be identified and no more than 15 credits of graduate coursework can be counted toward the B.S. degree.

**Degree Requirements and Notes**

- A cumulative 2.50 GPA is required for graduation in the B.S. degree program. Additional GPA stipulations are required for the B.S./M.S. accelerated programs.

**Accelerated Undergraduate to Master's Degree Programs**

- Students may participate in an accelerated program in the following areas:
  - B.S. Microbiology to Master of Science in Microbiology
  - B.S. Microbiology to Master of Public Health
- Instructions to apply and a sample 5-year plan for interested students can be found on the department website (<https://www.ndsu.edu/agriculture/academics/academic-units/microbiological-sciences/undergraduate-programs/pathways-success/>).

- Students may complete a thesis-based or comprehensive study-based masters program. Outcomes of these master's programs can be found here (<https://catalog.ndsu.edu/programs-study/graduate/microbiology/#degreerequirementstext>).

## Minor Requirements

### Minor: Microbiology

Required Credits: 16

Code	Title	Credits
<b>Required Courses</b>		
MICR 350 & 350L	General Microbiology and General Microbiology Lab	5
Elective Courses: Select 11 credits from the following:		11
No more than 3 credits may come from courses numbered 491-499 to fulfill this requirement.		
MICR 352	Critical Skills in Microbiology	
MICR 379	Study Tour Abroad	
MICR 445	Animal Cell Culture Techniques	
MICR 452	Microbial Ecology	
MICR 453	Food Microbiology	
MICR 460	Microbial Pathogenesis	
MICR 460L	Microbial Pathogenesis Laboratory	
MICR 463	Clinical Parasitology	
MICR 470	Basic Immunology	
MICR 471	Immunology and Serology Laboratory	
PH 474	Epidemiology	
MICR 475	Virology	
MICR 480	Microbial Physiology	
MICR 481	Microbial Genomics with Computational Laboratory	
MICR 482	Microbial Genetics	
MICR 491	Seminar	
MICR 494	Individual Study	
MICR 496	Field Experience	
MICR 499	Special Topics	
<b>Total Credits</b>		<b>16</b>

### 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.