

Microbiology Major

Major Requirements

Degree Type: B.S.
Minimum Credits Required: 120

University Degree Requirements

For complete details on these and other university degree requirements, refer to the Degree and Graduation Requirements (<http://catalog.ndsu.edu/academic-policies/undergraduate-policies/degree-and-graduation/>) section in the University Catalog.

1. Minimum of 120 semester credits (some programs may exceed this minimum).
2. Complete the University General Education requirements.
3. Minimum institutional GPA of 2.00 based on work taken at NDSU.
4. Minimum of 30 credits in resident at NDSU.
5. Minimum of 36 upper level credits (courses numbered 300 or higher).
6. Students with transfer credit must meet the NDSU 30 credits in residence (#4). Of these 30 credits in residence, a minimum of 15 credits must be in courses numbered 300 or above, and 15 credits must be in the student's declared major curricula.

University General Education Requirements

A list of university approved general education courses along with the administrative policies governing the requirement and the categories is available here (<http://catalog.ndsu.edu/academic-policies/undergraduate-policies/general-education/>).

Code	Title	Credits
Category C: Communication		12
Category R: Quantitative Reasoning		3
Category S: Science and Technology		10
Category A: Humanities and Fine Arts		6
Category B: Social and Behavioral Sciences		6
Category W: Wellness		2
Category D: Cultural Diversity		
Category G: Global Perspectives		
Category L: Digital Literacy		
Total Credits		39

Major Requirements

Code	Title	Credits
MICR 189	Skills for Academic Success ^{1,2}	1
MICR 350 & 350L	General Microbiology and General Microbiology Lab ²	5
MICR 352	The Science Toolkit: Skills for Scientific Success ²	3
MICR 452	Microbial Ecology ^{2,3}	3
MICR 470	Basic Immunology ^{2,3}	3
MICR 475	Virology ^{2,3}	3
MICR 480	Microbial Physiology ^{2,3}	3
MICR 482	Microbial Genetics ^{2,3}	3
MICR 485	Capstone Experience I: Reflecting and Planning ²	1
MICR 486	Capstone Experience II: Reflection and Dissemination ²	1
Required Capstone Experience - Select one course experience of the following: ²		2
MICR 493	Undergraduate Research	
MICR 494	Individual Study	
MICR 497	FE/Coop Ed/Internship	
BIOC 460	Foundations of Biochemistry and Molecular Biology I	3
BIOC 461	Foundations of Biochemistry and Molecular Biology II	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
ENGL 324 or ENGL 325	Writing in the Sciences Writing in the Health Professions	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 math course from the following:		3-4
MATH 105	Trigonometry	
MATH 107	Precalculus	
MATH 146	Applied Calculus I	
MATH 165	Calculus I	
Subplan		
Select either the Standard Microbiology subplan or the Biomedical Sciences subplan to complete the major requirements.		15
Total Credits		96-97

Standard MICROBIOLOGY Subplan

Code	Title	Credits
Select a minimum of 12 credits from the following course list.		
MICR 379 or MICR 492	Global Seminar (with prior approval) ² Global Practicum: Study Abroad	12
MICR 394	Individual Study (no more than 3 credits) ²	
MICR 453	Food Microbiology ^{2,3}	
MICR 454	Biotechnology for Sustainability ^{2,3}	
MICR 455	Microbial Biotechnology ^{2,3}	
MICR 456	Human Microbiome ^{2,3}	
MICR 457	Microbiomes: Agriculture and Environmental Resilience ^{2,3}	
MICR 458	Animal Health and Antimicrobial Resistance (AMR) ^{2,3}	
MICR 460	Microbial Pathogenesis ^{2,3}	
MICR 481	Microbial Genomics with Computational Laboratory ^{2,3}	
MICR 491	Seminar ((1-3 credits)) ²	
ANSC 475	One Health ^{2,3}	
BIOC 483	Cellular Signal Transduction Processes and Metabolic Regulations ^{2,3}	

BIOC 487	Molecular Biology of Gene Expression ^{2,3}	
BIOL 401	Science Communication ^{2,3}	
PLSC 307	History and Evolution of Wine in America ²	
PLSC 431	Intermediate Genetics ^{2,3}	
PPTH 424	Fundamental Plant Pathology	
PPTH 435	Principles of Plant Disease Management	
PPTH 437	Practices of Plant Disease Management Research	
PPTH 447	Fundamentals of Molecular Techniques in Agriculture	
PPTH 460	Fungal Biology ^{2,3}	
SOIL 351	Soil Ecology ²	
Laboratory Courses - Select at least 3 credits from the following: ²		3
MICR 445	Animal Cell Culture Techniques ^{2,3}	
MICR 453L	Food Microbiology Laboratory ^{2,3}	
MICR 460L	Microbial Pathogenesis Laboratory ^{2,3}	
MICR 471	Immunology and Serology Laboratory ^{2,3}	
BIOC 474	Methods of Recombinant DNA Technology ^{2,3}	
PPTH 424L	Fundamental Plant Pathology Laboratory	
PPTH 448	Plant Disease Diagnostics and Quantification	

Total Credits **15**

Biomedical Sciences subplan

Code	Title	Credits
MICR 460	Microbial Pathogenesis ^{2,3}	3
MICR 460L	Microbial Pathogenesis Laboratory ^{2,3}	2
Select a minimum of 10 credits from the following: ²		10
ANSC 218	Anatomy and Physiology of Domestic Animals	
ANSC 219	Anatomy and Physiology Laboratory	
ANSC 300	Domestic Animal Behavior and Management	
ANSC 370	Fundamentals/Animal Disease	
ANSC 371	Fundamentals of Animal Disease II	
BIOL 220	Human Anatomy and Physiology I	
BIOL 220L	Human Anatomy and Physiology I Laboratory	
BIOL 221	Human Anatomy and Physiology II	
BIOL 221L	Human Anatomy and Physiology II Laboratory	
BIOL 370	Cell Biology	
BIOL 401	Science Communication ³	
BIOL 483	Cellular Mechanisms of Diseases ³	
MLS 435	Hematology	
MICR 456	Human Microbiome ³	
MICR 458	Animal Health and Antimicrobial Resistance (AMR) ³	
MICR 477	Vaccinology ³	
PH 474	Epidemiology	

Total Credits **15**

¹ MICR189 is required for new students to our programs - This includes: first-time, first-year student and transfer students into the university. Students who change their major are not required to take MICR 189, but can elect to.

² Requires a grade of C or better.

³ 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.

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
- A 3.0 GPA is required for the B.S./M.S. accelerated programs
- Instructions to apply are found here (<https://www.ndsu.edu/onestop/accelerated-degrees-undergraduate-graduate-programs/>).
- 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>).