

Biotechnology

Department Information

- **Department Web Site:**
www.ndsu.edu/agriculture/academics/academic-units/microbiological-sciences (<http://www.ndsu.edu/agriculture/academics/academic-units/microbiological-sciences/>)
- **Credential Offered:**
B.S.; Minor
- **Sample Program Guide:**
catalog.ndsu.edu/programs-study/undergraduate/biotechnology/#planofstudytext (<http://catalog.ndsu.edu/programs-study/undergraduate/biotechnology/#planofstudytext>)

Major Requirements

Major: Biotechnology

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/past-bulletin-archive/2023-24/academic-policies/undergraduate-policies/degree-and-graduation/>) section of this Bulletin.

University General Education Requirements

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.

[†] 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/past-bulletin-archive/2023-24/academic-policies/undergraduate-policies/general-education/#genedcoursestext>).

Major requirements

Code	Title	Credits
Biotechnology Requirements		
MICR 189	Skills for Academic Success ¹	1
CSCI 114 or CSCI 122	Computer Applications Visual BASIC	3
MATH 165	Calculus I	4
PHYS 211 & 211L	College Physics I and College Physics I Laboratory	4
PHYS 212 & 212L	College Physics II and College Physics II Laboratory	4
STAT 330	Introductory Statistics (May satisfy general education category R)	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
PLSC 315 & 315L	Genetics and Genetics Laboratory (May satisfy general education category S) <small>Cross-listed as BIOL 315/L</small>	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	Foundations of Biochemistry and Molecular Biology I	3
BIOC 461	Foundations of Biochemistry and Molecular Biology II	3
BIOC 474	Methods of Recombinant DNA Technology	3
MICR 350 & 350L	General Microbiology and General Microbiology Lab	5
MICR 470	Basic Immunology	3
MICR 471	Immunology and Serology Laboratory	2
MICR 482	Microbial Genetics	3
MICR 491 or BIOC 491	Seminar (Biotechnology) Seminar	1-2
Choose one of the following:		3
MICR 493 & MICR 494	Undergraduate Research and Individual Study (2-4 cr. of 493 (research) and 1 cr. of 494 (thesis)) <small>The research and thesis may also be completed as BIOC or PLSC</small>	
MICR 497	FE/Coop Ed/Internship	
Major Elective in Physiology: Select 3 credits from the following:		3
MICR 480	Microbial Physiology	
PLSC 380	Principles of Plant Physiology	
BIOL 460	Animal Physiology	
Major Elective in Biotechnology Technique: Select 7-9 credits from the following:		7-9
BIOC 473	Methods of Biochemical Research	
BIOC 487	Molecular Biology of Gene Expression	
CHEM 431	Analytical Chemistry I	
MICR 445	Animal Cell Culture Techniques	
PLSC 411	Genomics	
PLSC 484	Plant Tissue Culture and Biotechnology	

Additional Humanities & Fine Arts or Social & Behavioral Sciences Credits 6

An additional 6 credits from these General Education categories is required for earning a B.S. degree from either the College of Agriculture, Food Systems, and Natural Resources or the College of Science and Mathematics.

Total Credits 88-91

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MICR 189 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 Notes:

- The Bachelors of Science degree is the default degree type for this program of study. However, a Bachelor of Arts degree is available if the degree is being earned from the College of Science & Mathematics.
- Bachelor of Arts (B.A.) Degree Requirements: An additional 12 credits of Humanities and/or Social Sciences courses and proficiency of a modern foreign language at the second year level (example: SPAN 201 & 202). Courses for the Humanities and/or Social Sciences may be fulfilled by any course having the following prefix: ADHM, ANTH, ARCH, ART, CJ, CLAS, COMM, ECON, ENGL, FREN GEOG, GERM, HDFS, HIST, LA, LANG, MUSC, PHIL, POLS, PSYC, RELS, SOC, SPAN, THEA, WGS, or any course from the current Humanities & Fine Arts (A) and/or Social & Behavioral Sciences (B) General Education list.

Minor Requirements**Minor: Biotechnology**

Required Credits: 20

Minor Requirements

Code	Title	Credits
BIOC 460	Foundations of Biochemistry and Molecular Biology I	3
BIOC 461	Foundations of Biochemistry and Molecular Biology II	3
PLSC 315 & 315L	Genetics and Genetics Laboratory	4
Biotechnology Technique Electives: Select 4 credits from the following:		4
BIOC 473	Methods of Biochemical Research	
BIOC 474	Methods of Recombinant DNA Technology	
MICR 445	Animal Cell Culture Techniques	
PLSC 484	Plant Tissue Culture and Biotechnology	
Specialized Electives: Select 6 credits from the following:		6
MICR 470	Basic Immunology	
MICR 471	Immunology and Serology Laboratory	
MICR 482	Microbial Genetics	
PPTH 324	Introductory Plant Pathology	
PLSC 380	Principles of Plant Physiology	
BIOL 370	Cell Biology	
BIOL 460	Animal Physiology	
Total Credits		20

Minor Requirements and Notes

- A minimum of 8 credits must be taken at NDSU.