Biotechnology Major

Major Requirements

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Degree Type: B.S.
Minimum Credits Required: 120
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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
Biotechnology Requirements		
MICR 189	Skills for Academic Success [1]	1
CSCI 114	Computer Applications	3
or CSCI 122	Visual BASIC	
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	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 Cross-listed as BIOL 315/L	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
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 [2]	4
MICR 350 & 350L	General Microbiology and General Microbiology Lab	5
MICR 470	Basic Immunology [2]	3
MICR 471	Immunology and Serology Laboratory [2]	2
MICR 485	Capstone Experience I: Reflecting and Planning	1
MICR 486	Capstone Experience II: Reflection and Dissemination	1
Ethics - Select one philosophy/ethics 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	
Capstone - Select one of the following capstone experiences from the following:		2
MICR 493	Undergraduate Research (Research Experience) [3]	
MICR 494	Individual Study	
MICR 497	FE/Coop Ed/Internship (Internship Experience)	
Biotechnology Elective - Select one course from the following:		2-3
BME 220	Introduction to Biomedical Engineering	
MICR 455	Microbial Biotechnology [2]	
Genetics Elective - Select one course from the following:		3
ANSC 357	Animal Genetics [2]	
MICR 482	Microbial Genetics [2]	
PLSC 431	Intermediate Genetics [2]	
Physiology Elective - Select one course from the following:		3
MICR 480	Microbial Physiology [2]	
PLSC 380	Principles of Plant Physiology [2]	
BIOL 460	Animal Physiology [2]	
Major Electives - Select 9 credits from the following:		9
ABEN 263	Biological Materials Processing	
ABEN 456	Biobased Energy [2]	
ABEN 458	Process Engineering for Food, Biofuels and Bioproducts [2]	
ASM 234	3D Printing and Manufacturing	
BIOC 473	Methods of Biochemical Research [2]	
BIOC 487	Molecular Biology of Gene Expression [2]	
CFS 462	Food Ingredient Technology [2]	
CHEM 431	Analytical Chemistry I [2]	
CPM 436	Biopolymers and Biocomposites [2]	
ENVE 240	Microbiological Principles for Environmental Engineers	
IME 456	Program and Project Management	
MICR 352	The Science Toolkit: Skills for Scientific Success	
MICR 445	Animal Cell Culture Techniques [2]	
MICR 454	Biotechnology for Sustainability [2]	
MICR 457	Microbiomes: Agriculture and Environmental Resilience [2]	
MICR 481	Microbial Genomics with Computational Laboratory [2]	

PLSC 411	Genomics [2]	
PLSC 484	Plant Tissue Culture and Biotechnology [2]	
Total Credits		**90-91**

1 MICR 189 is required for first-year students and transfer students new to NDSU.

2 Courses that offer a 600 level dual course can be taken for the B.S./M.S. accelerated program. The 600 level courses have additional outcomes/requirements that students will have to complete. Students approved for accelerated programs must complete and submit the *Accelerated Declaration form*, which will require the student and advisor to identify which graduate courses (no more than 15 credits) will be counted toward the B.S. degree.

3 The research may also be completed as BIOC or PLSC.

Degree Notes:

- An accelerated undergraduate to master's degree program is available for the B.S. in Biotechnology major to the M.S. in Microbiology. Students must have a 3.00 GPA. Instructions to apply can be found in the online catalog and a sample 5-year plan can be found on the departments website. Students may complete a thesis-based or comprehensive study-based master's program.