

Biotechnology

Department Information

- **Department Location:**
Van Es Hall
- **Department Phone:**
701-231-7520
- **Department Web Site:**
www.ndsu.edu/majors/biotech/
- **Degrees Offered:**
B.S.
- **Plan Of Study Sample:**
bulletin.ndsu.edu/programs-study/undergraduate/biotechnology/#planofstudytext

Major Requirements

Major: Biotechnology

Degree Type: B.S.

Minimum Degree Credits to Graduate: 128

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 specific by the university.
4. A minimum institutional GPA of 2.00 based on work taken at NDSU.
5. At least 36 credits presented for graduation must be in courses number 300 or higher.
6. Transfer Students: Must earn a minimum of 60 credits from a baccalaureate-degree granting or professional institution.
 - a. Of these 60, at least 36 must be NDSU residence credits as defined in #7.
 - b. Within the 36 resident credits, a minimum of 15 must be in courses numbered 300 or higher and 15 credits in the major field of study.
7. At least 36 credits must be NDSU resident credits. Residence credits include credits registered and paid for at NDSU.

For complete information, please refer to the Degree and Graduation Requirements (<http://bulletin.ndsu.edu/past-bulletin-archive/2018-19/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://bulletin.ndsu.edu/past-bulletin-archive/2018-19/academic-policies/undergraduate-policies/general-education/#genedcoursestext>).

Major requirements

| Code | Title | Credits |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Biotechnology Requirements | | |
| 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 |
| BIOC 474 | Methods of Recombinant DNA Technology | 3 |
| CHEM 465 | Survey of Physical Chemistry | 4 |
| MICR 350 & 350L | General Microbiology and General Microbiology Lab | 5 |
| MICR 470 | Basic Immunology | 3 |
| MICR 471 | Immunology and Serology Laboratory | 2 |
| MICR 482 | Bacterial Genetics & Phage | 3 |
| MICR 491 | Seminar (Biotechnology) | 1-5 |
| MICR 494 | Individual Study (Senior Research) | 2-4 |
| MICR 494 | Individual Study (Senior Thesis) | 1 |
| Supporting Requirements | | |
| AGRI 150 | Agriculture Orientation (Applies only to students earning this degree out of the College of AFSNR; Not required for students transferring in 24 or more credits) | 1 |
| 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 |
| CSCI 114 or CSCI 122 | Microcomputer Packages Introduction to Programming Concepts | 3 |
| Select one from the following: (May satisfy general education category R) | | 8 |
| MATH 146 & MATH 147 | Applied Calculus I and Applied Calculus II | |
| MATH 165 & MATH 166 | Calculus I and Calculus II | |
| Select one from the following: (May satisfy general education category S) | | 4 or 5 |
| PHYS 211 & 211L | College Physics I and College Physics I Laboratory | |
| PHYS 251 & 251L | University Physics I and University Physics I Laboratory | |
| Select one from the following: (May satisfy general education category S) | | 4 or 5 |
| PHYS 212 & 212L | College Physics II and College Physics II Laboratory | |
| PHYS 252 & 252L | University Physics II and University Physics II Laboratory | |
| 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 |
| Major Elective in Physiology: Select 3 credits from the following: | | 3 |

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------|
| BOT 380 | Plant Physiology | |
| ZOO 460 | Animal Physiology | |
| MICR 480 | Bacterial Physiology | |
| Major Elective in Biotechnology Technique: Select 4-6 credits from the following: | | 4-6 |
| BIOC 473 | Methods of Biochemical Research | |
| BIOC 487 | Molecular Biology of Gene Expression | |
| 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 | | 95-105 |

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 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

Biotechnology Minor

Required Credits: 21

| Code | Title | Credits |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------|
| 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 |
| 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 form the following: | | 6 |
| BOT 380 | Plant Physiology | |
| MICR 470 | Basic Immunology | |
| MICR 471 | Immunology and Serology Laboratory | |
| MICR 482 | Bacterial Genetics & Phage | |
| PPTH 324 | Introductory Plant Pathology | |
| ZOO 370 | Cell Biology | |
| ZOO 460 | Animal Physiology | |
| Total Credits | | 21 |

Minor Requirements and Notes

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