Biological Sciences

Department Information

- **Department Location:** 201 Stevens Hall
- **Department Phone:** 701-231-7087
- **Department Web Site:** [www.ndsu.edu/biology/](http://www.ndsu.edu/biology/)
- **Credential Offered:** B.S.; B.A.
- **Sample Program Guide:** [catalog.ndsu.edu/programs-study/undergraduate/biological-science/](http://catalog.ndsu.edu/programs-study/undergraduate/biological-science/)

Major Requirements

Major: Biological Sciences

**Degree Type:** B.A. or 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 36 credits presented for graduation must be in courses numbered 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 resident 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. Resident credits include credits registered and paid for at NDSU.

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

**University General Education Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 120</td>
<td>College Composition II</td>
<td>3</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
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</table>
### Upper Division Writing †

<table>
<thead>
<tr>
<th>Category</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Quantitative Reasoning (R) †</td>
<td>3</td>
</tr>
<tr>
<td>Science and Technology (S) †</td>
<td>10</td>
</tr>
<tr>
<td>Humanities and Fine Arts (A) †</td>
<td>6</td>
</tr>
<tr>
<td>Social and Behavioral Sciences (B) †</td>
<td>6</td>
</tr>
<tr>
<td>Wellness (W) †</td>
<td>2</td>
</tr>
<tr>
<td>Cultural Diversity (D) **</td>
<td></td>
</tr>
<tr>
<td>Global Perspectives (G) †</td>
<td></td>
</tr>
</tbody>
</table>

**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.

** College Requirements **

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Arts (BA) Degree – An additional 12 credits Humanities and Social Sciences and proficiency at the second year level in a modern foreign language. *</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Bachelor of Science (BS) Degree – An additional 6 credits in Humanities or Social Sciences *</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

* Humanities and 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 approved list of general education courses in humanities and social sciences (general education categories A and B). These credits must come from outside the department of the student’s major.

** Major Requirements **

Except for courses offered only as pass/fail grading, no course may be taken Pass/Fail

### Biological Sciences Core Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 150  &amp; 150L</td>
<td>General Biology I and General Biology I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 151  &amp; 151L</td>
<td>General Biology II and General Biology II Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 121  &amp; 121L</td>
<td>General Chemistry I and General Chemistry I Laboratory (May satisfy general education category S)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 122  &amp; 122L</td>
<td>General Chemistry II and General Chemistry II Laboratory (May satisfy general education category S)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 146  or MATH 165</td>
<td>Applied Calculus I (May satisfy general education category R) ²</td>
<td>4</td>
</tr>
<tr>
<td>STAT 330</td>
<td>Introductory Statistics</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 189</td>
<td>Skills for Academic Success ¹</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 270</td>
<td>Undergraduate Research Experience: Antibiotic Discovery</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 271</td>
<td>Undergraduate Research Experience: Field Biology and Experimental Ecology</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 272</td>
<td>Undergraduate Research Experience: Learning in Biology</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 273</td>
<td>Undergraduate Research Experience: Genomic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 274</td>
<td>Undergraduate Research Experience: Biomedical Research Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 275</td>
<td>Undergraduate Research Experience: Insect Behavior</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 315  &amp; 315L</td>
<td>Genetics and Genetics Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 359</td>
<td>Evolution</td>
<td>3</td>
</tr>
</tbody>
</table>
Select one of the emphasis areas listed below to complete the major requirements  

Total Credits 63-93

1. BIOL 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 BIOL 189.

2. Students interested in graduate programs that require 2 semesters of calculus should take MATH 165 and 166.

### Standard emphasis

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 364</td>
<td>General Ecology</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 370</td>
<td>Cell Biology</td>
<td></td>
</tr>
</tbody>
</table>

Select one from the following: 3 or 8

- CHEM 240 Survey of Organic Chemistry (or)
- CHEM 341 Organic Chemistry I
  & 341L and Organic Chemistry I Laboratory
  & CHEM 342 and Organic Chemistry II
  & CHEM 342L and Organic Chemistry II Laboratory

Select one from the following: 3 or 8

- PHYS 120 Fundamentals of Physics (or)
- PHYS 211 College Physics I
  & 211L and College Physics I Laboratory
  & PHYS 212 and College Physics II
  & PHYS 212L and College Physics II Laboratory

Select 15 credits of any 300-400 level course offered in the department 15

- BIOL 364 General Ecology (if not used to meet the above requirement)
- BIOL 370 Cell Biology (if not used to meet the above requirement)
- BIOL 379 Study Tour Abroad
- BIOL 410 Comparative Chordate Morphology
- BIOL 414 Plant Systematics
- BIOL 444 Vertebrate Histology
- BIOL 450 Invertebrate Zoology
- BIOL 452 Ichthyology
- BIOL 454 Herpetology
- BIOL 456 Ornithology
- BIOL 458 Mammalogy
- BIOL 460 Animal Physiology
- BIOL 461 Plant Ecology
- BIOL 462 Physiological Ecology
- BIOL 463 Animal Behavior
- BIOL 464 Endocrinology
- BIOL 465 Hormones and Behavior
- BIOL 470 Freshwater Ecology and Limnology
- BIOL 472 Structure and Diversity of Plants and Fungi
- BIOL 475 Conservation Biology
- BIOL 476 Wildlife Ecology and Management
- BIOL 477 Wildlife and Fisheries Management Techniques
- BIOL 479 Biomedical Genetics and Genomics
- BIOL 480 Ecotoxicology
- BIOL 481 Wetland Science
- BIOL 482 Developmental Biology
- BIOL 483 Cellular Mechanisms of Diseases

Total Credits 24-34
### Biomedical sciences emphasis

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 370</td>
<td>Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 341</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 341L</td>
<td>Organic Chemistry I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 342</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 342L</td>
<td>Organic Chemistry II Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>College Physics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211L</td>
<td>College Physics I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>College Physics II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212L</td>
<td>College Physics II Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BIOC 460</td>
<td>Foundations of Biochemistry and Molecular Biology I</td>
<td>3</td>
</tr>
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</table>

Select 12 credits from the following - at least 9 credits must have BIOL prefix

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BIOC 461</td>
<td>Foundations of Biochemistry and Molecular Biology II</td>
</tr>
<tr>
<td>BIOL 444</td>
<td>Vertebrate Histology</td>
</tr>
<tr>
<td>BIOL 460</td>
<td>Animal Physiology</td>
</tr>
<tr>
<td>BIOL 464</td>
<td>Endocrinology</td>
</tr>
<tr>
<td>BIOL 465</td>
<td>Hormones and Behavior</td>
</tr>
<tr>
<td>BIOL 479</td>
<td>Biomedical Genetics and Genomics</td>
</tr>
<tr>
<td>BIOL 482</td>
<td>Developmental Biology</td>
</tr>
<tr>
<td>BIOL 483</td>
<td>Cellular Mechanisms of Diseases</td>
</tr>
<tr>
<td>MICR 350</td>
<td>General Microbiology</td>
</tr>
<tr>
<td>MICR 460</td>
<td>Microbial Pathogenesis</td>
</tr>
<tr>
<td>MICR 470</td>
<td>Basic Immunology</td>
</tr>
<tr>
<td>BIOL Course</td>
<td>Choose one additional 3 credit 300-400 level BIOL course offered by the department</td>
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</table>

**Total Credits** 37

### Ecology and conservation Science emphasis

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 364</td>
<td>General Ecology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 475</td>
<td>Conservation Biology</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 476</td>
<td>Wildlife Ecology and Management</td>
<td></td>
</tr>
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Select one from the following: 3 or 8

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>CHEM 240</td>
<td>Survey of Organic Chemistry</td>
</tr>
<tr>
<td>CHEM 341</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>&amp; 341L</td>
<td>and Organic Chemistry I Laboratory</td>
</tr>
<tr>
<td>&amp; CHEM 342</td>
<td>and Organic Chemistry II</td>
</tr>
<tr>
<td>&amp; CHEM 342L</td>
<td>and Organic Chemistry II Laboratory</td>
</tr>
</tbody>
</table>

Select one from the following: 3 or 8

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>PHYS 120</td>
<td>Fundamentals of Physics</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>College Physics I</td>
</tr>
<tr>
<td>&amp; 211L</td>
<td>and College Physics I Laboratory</td>
</tr>
<tr>
<td>&amp; PHYS 212</td>
<td>and College Physics II</td>
</tr>
<tr>
<td>&amp; PHYS 212L</td>
<td>and College Physics II Laboratory</td>
</tr>
</tbody>
</table>

Select 9 credits from the following - at least 6 credits must have a BIOL prefix 9

<table>
<thead>
<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>BIOL 414</td>
<td>Plant Systematics</td>
</tr>
<tr>
<td>BIOL 450</td>
<td>Invertebrate Zoology</td>
</tr>
<tr>
<td>BIOL 452</td>
<td>Ichthyology</td>
</tr>
<tr>
<td>BIOL 454</td>
<td>Herpetology</td>
</tr>
<tr>
<td>BIOL 456</td>
<td>Ornithology</td>
</tr>
<tr>
<td>BIOL 458</td>
<td>Mammalogy</td>
</tr>
<tr>
<td>BIOL 460</td>
<td>Animal Physiology</td>
</tr>
<tr>
<td>BIOL 461</td>
<td>Plant Ecology</td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>BIOL 462</td>
<td>Physiological Ecology</td>
</tr>
<tr>
<td>BIOL 463</td>
<td>Animal Behavior</td>
</tr>
<tr>
<td>BIOL 470</td>
<td>Freshwater Ecology and Limnology</td>
</tr>
<tr>
<td>BIOL 472</td>
<td>Structure and Diversity of Plants and Fungi</td>
</tr>
<tr>
<td>BIOL 475</td>
<td>Conservation Biology (if not used to meet the above requirement)</td>
</tr>
<tr>
<td>BIOL 476</td>
<td>Wildlife Ecology and Management (if not used to meet the above requirement)</td>
</tr>
<tr>
<td>BIOL 477</td>
<td>Wildlife and Fisheries Management Techniques</td>
</tr>
<tr>
<td>BIOL 480</td>
<td>Ecotoxicology</td>
</tr>
<tr>
<td>BIOL 481</td>
<td>Wetland Science</td>
</tr>
<tr>
<td>RNG 450</td>
<td>Range Plants</td>
</tr>
<tr>
<td>ENT 350</td>
<td>General Entomology</td>
</tr>
<tr>
<td>ENT 470</td>
<td>Insect Ecology</td>
</tr>
<tr>
<td>MICR 350</td>
<td>General Microbiology</td>
</tr>
<tr>
<td>MICR 452</td>
<td>Microbial Ecology</td>
</tr>
<tr>
<td>MICR 460</td>
<td>Microbial Pathogenesis</td>
</tr>
<tr>
<td>PPTH 460</td>
<td>Fungal Biology</td>
</tr>
<tr>
<td>PLSC 433</td>
<td>Weed Biology and Ecology</td>
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<tr>
<td>SOIL 351</td>
<td>Soil Ecology</td>
</tr>
<tr>
<td>BIOL Course</td>
<td>Choose one additional 3 credit 300-400 level BIOL course offered by the department</td>
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</table>

**Total Credits**: 24-34

**environmental science emphasis**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 364</td>
<td>General Ecology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 480</td>
<td>Ecotoxicology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 105</td>
<td>Physical Geology</td>
<td>3</td>
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<tr>
<td>GEOL 105L</td>
<td>Physical Geology Lab</td>
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<tr>
<td>GEOL 106L</td>
<td>The Earth Through Time Lab</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 106</td>
<td>The Earth Through Time</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211L</td>
<td>College Physics I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>College Physics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 212L</td>
<td>College Physics II Laboratory</td>
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<tr>
<td>PHYS 212</td>
<td>College Physics II</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 210</td>
<td>Introduction to Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>SOIL 410</td>
<td>Soils and Land Use</td>
<td>3</td>
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</table>

Select one from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PLSC 380</td>
<td>Principles of Plant Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Plant Systematics</td>
<td></td>
</tr>
<tr>
<td>BIOL 461</td>
<td>Plant Ecology</td>
<td></td>
</tr>
<tr>
<td>BIOL 472</td>
<td>Structure and Diversity of Plants and Fungi</td>
<td></td>
</tr>
<tr>
<td>RNG 450</td>
<td>Range Plants</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following sequences:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 240</td>
<td>Survey of Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOC 260</td>
<td>and Elements of Biochemistry (or)</td>
<td></td>
</tr>
<tr>
<td>CHEM 341</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; 341L</td>
<td>and Organic Chemistry I Laboratory</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 342</td>
<td>and Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOC 460</td>
<td>and Foundations of Biochemistry and Molecular Biology I</td>
<td></td>
</tr>
</tbody>
</table>

Choose one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 431</td>
<td>Analytical Chemistry I</td>
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</tr>
<tr>
<td>&amp; 431L</td>
<td>and Analytical Chemistry I Laboratory (or)</td>
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</tr>
<tr>
<td>GEOL 428</td>
<td>Geochemistry</td>
<td></td>
</tr>
</tbody>
</table>
BIOL Courses | Choose an additional 12 credits of 300 - 400 level BIOL courses offered by the department | 12

Total Credits | 49-59

Degree and Program Note:

- **Biological Sciences Majors:** Electives taken for the Biological Sciences major cannot be double-counted with the Botany or Zoology minors. The only classes that can be double counted are BIOL 150/150L, 151/151L, and 359.