

# Biological Sciences

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## Department Information

- **Department Web Site:**  
www.ndsu.edu/biology/ (<http://www.ndsu.edu/biology/>)
- **Credential Offered:**  
B.S.; B.A.; Minor
- **Sample Program Guide:**  
[catalog.ndsu.edu/programs-study/undergraduate/biological-science/](http://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 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.

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### University General Education Requirements

Code	Title	Credits
<b>Communication (C)</b>		<b>12</b>
ENGL 110	College Composition I	
ENGL 120	College Composition II	
COMM 110	Fundamentals of Public Speaking	
Upper Division Writing <sup>†</sup>		
<b>Quantitative Reasoning (R) <sup>†</sup></b>		<b>3</b>
<b>Science and Technology (S) <sup>†</sup></b>		<b>10</b>
<b>Humanities and Fine Arts (A) <sup>†</sup></b>		<b>6</b>

<b>Social and Behavioral Sciences (B) †</b>	<b>6</b>
<b>Wellness (W) †</b>	<b>2</b>
<b>Cultural Diversity (D) **†</b>	
<b>Global Perspectives (G) **†</b>	
<b>Total Credits</b>	<b>39</b>

\*

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>).

## College Requirements

Code	Title	Credits
<b>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. *</b>		<b>12</b>
<b>Bachelor of Science (BS) Degree – An additional 6 credits in Humanities or Social Sciences *</b>		<b>6</b>

\*

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

Code	Title	Credits
<b>Biological Sciences Core Requirements</b>		
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
MATH 146 or MATH 165	Applied Calculus I (May satisfy general education category R) <sup>2</sup> Calculus I	4
STAT 330	Introductory Statistics	3
BIOL 189	Skills for Academic Success <sup>1</sup>	1
BIOL 270 or BIOL 271 or BIOL 272 or BIOL 273 or BIOL 274 or BIOL 275	Undergraduate Research Experience: Antibiotic Discovery Undergraduate Research Experience: Field Biology and Experimental Ecology Undergraduate Research Experience: Learning in Biology Undergraduate Research Experience: Genomic Analysis Undergraduate Research Experience: Biomedical Research Analysis Undergraduate Research Experience: Insect Behavior	3
BIOL 315 & 315L	Genetics and Genetics Laboratory	4
BIOL 359	Evolution	3
<b>Emphasis Area</b>		
Select one of the emphasis areas listed below to complete the major requirements		29-59
<b>Total Credits</b>		<b>63-93</b>

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

Code	Title	Credits
BIOL 364 or BIOL 370	General Ecology Cell Biology	3
Select one from the following:		3 or 8
CHEM 240	Survey of Organic Chemistry ( or	
CHEM 341 & 341L & CHEM 342 & CHEM 342L	Organic Chemistry I and Organic Chemistry I Laboratory and Organic Chemistry II and Organic Chemistry II Laboratory	
Select one from the following:		3 or 8
PHYS 120	Fundamentals of Physics (or)	
PHYS 211 & 211L & PHYS 212 & PHYS 212L	College Physics I and College Physics I Laboratory and College Physics II 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**

Code	Title	Credits
BIOL 370	Cell Biology	3
CHEM 341	Organic Chemistry I	3
CHEM 341L	Organic Chemistry I Laboratory	1
CHEM 342	Organic Chemistry II	3
CHEM 342L	Organic Chemistry II Laboratory	1
PHYS 211	College Physics I	3
PHYS 211L	College Physics I Laboratory	1
PHYS 212	College Physics II	3
PHYS 212L	College Physics II Laboratory	1
BIOC 460	Foundations of Biochemistry and Molecular Biology I	3
Select 12 credits from the following - at least 9 credits must have BIOL prefix		12
BIOC 461	Foundations of Biochemistry and Molecular Biology II	
BIOL 410	Comparative Chordate Morphology	
BIOL 444	Vertebrate Histology	
BIOL 460	Animal Physiology	
BIOL 464	Endocrinology	
BIOL 465	Hormones and Behavior	
BIOL 479	Biomedical Genetics and Genomics	
BIOL 482	Developmental Biology	
BIOL 483	Cellular Mechanisms of Diseases	
MICR 350	General Microbiology	
MICR 460	Microbial Pathogenesis	
MICR 470	Basic Immunology	
BIOL Course	Choose one additional 3 credit 300-400 level BIOL course offered by the department	3
<b>Total Credits</b>		<b>37</b>

**ecology and conservation Science emphasis**

Code	Title	Credits
BIOL 364	General Ecology	3
BIOL 475	Conservation Biology	3
or BIOL 476	Wildlife Ecology and Management	
Select one from the following:		3 or 8
CHEM 240	Survey of Organic Chemistry	
CHEM 341 & 341L & CHEM 342 & CHEM 342L	Organic Chemistry I and Organic Chemistry I Laboratory and Organic Chemistry II and Organic Chemistry II Laboratory	
Select one from the following:		3 or 8
PHYS 120	Fundamentals of Physics	
PHYS 211 & 211L & PHYS 212 & PHYS 212L	College Physics I and College Physics I Laboratory and College Physics II and College Physics II Laboratory	
Select 9 credits from the following - at least 6 credits must have a BIOL prefix		9
BIOL 414	Plant Systematics	
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 470	Freshwater Ecology and Limnology	
BIOL 472	Structure and Diversity of Plants and Fungi	
BIOL 475	Conservation Biology (if not used to meet the above requirement)	
BIOL 476	Wildlife Ecology and Management (if not used to meet the above requirement)	
BIOL 477	Wildlife and Fisheries Management Techniques	
BIOL 480	Ecotoxicology	
BIOL 481	Wetland Science	
RNG 450	Range Plants	
ENT 350	General Entomology	
ENT 470	Insect Ecology	
MICR 350	General Microbiology	
MICR 452	Microbial Ecology	
MICR 460	Microbial Pathogenesis	
PPTH 460	Fungal Biology	
PLSC 433	Weed Biology and Ecology	
SOIL 351	Soil Ecology	
BIOL Course	Choose one additional 3 credit 300-400 level BIOL course offered by the department	3

**Total Credits****24-34****environmental science emphasis**

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

Select one from the following:

3

PLSC 380	Principles of Plant Physiology	
BIOL 414	Plant Systematics	
BIOL 461	Plant Ecology	
BIOL 472	Structure and Diversity of Plants and Fungi	
RNG 450	Range Plants	

Select one of the following sequences:

3 or 8

CHEM 240 & BIOC 260	Survey of Organic Chemistry and Elements of Biochemistry (or)	
CHEM 341 & 341L & CHEM 342 & BIOC 460	Organic Chemistry I and Organic Chemistry I Laboratory and Organic Chemistry II and Foundations of Biochemistry and Molecular Biology I	

Choose one of the following:

3 or 8

CHEM 431 & 431L	Analytical Chemistry I and Analytical Chemistry I Laboratory (or)	
GEOL 428	Geochemistry	

**Total Credits****49-59****Degree and Program Note:**

- Botany and/or Zoology minors: Students completing a botany or zoology minor along with their biological sciences major must take a 300 or 400 level elective in the minor that is different from any 300 or 400 level electives taken for the major emphasis area. The only classes that students can take in common for the biological sciences major and the botany and/or zoology minor are the BIOL 150/150L, BIOL 151/151L, and BIOL 359 courses.
- Except for courses offered only with pass/fail grading, no course may be requested to take as Pass/Fail grading for this major.

**Minor Requirements****Minor: Biological Sciences**

Required Credits: 17

**Minor Requirements**

Code	Title	Credits
<b>Required Courses</b>		
BIOL 150	General Biology I	3
BIOL 150L	General Biology I Laboratory	1
BIOL 151	General Biology II	3
BIOL 151L	General Biology II Laboratory	1
BIOL 359	Evolution	3
<b>Select one of the following:</b>		<b>3</b>
BIOL 364	General Ecology	
BIOL 370	Cell Biology	
<b>Electives: Select one of the 300-400 level courses listed below</b>		<b>3</b>
BIOL 364	General Ecology (if not used above)	
BIOL 370	Cell Biology (if not used above)	
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****17****Minor Requirements and Notes**

- A minimum of 8 credits must be taken at NDSU.
- Classes taken for the biological sciences minor cannot be double-counted with courses taken to fulfill botany and/or zoology minors. The credits must be unique from courses used to fulfill the biological sciences minor. The only classes that can be double counted are BIOL 150/L, 151/L, and 359.