

Biological Sciences

Department Information

- **Department Web Site:**
www.ndsu.edu/biology/ (<http://www.ndsu.edu/biology/>)
- **Credential Offered:**
 B.S.; B.A.; Minor
- **Official Program Curriculum:**
catalog.ndsu.edu/undergraduate/program-curriculum/biological-sciences/ (<http://catalog.ndsu.edu/undergraduate/program-curriculum/biological-sciences/>)

Biological sciences is an exciting, rewarding area of science that prepares students for a variety of careers. Biology is at the intersection of many societal challenges including environmental quality and human health, and our students finish their degrees well prepared to help solve these problems. The program provides hands-on experience in biological research and focuses on student experience and interests. Department faculty are involved in scientific research that answers questions in molecular and cellular biology, evolution, population biology, ecology, and science education. Students interested in biological sciences will need a strong interest and aptitude in the sciences and possess the ability to think both analytically and comprehensively.

CAREER Opportunities

Students graduate with an excellent foundation to pursue rewarding careers or gain admission into graduate and professional programs. Our graduates pursue many different careers including medical doctors, optometrists, dentists, physician assistants, chiropractors, genetic counselors, veterinarians, state and federal wildlife biologists, naturalists, wildlife rehabilitators, directors of zoological parks, conservation biologists, environmental consultants, teachers, and researchers. Students leave well-prepared to continue in graduate degree programs that require a solid background in the biological sciences. Most professional scientists can anticipate graduate education as being essential for career advancement.

High School Preparation

High school students are encouraged to take year-long courses in biology, chemistry, physics, algebra, geometry and trigonometry and, if available, an advanced science course and pre-calculus.

The Program

The program integrates studies in zoology, botany, and biological sciences and offers students the flexibility to customize their field of study to align course selection with educational and professional goals. The program integrates broad-based biology foundation classes with specializations, such as biomedical science or conservation biology, in later years. With appropriate course selection, the biological sciences degree provides a broad understanding of the complex relationship between the living and nonliving world. Students choose a research-based course in biology that focuses on antibiotics, wild-life ecology and conservation, STEM education, genomics, or biomedical research. Students have the option to choose an emphasis in Biomedical Science, Ecology and Conservation, or Environmental Sciences. Students planning to enter a health professional program, such as medical school, should refer to the plan of study for the Biomedical Science emphasis. Minors are available in Zoology and Botany with a Biological Sciences minor option for non-biology majors.

PROGRAM OUTCOMES

1. Makes connections between biology, the physical sciences and math.
2. Identifies scientific issues and uses the scientific method, including experimental design, data collection, analysis, and interpretation.
3. Understands the philosophical underpinnings of scientific reasoning.
4. Demonstrates the ability to use sources of information in biology, including published literature and scientific databases, and to evaluate the quality of information sources.
5. Demonstrates the ability to acquire and analyze experimental data and use quantitative analysis to interpret biological data.
6. Demonstrates the ability to develop numerical and graphical models and to simulate biological mechanisms.
7. Demonstrates the ability to use scientific techniques necessary for data gathering and analysis.
8. Communicates effectively in writing, speech, and visual presentations within a variety of contexts.
9. Understands the role of teamwork and individual effort in scientific endeavors; discusses issues constructively and appreciates different ideas and viewpoints.
10. Understands professional standards in science and its applications, including the responsible use of information.

Related Experiences

Career and professional program opportunities are enhanced by work experiences and extra-curricular involvement including student organization participation, internships, volunteering, work and research experiences. Part-time, science-related work and research experiences are available in several North Dakota State University departments, as well as at the nearby U.S. Department of Agriculture laboratories. Off-campus work, such

as summer employment with public agencies or private organizations, is especially valuable and has sometimes been the entry point for a first permanent position after graduation. NDSU offers many extra-curricular activities, including student organizations suitable to diverse personal and professional interests.

Accelerated Program

The Department of Biological Sciences offers an Accelerated Bachelor and Master of Science program. The program allows students to begin thesis research during their junior year and simultaneously pursue their Bachelor of Science and Master of Science degrees in biological sciences. Students will work closely with a faculty member in our department who will serve as a mentor. The program is designed to produce a research-based master's degree. Students must be at junior standing with a minimum cumulative GPA of 3.5.

Sample Program Guide

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To ensure proper program completion, enrolled students should utilize Degree Map (<https://www.ndsu.edu/registrar/degreemap/>) and Schedule Planner (<https://www.ndsu.edu/onestop/degree-map-and-planning/>) in Campus Connection and consult regularly with their academic advisor to ensure requirements are being met.

First Year			
Fall	Credits	Spring	Credits
BIOL 189		1 BIOL 151 & 151L	4
BIOL 150 & 150L		4 CHEM 122 & 122L	4
CHEM 121 & 121L		4 ENGL 120	3
ENGL 110		3 MATH 146 or 165	4
MATH 103		3	
		15	15
Second Year			
Fall	Credits	Spring	Credits
BIOL 315 & 315L		4 PHYS 120 or 211 <i>and</i> 211L <i>and</i> 212 <i>and</i> 212L	3
BIOL 270, 271, 272, 273, 274, or 275		3 BIOL 364 or 370	3
CHEM 240 or 341 <i>and</i> 341L <i>and</i> 342 <i>and</i> 342L		3-8 Social & Behavioral Sciences Gen Ed	3
COMM 110		3 Wellness Gen Ed	2
STAT 330		3 BIOL 359	3
		Free elective	3
		16-21	17
Third Year			
Fall	Credits	Spring	Credits
BIOL 300-400 Elective		3 BIOL 300-400 Elective	3
ENGL 324		3 Free Elective	6
Free Elective		6 College requirement	3
Humanities & Fine Arts/Cultural Diversity Gen Ed		3 Social & Behavioral Science/Global Perspective Gen Ed	3
		15	15

Fourth Year			
Fall	Credits	Spring	Credits
BIOL 300-400 Elective		6 BIOL 300-400 Elective	3
Free Elective		6 Free Elective	6
Humanities & Fine Arts Gen Ed		3 College requirement	3
		15	12

Total Credits: 120-125

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biomedical science emphasis

First Year			
Fall	Credits	Spring	Credits
BIOL 189		1 BIOL 151	3
BIOL 150		3 BIOL 151L	1
BIOL 150L		1 CHEM 122	3
CHEM 121		3 CHEM 122L	1
CHEM 121L		1 MATH 146	4
MATH 103		3 ENGL 120	3
ENGL 110		3	
		15	15

Second Year			
Fall	Credits	Spring	Credits
BIOL 315		3 BIOL 270 or 274	3
BIOL 315L		1 CHEM 342	3
BIOL 370		3 CHEM 342L	1
CHEM 341		3 PSYC 111 (Soc/Beh Gen Ed)	3
CHEM 341L		1 SOC 110 (Soc/Beh Gen Ed)	3
COMM 110		3 Free elective	3
STAT 330		3	
		17	16

Third Year			
Fall	Credits	Spring	Credits
PHYS 211		3 BIOL 359	3
PHYS 211L		1 PHYS 212	3
BIOC 460		3 PHYS 212L	1
ENGL 324		3 Recommended Pre-Requisite	3
Wellness Gen Ed		2 Humanities and Fine Arts/Cultural Diversity Gen Ed	3

BIOL 300-400 Elective		3		
		15		13
Fourth Year				
Fall	Credits		Spring	Credits
BIOL 300-400 Electives		6	BIOL 300-400 Electives	6
Recommended pre-requisite		3	Recommended Pre-Requisite	6
Humanities and Fine Arts/Global Perspective Gen Ed		3	College Requirement	3
College Requirement		3		
		15		15

Total Credits: 121

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ecology and conservation emphasis

First Year				
Fall	Credits		Spring	Credits
BIOL 189		1	BIOL 151	3
BIOL 150		3	BIOL 151L	1
BIOL 150L		1	CHEM 122	3
MATH 103		3	CHEM 122L	1
CHEM 121		3	MATH 146	4
CHEM 121L		1	ENGL 120	3
ENGL 110		3		
		15		15
Second Year				
Fall	Credits		Spring	Credits
CHEM 240		3	PHYS 120	3
BIOL 271 or 275		3	BIOL 359	3
BIOL 315		3	Free elective	3
BIOL 315L		1	Social & Behavioral Sciences Gen Ed	3
STAT 330		3	Humanities & Fine Arts Gen Ed	3
COMM 110		3		
		16		15
Third Year				
Fall	Credits		Spring	Credits
BIOL 364		3	BIOL 300-400 Elective	3
BIOL 475 or 476		3	ENGL 324	3
Social & Behavioral Sciences Gen Ed		3	College Requirement	3
Wellness Gen Ed		3	Global Perspectives Gen Ed	3

Free elective	3	Free elective	3
15		15	

Fourth Year			
Fall	Credits	Spring	Credits
BIOL 300-400 Elective		3 BIOL 300-400 Elective	3
BIOL 300-400 Elective		3 Humanities & Fine Arts Gen Ed	3
Cultural Diversity Gen Ed		3 Free electives	9
College requirement		3	
Free elective		3	
15		15	

Total Credits: 121

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environmental science emphasis

First Year			
Fall	Credits	Spring	Credits
BIOL 189		1 BIOL 151	3
BIOL 150		3 BIOL 151L	1
BIOL 150L		1 MATH 146	4
MATH 103		3 CHEM 122	3
CHEM 121		3 CHEM 122L	1
CHEM 121L		1 ENGL 120	3
ENGL 110		3	
15		15	

Second Year			
Fall	Credits	Spring	Credits
BIOL 315		3 BIOL 359	3
BIOL 315L		1 BIOC 260	4
CHEM 240		3 SOIL 210	3
COMM 110		3 Wellness Gen Ed	2-3
STAT 330		3 Humanities & Fine Arts Gen Ed	3
BIOL 271, 270, 272, 273, 274, or 275		3	
16		15-16	

Third Year			
Fall	Credits	Spring	Credits
BIOL 364		3 BIOL 480 ^{Spring even years}	3
GEOL 105		3 BIOL 300-400 Elective	3
GEOL 105L		1 GEOL 106	3
PHYS 211		3 GEOL 106L	1

PHYS 211L		1	PHYS 212		3
BIOL 300-400 Plant course requirement from list		3	PHYS 212L		1
Humanities & Fine Arts/Cultural Diversity Gen Ed		3	Social & Behavioral Sciences Gen Ed		3
		17			17
Fourth Year					
Fall	Credits		Spring		Credits
BIOL 300-400 Elective		3	BIOL 300-400 Elective		3
BIOL 300-400 Elective		3	SOIL 410		3
GEOL 428 or CHEM 431 <i>and</i> CHEM 431L		3	College Requirement		3
ENGL 324		3	Social & Behavioral Sciences/Global Perspective Gen Ed		3
College Requirement		3			
		15			12
Total Credits: 122-123					