

BIOLOGICAL SCIENCES, B.S.

Contact

Dr. Steven Travis
Director, School of Biological Sciences
stravis@une.edu

Dr. Kristin Burkholder
Assistant Director, School of Biological Sciences
kburkholder@une.edu

Mission

At the heart of our mission lies a dedication to nurturing a vibrant learning environment where students are active participants and collaborators. We believe in the transformative power of experiential learning, in guiding students through hands-on experiences that bridge the gap between theory and practice, and in preparing them to navigate real-world challenges with confidence and insight. We strive to create welcoming spaces where every voice is heard and valued. Grounded in academic rigor and scientific integrity, we equip students with the tools and knowledge to critically engage with complex biological concepts and global issues. As stewards of both knowledge and the environment, we inspire a sense of responsibility and encourage innovation for a healthier planet.

Our Core Values

Student Centeredness: Every decision we make is predicated by the question, "What is best for our students?"

Community and Belonging: We celebrate the many backgrounds, perspectives, and experiences within our community. By promoting a culture of belonging and mutual respect, we strive to create a supportive and welcoming environment where all individuals can thrive and contribute.

Experiential Learning: Students learn best by doing. We value hands-on experiences and reflection so students can connect theories and knowledge learned in the classroom to real-world situations.

Information Literacy: We strive to instill students with knowledge and skills needed to develop a data-driven understanding of biological processes and their global implications.

Academic Rigor: We embrace uncompromising standards of academic rigor and strive for excellence in all facets of teaching and research.

Scientific Integrity: We adhere to the highest professional and ethical standards when teaching, conducting, and reporting research.

Environmental Stewards: We promote environmental stewardship by fostering an understanding of biological systems and their susceptibility to human impacts, and by recognizing our shared responsibility for planetary health.

Collaboration: Scientific progress thrives when minds come together. We strive to create a collaborative environment where students and instructors come together to engage in teamwork through shared learning experiences and joint research projects.

Major Description

The Biological Sciences major provides a broad background for students interested in biology. The core program is flexible, thereby permitting the student latitude in the area of emphasis. However, students who wish to narrow their focus can elect a concentration in either Cellular and Molecular Biology or Ecology and Evolutionary Biology. A goal of the major is to provide students with the necessary background for entry-level career positions and graduate study.

The school also offers Biological Sciences majors the opportunity to select all of the EDU secondary education certification courses (listed below) as their electives to become middle or high school teachers (grades 7–12) in life science.

The Pre-Health Professions Advisory Committee

The Pre-Health Professions Advisory Committee (<https://www.une.edu/cas/schools/biological-sciences-2/>) (PHPAC) consists of professional staff and faculty members of the College of Arts and Sciences. The major function of this committee is to draft letters of evaluation for students applying to health professions programs such as medical, dental, and veterinary schools. Interested students should view our web page for information regarding the protocol for obtaining a PHPAC letter of evaluation.

Graduation Requirements

A minimum grade of C- must be achieved in all BIO, CHE, PHY, and MAT courses used to fulfill the requirements of the Biological Sciences major. A 2.00 cumulative average in sciences is a requirement for graduation in any of the programs in the School of Biological Sciences.

Students in this major can participate in the pre-health graduate school preparation tracks (<https://www.une.edu/catalog/2025-2026/graduate/science-prerequisites-health-professions/>)

Honors Program

We offer qualified students the option of graduating with Honors. This includes significant research, scholarship or creative activity under the direction of a faculty member. Interested students should consult with their advisor.

Transfer Credit

See Undergraduate Admissions (<https://catalog.une.edu/undergraduate/admissions/>) for more information.

Admissions

See Undergraduate Admissions (<https://catalog.une.edu/undergraduate/admissions/>) for more information.

Financial Information

Tuition and fees for subsequent years may vary. Other expenses include books and housing. For more tuition and fee information, please consult this catalog's Financial Information (<https://catalog.une.edu/undergraduate/financial-information-undergraduate-programs/>) section.

Curricular Requirements

Code	Title	Hours
	Nor'easter Core Requirements	40
	Nor'easter Core Requirements (https://catalog.une.edu/undergraduate/core-curriculum/)	40

Program Required Courses

BIO 105 & 105L	Biology I: Ecology/Evolution and Bio I: Ecology/Evolution Lab	4
BIO 106 & 106L	Biology II: Cellular/Molecular and Bio II:Cellular/Molecular Lab	4
BIO 214 & 214L	Genetics and Genetics Lab	4
BIO 400-level capstone ¹		3-4
CHE 110 & 110L or CHE 150	General Chemistry I and General Chemistry I Lab University General Chemistry I	4
CHE 111 & 111L or CHE 151	General Chemistry II and General Chemistry II Lab University General Chemistry II	4
CHE 201 & 201L or CHE 250 & 250L & 250S	Organic Chemistry I and Organic Chemistry I Lab University Organic Chemistry I and University Organic Chemistry I Lab and University Organic Chemistry I Lab Lecture	4-5
CHE 202 & 202L or CHE 251 & 251L & 251S or CHE 310 & 310L	Organic Chemistry II and Organic Chemistry II Lab University Organic Chemistry II and University Organic Chemistry II Lab and University Organic Chemistry II Lab Lecture Fundamentals of Biochemistry and Biochemistry Lab	4-5
Select one of the following: 3		
MAT 150	Statistics for Life Sciences (Biological Sciences Core Program and Cellular and Molecular Biology concentration)	
MAT 151	Statistics for Environmental Sciences (Ecology and Evolutionary Biology concentration)	
MAT 190	Calculus I	4
PHY 110 or PHY 210	General Physics I w/Lab University Physics I	4
PHY 111 or PHY 211	General Physics II w/Lab University Physics II	4
Select one course from each topic area below: ²		
<i>Cellular & Molecular Area Courses</i>		
BIO 203 & 203L	and (Histology w/Lab)	
BIO 365	Immunology	
BIO 370	Cell & Molecular Biology	
<i>Ecology & Evolutionary Biology Area Courses</i>		
BIO 307	Conservation Genetics	
BIO 328	Human Evolution	
BIO 329	Disease Ecology	
BIO 333	Evolution	
BIO 350 & 350L	Ecology and Ecology Lab	
MAR 335 & 335L	Animal Behavior and Behavioral Ecology and Animal Behav/Behav Ecology Lab	
<i>Organismal Biology Area Courses ²</i>		
BIO 204 & 204L	Parasitology and Parasitology Lab	

BIO 232 & 232L or BIO 234 & 234L	Microbiology and Microbiology Lab Environmental Microbiology and Environmental Microbiology Lab	
BIO 235 & 235L	Winter Natural History and Winter Natural History Lab	
BIO 254	Medicinal Plant Biology	
BIO 305 & 305L	Mammalogy and Mammalogy Lab	
BIO 306	Virology	
BIO 314 & 314L	Herpetology and Herpetology Lab	
BIO 319 & 319L	Ornithology and Ornithology Lab	
MAR 320 & 320L	Invertebrate Zoology and Invertebrate Zoology Lab	
MAR 331 & 331L	Biology of Fishes and Biology of Fishes Lab	

Open Elective Courses (Students complete open elective credits as necessary to meet the University's 120-credit minimum for graduation. The total number of elective credits required will depend on the student's completed program, core, and other degree requirements.)

Total Hours **126-129**

- ¹ Course is to be selected in consultation with your faculty advisor. Not satisfied by BIO 410 Biological Sciences Research, BIO 495 Adv Biological Sci Internship or Internship/Research Courses.
- ² Topic Area courses are to be selected in consultation with your faculty advisor.

Please note: While some courses can fulfill both core and program requirements, the credits earned do not count twice towards the minimum total required credits for the degree.

BIO 290 Biological Topics may fulfill biology area requirements depending on the subject matter and advisor permission.

Additional Guidelines

Students wishing to pursue teacher certification in Life Science can complete a double major with Biological Sciences and Middle and Secondary Education or a major in Middle and Secondary Education and a concentration in Biological Sciences. For more information, see the Middle and Secondary Education catalog page. (<https://catalog.une.edu/programs/middle-secondary-education-certification-bs/>)

Concentrations

Biological Sciences students who wish to narrow their focus beyond the core program can elect a concentration in either Cellular and Molecular Biology or Ecology and Evolutionary Biology. Please see the Curricular Requirements section for details.

Concentration Options**Optional Concentration in Cellular and Molecular Biology Required Courses**

Code	Title	Hours
BIO 105 & 105L	Biology I: Ecology/Evolution and Bio I: Ecology/Evolution Lab	4

BIO 106 & 106L	Biology II: Cellular/Molecular and Bio II:Cellular/Molecular Lab	4
BIO 214 & 214L	Genetics and Genetics Lab	4
BIO 370	Cell & Molecular Biology	3
BIO 407	Developmental Biology	3
BIO 400-level capstone course ¹		3-4
Ecology & Evolutionary Biology Area Course ²		3-4
Organismal Biology Area Course ²		3-4
Cognate Chemistry, Physics, and Math Courses (same as above program requirements)		31-33
Total Hours		58-63

¹ Course is to be selected in consultation with your faculty advisor. Not satisfied by BIO 410 Biological Sciences Research, BIO 495 Adv Biological Sci Internship or Internship/Research Courses.

² Topic Area courses are to be selected in consultation with your faculty advisor and can be found in the Curricular Requirements section.

Optional Concentration in Ecology and Evolutionary Biology Required Courses

Code	Title	Hours
BIO 105 & 105L	Biology I: Ecology/Evolution and Bio I: Ecology/Evolution Lab	4
BIO 106 & 106L	Biology II: Cellular/Molecular and Bio II:Cellular/Molecular Lab	4
BIO 214 & 214L	Genetics and Genetics Lab	3-4
or BIO 322	Comparative Animal Physiology	
BIO 333	Evolution	3
BIO 350 & 350L	Ecology and Ecology Lab	4
BIO 400-level capstone course ¹		3-4
Organismal Biology Topic Area ²		3-4
Ecology & Evolutionary Biology Area Course or a second Organismal Biology Area Course ²		3-4
Cognate Chemistry, Physics, and Math Courses (same as above program requirements)		31-33
Total Hours		58-64

¹ Course is to be selected in consultation with your faculty advisor. Not satisfied by BIO 410 Biological Sciences Research, BIO 495 Adv Biological Sci Internship or Internship/Research Courses.

² Topic Area courses are to be selected in consultation with your faculty advisor and can be found in the Curricular Requirements section.

Please note: While some courses can fulfill both core and program requirements, the credits earned do not count twice towards the minimum total required credits for the degree.

Learning Outcomes

The expected learning outcomes for students graduating with a Bachelor of Science degree from the School of Biological Sciences include:

1. Process of Science: Scientific Thinking and Information Literacy
 - a. Explain how science generates knowledge of the natural world, and locate, interpret, and evaluate scientific information.
 - b. Apply science process skills to address a research question in a course-based or independent research experience, which includes being able to: pose testable questions and hypotheses to address gaps in knowledge, plan, evaluate, and implement scientific investigations, and interpret, evaluate, and draw conclusions from data to make evidence-based arguments about the natural world.
 - c. Recognize the important roles that scientific models and simulations of many different types (conceptual, mathematical, physical, etc.) play in predicting and communicating biological phenomena, making inferences, and solving problems.
2. Interdisciplinary and Communicative Nature of Science
 - a. Connect scientific knowledge by integrating concepts across multiple fields of biology (e.g., cell and molecular biology, ecology and evolution, anatomy, physiology) and other STEM disciplines (e.g., chemistry, physics) in order to generate interdisciplinary solutions to real-world problems.
 - b. Communicate ideas, data, and findings clearly and accurately with others to enable productive teamwork among people of diverse backgrounds, skill sets, and perspectives, which includes being able to:
 - i. Provide and respond to constructive feedback to improve individual and team-based work while reflecting on your learning, performance, and achievements.
 - ii. Critically analyze ethical issues in the conduct of science while considering the potential impacts of outside influences (historical, cultural, political, technological, etc.) on how science is practiced.