

Artificial Intelligence and Biology, BS (Boston)

The artificial intelligence and biology major provides a strong foundation in biology, chemistry, and mathematics, as well as software development and algorithms. Students study the collection, manipulation, storage, retrieval, and computational analysis of data in its various forms, including numeric, textual, image, and video data from small to large volumes. Students also explore the organization and processes of life across broad areas of the field, from molecules and cells through organs and organ systems to populations, ecosystems, and evolution.

Program Requirements

Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified and complete any additional courses needed beyond specific college and major requirements to satisfy graduation credit requirements.

Universitywide Requirements

All undergraduate students are required to complete the Universitywide Requirements (<https://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/>).

NUPath Requirements

All undergraduate students are required to complete the NUPath Requirements (<https://catalog.northeastern.edu/undergraduate/university-academics/general-education-requirements/#nupathtext>).

Artificial Intelligence Requirements

Code	Title	Hours
Computer Science Overview		
Must be taken in alignment with your home college:		
CS 1200	First Year Seminar	1
or BIOL 1000	Biology at Northeastern	
or INPR 1000	First-Year Interdisciplinary Seminar	
or INSC 1000	Science at Northeastern	
CS 1210	Professional Development for Khoury Co-op	1
or EESC 2000	Professional Development for Co-op	
Fundamental Courses		
All students can take a self-assessment to attempt to place out of CS 2000 and CS 2001. Students who place out of CS 2000 and CS 2001 will instead substitute with 4-5 semester hours of CS, CY, or DS coursework at the 3000 level or higher not otherwise required in the degree.		
CS 2000 and CS 2001	Introduction to Program Design and Implementation and Lab for CS 2000	5
CS 2100 and CS 2101	Program Design and Implementation 1 and Lab for CS 2101	5
DS 3500	Advanced Programming with Data	4
CS 3200	Introduction to Databases	4
MATH 1365 or MATH 1465	Introduction to Mathematical Reasoning Intensive Mathematical Reasoning	4
Artificial Intelligence Foundations		
DS 3000	Mathematical Foundations of Artificial Intelligence	4
DS 4200	Information Presentation and Visualization	4
DS 4300	Large-Scale Information Storage and Retrieval	4
DS 4400	Machine Learning	4
Khoury Approved Electives		
With advisor approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.		
Complete 4 semester hours from within the following options:		4
CS 2300 or higher, except CS 5010		
CY 2000 or higher, except CY 4930		
DS 2500 or higher, except DS 4900		
EECE 2160	Embedded Design: Enabling Robotics	
EECE 2322	Fundamentals of Digital Design and Computer Organization	

MKTG 4606	Digital, Analytics, Technology, and Automation Research Practicum	
Statistics Foundations		
ENVR 2500 and ENVR 2501	Biostatistics and Lab for ENVR 2500	5

Writing Requirements

Code	Title	Hours
College Writing		
ENGW 1111 or ENGW 1102	First-Year Writing First-Year Writing for Multilingual Writers	4
Advanced Writing in the Disciplines		
ENGW 3302 or ENGW 3315 or ENGW 3307	Advanced Writing in the Technical Professions Interdisciplinary Advanced Writing in the Disciplines Advanced Writing in the Sciences	4

Biology Requirements

Code	Title	Hours
Biology Core Courses		
BIOL 1107 and BIOL 1108	Foundations of Biology and Lab for BIOL 1107	5
BIOL 2299	Inquiries in Biological Sciences	4
BIOL 2301 and BIOL 2302	Genetics and Molecular Biology and Lab for BIOL 2301	5
BIOL 2309 or BIOL 2407	Biology Project Lab Computational Project Lab	4
BIOL 3611 and BIOL 3612	Biochemistry and Lab for BIOL 3611	5
Intermediate and Advanced Biology Elective		
Complete one of the following:		4
BIOL 2327 to BIOL 3999		
BIOL 4705 to BIOL 5999		
EEMB 2290 to EEMB 5515		
EEMB 5520 to EEMB5534		
EEMB 5548 to EEMB 5569		
<i>Research</i>		
BIOL 4991	Research	
BIOL 4970	Junior/Senior Honors Project 1	
BIOL 4971	Junior/Senior Honors Project 2	
BIOL 4994	Internship	

Organismal and Evolutionary Biology Elective

Complete one course and its corresponding lab, if indicated:		4-5
BIOL 2327	Human Parasitology	
BIOL 3401	Comparative Vertebrate Anatomy	
BIOL 3413	Current Topics in Organismal and Population Biology	
BIOL 3427	Microbial Evolution	
BIOL 3451	Avian Biology	
BIOL 5585	Evolution	
EEMB 2302 and EEMB 2303	Ecology and Lab for EEMB 2302	
EEMB 2400	Introduction to Evolution	
EEMB 2700 and EEMB 2701	Marine Biology and Lab for EEMB 2700	
EEMB 3460	Conservation Biology	
EEMB 3466	Disease Ecology	
EEMB 3600	Animal Behavior	

Supporting Courses for Biology*Chemistry*

A grade of D or better is required in CHEM 1161 and CHEM 1162.

CHEM 1161 and CHEM 1162	General Chemistry for Science Majors and Lab for CHEM 1161	5
CHEM 2311 and CHEM 2312	Organic Chemistry 1 and Lab for CHEM 2311	5
CHEM 2313 and CHEM 2314	Organic Chemistry 2 and Lab for CHEM 2313	5

Physics

PHYS 1145 and PHYS 1146 or PHYS 1151 or PHYS 1161	Physics for Life Sciences 1 and Lab for PHYS 1145 (Preferred) Physics for Engineering 1 Physics 1	5
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Math

MATH 1341	Calculus 1 for Science and Engineering	4
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Integrative Requirements

Code	Title	Hours
Integrative Course		
Complete one of the following:		4
BINF 6310	Introduction to Bioinformatics	
BIOL 4707	Cell and Molecular Biology	
BIOL 5581	Biological Imaging	
BIOL 5591	Advanced Genomics	

Capstone

Choose one:		4
BIOL 4701	Biology Capstone	
BIOL 4900	Biology Research Capstone (concurrent with BIOL 4991 or BIOL 4994, which may be used toward Intermediate/Advanced Biology Electives)	
BIOL 4971	Junior/Senior Honors Project 2	

Required General Electives

Code	Title	Hours
Complete 20 semester hours of general electives.		20

Science GPA Requirement (Biology)

A minimum 2.000 GPA in the following course codes is required: BIOC, BIOL, BNSC, CHEM, EEMB, ENVR, MATH, PHYS, PSYC.

NUpath Requirements Satisfied

- Advanced Writing in the Disciplines
- Analyzing and Using Data
- Conducting Formal and Quantitative Reasoning
- Demonstrating Thought and Action in a Capstone
- Engaging with the Natural and Designed World
- Writing in the First Year
- Writing-Intensive in the Major

Integrating Knowledge and Skills Through Experience is satisfied through co-op.

Program Requirement

138 total semester hours required