Artificial Intelligence and Environmental and Sustainability Sciences, BS (Boston)

The artificial intelligence and environmental and sustainability sciences combined major focuses on major environmental challenges facing our planet and provides broad training to understand how these challenges can be met through advances in artificial intelligence. Understanding these processes requires acquisition and analysis of large amounts of data—an ideal fit with artificial intelligence, where 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.

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 Courses

Code	Title	Hours
Computer Science Overview		
Must be taken in alignment with your home college:		
CS 1200	First Year Seminar	1
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 2100	5
CS 3200	Introduction to Databases	4
DS 3500	Advanced Programming with Data	4
MATH 1365	Introduction to Mathematical Reasoning	4
or MATH 1465	Intensive Mathematical Reasoning	
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
DS 4420	Advanced 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 and EECE 2323	Fundamentals of Digital Design and Computer Organization and Lab for EECE 2322
MKTG 4606	Digital, Analytics, Technology, and Automation Research Practicum

Environmental Science and Sustainability Courses

Code	Title	Hours
Environmental and Sustainability Sciences Major Requirements		
EEMB 2302 and EEMB 2303	Ecology and Lab for EEMB 2302	5
ENVR 1400 and ENVR 1401	Foundations in Environmental and Sustainability Sciences and Lab for ENVR 1400	5
ENVR 1200 and ENVR 1201	Dynamic Earth and Lab for ENVR 1200	4-5
or ENVR 2200	Earth's Changing Cycles	
ENVR 2515	Sustainable Development	4
Skills Courses		
Complete one of the following:		4-5
ENVR 3300 and ENVR 3301	Geographic Information Systems and Lab for ENVR 3300	
ENVR 5260	Geographical Information Systems	
Environmental and Sustainability Sciences Electives		
Complete any 4 courses from this list:		16-19
ENVR 4970	Junior/Senior Honors Project 1	
Earth Oceans and Environmental Change		
ENVR 2310 and ENVR 2311	Earth Materials and Lab for ENVR 2310	
ENVR 2340 and ENVR 2341	Earth Landforms and Processes and Lab for ENVR 2340	
ENVR 3125	Global Oceanic Change	
or ENVR 3600	Oceanography	
ENVR 4500 and ENVR 4501	Applied Hydrogeology and Lab for ENVR 4500	
ENVR 5150	Climate and Atmospheric Change	
ENVR 5190	Soil Science	
ENVR 5600	Coastal Processes, Adaptation, and Resilience	
ENVR 5670	Global Biogeochemistry	
Conservation, Restoration, and Management		
EEMB 2400	Introduction to Evolution	
EEMB 3460	Conservation Biology	
EEMB 3465	Ecological and Conservation Genomics	
EEMB 4001	Landscape and Restoration Ecology	
ENVR 4505	Wetlands	
ENVR 5700	Streams and Watershed Ecology	
ENVR 5750	Urban Ecology	
Sustainable Planning and Development		
ENVR 3150	Food Security and Sustainability	
ENVR 3200	Water Resources	
ENVR 5000	Community Stakeholder Engagement in Environmental Management and Research	
ENVR 5210	Environmental Planning	
ENVR 5350	Sustainable Energy and Climate Solutions	
ENVR 5563	Advanced Spatial Analysis	
ENVR 5800	Climate Adaptation and Nature-Based Solutions	
Environment and Society		

ENVR 5220	Ecosystem-Based Management
ENVR 5450	Applied Social-Ecological Systems Modeling
ENVR 5800	Climate Adaptation and Nature-Based Solutions
POLS 2395	Environmental Politics and Policy
PPUA 5260	Ecological Economics
PPUA 5268	International Environmental Policy
SOCL 2485	Environment, Technology, and Society

Supporting Courses

Code	Title	Hours
Calculus		
ENVR 2500 and ENVR 2501	Biostatistics and Lab for ENVR 2500	5
MATH 1341	Calculus 1 for Science and Engineering	4
Chemistry		
CHEM 1161 and CHEM 1162 and CHEM 1163	General Chemistry for Science Majors and Lab for CHEM 1161 and Recitation for CHEM 1161	5

English Requirement

Code	Title	Hours
College Writing		
ENGW 1111	First-Year Writing	4
or ENGW 1102	First-Year Writing for Multilingual Writers	
Advanced Writing in the Disciplines		
Complete one of the following:		4
ENGW 3302	Advanced Writing in the Technical Professions	
ENGW 3303	Advanced Writing in the Environmental Professions	
ENGW 3307	Advanced Writing in the Sciences	
ENGW 3315	Interdisciplinary Advanced Writing in the Disciplines	

Integrative Requirement

Code	Title	Hours
Complete one of the following:		4
CS 4991	Research	
ENVR 4050	Solving Emerging Environmental Challenges through Capstone	
ENVR 4971	Junior/Senior Honors Project 2	
ENVR 4997	Senior Thesis	

Required General Electives

Code	Title	Hours
Complete 16 semester hours of general electives.		16

Science GPA Requirement (Environmental and Sustainability Sciences)

A minimum 2.000 GPA in the following course codes is required: ENVR, EEMB

NUpath Requirements Satisfied

- Advanced Writing in the Disciplines
- Analyzing and Using Data
- `Demonstrating Thought and Action in a Capstone`
- Engaging with the Natural and Designed World
- Conducting Formal and Quantitative Reasoning
- Exploring Creative Expression and Innovation
- Understanding Societies and Institutions

- Writing in the First Year
- Writing-Intensive in the Major

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

Program Requirement

131 total semester hours required