

# Computer Science and Environmental and Sustainability Sciences, BS

The computer science and the environmental and sustainability sciences combined major focuses on the major environmental challenges facing our planet and provides broad training to understand how these challenges can be met through advances in computer science and artificial intelligence. Understanding these processes requires both the acquisition and computational analysis of large amounts of data—underscoring the synergistic relationship between computer science and environmental and sustainability sciences.

## Program Requirements

- Concentrations and course offerings may vary by campus and/or by program modality. Please consult with your advisor or admissions coach for the course availability each term at your campus or within your program modality.
- Certain options within the program may be *required* at certain campuses or for certain program modalities. Please consult with your advisor or admissions coach for requirements at your campus or for your program modality.

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/nupath/>).

## Computer Science Courses

Code	Title	Hours
<b>Computer Science Overview</b>		
CS 1200	First Year Seminar	1
CS 1210	Professional Development for Khoury Co-op	1
<b>Computer Science Fundamental Courses</b>		
CS 1800 and CS 1802	Discrete Structures and Seminar for CS 1800	5
CS 2500 and CS 2501	Fundamentals of Computer Science 1 and Lab for CS 2500	5
CS 2510 and CS 2511	Fundamentals of Computer Science 2 and Lab for CS 2510	5
<b>Computer Science Required Courses</b>		
CS 3000 and CS 3001	Algorithms and Data and Recitation for CS 3000	4
CS 3200	Introduction to Databases	4
CS 3500 and CS 3501	Object-Oriented Design and Lab for CS 3500	5
CS 3800	Theory of Computation	4
CS 4500 or CS 4530	Software Development Fundamentals of Software Engineering	4
<b>Khoury Elective Courses</b>		
With advisor approval, a directed study, research, project study, or appropriate graduate-level course may also be taken as a computer science elective.		
Complete 4 credits of CS, CY, DS, or IS classes that are not already required. Choose courses within the following ranges:		4
CS 2500 or higher, except CS 5010		
CY 2000 or higher, except CY 4930		

DS 2500 or higher, except DS 4900

IS 2000 or higher, except IS 4900

**Environmental and Sustainability Sciences Courses**

Code	Title	Hours
<b>Environmental and Sustainability Sciences Required Courses</b>		
EEMB 2302 and EEMB 2303	Ecology and Lab for EEMB 2302	5
ENVR 1200 and ENVR 1201 or ENVR 2200	Dynamic Earth and Lab for ENVR 1200 Earth's Changing Cycles	4-5
ENVR 1400 and ENVR 1401	Foundations in Environmental and Sustainability Sciences and Lab for ENVR 1400	5
ENVR 2515	Sustainable Development	4
<b>Skills</b>		
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	
<b>Earth Oceans and Environmental Change</b>		
Complete one of the following:		4-5
ENVR 2310 and ENVR 2311	Earth Materials and Lab for ENVR 2310	
ENVR 3125	Global Oceanic Change	
ENVR 3600	Oceanography	
ENVR 4500 and ENVR 4501	Applied Hydrogeology and Lab for ENVR 4500	
ENVR 5150	Climate and Atmospheric Change	
ENVR 5600	Coastal Processes, Adaptation, and Resilience	
ENVR 5670	Global Biogeochemistry	
<b>Conservation, Restoration, and Management</b>		
Complete one of the following:		4
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	
<b>Sustainable Planning and Development</b>		
Complete one of the following:		4
ENVR 3150	Food Security and Sustainability	
ENVR 3200	Water Resources	
ENVR 5210	Environmental Planning	
ENVR 5350	Sustainable Energy and Climate Solutions	
ENVR 5600	Coastal Processes, Adaptation, and Resilience	
ENVR 5750	Urban Ecology	
ENVR 5800	Climate Adaptation and Nature-Based Solutions	
<b>Environment and Society</b>		
Complete one of the following:		4
ENVR 5750	Urban Ecology	
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
<b>Calculus</b>		
MATH 1251 or MATH 1341	Calculus and Differential Equations for Biology 1 Calculus 1 for Science and Engineering	4
MATH 1252 or MATH 1342	Calculus and Differential Equations for Biology 2 Calculus 2 for Science and Engineering	4
MATH 3081	Probability and Statistics	4
<b>Chemistry</b>		
CHEM 1211 and CHEM 1212 and CHEM 1213	General Chemistry 1 and Lab for CHEM 1211 and Recitation for CHEM 1211	5
CHEM 1214 and CHEM 1215 and CHEM 1216	General Chemistry 2 and Lab for CHEM 1214 and Recitation for CHEM 1214	5
<b>Computing and Social Issues</b>		
Complete one of the following:		4
AFCS 2600	Issues in Race, Science, and Technology	
CY 5240	Cyberlaw: Privacy, Ethics, and Digital Rights	
HIST 2220	History of Technology	
INSH 2102	Bostonography: The City through Data, Texts, Maps, and Networks	
IS 1300 or PHIL 1300	Knowledge in a Digital World Knowledge in a Digital World	
PHIL 1145	Technology and Human Values	
SOCL 1280	The Twenty-First-Century Workplace	
SOCL 4528	Technology and Society	

### Computer Science English Requirement

Code	Title	Hours
<b>College Writing</b>		
ENGW 1111 or ENGW 1102	First-Year Writing First-Year Writing for Multilingual Writers	4
<b>Advanced Writing in the Disciplines</b>		
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
ENVR 4050	Solving Emerging Environmental Challenges through Capstone	
ENVR 4971	Junior/Senior Honors Project 2	
ENVR 4997	Senior Thesis	
CS 4991	Research	

### Required General Electives

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

## Khoury College GPA Requirement

Minimum cumulative 2.000 GPA required in all CS, DS, CY, and IS courses

## NUpath Requirements Satisfied

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

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

## Program Requirement

136 total semester hours required

## Plan of Study

### Sample Plan of Study:

### Four Years, Two Co-ops in Spring/Summer 1

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
CS 1200		1 CS 2510 and CS 2511		5 CS 3500 and CS 3501		5 Elective		4
CS 1800 and CS 1802	5	CS 3200	4	Elective	4	Elective	4	4
CS 2500 and CS 2501	5	ENVR Skills Coures	4					
ENGW 1111	4	EEMB 2302 and EEMB 2303	5					
ENVR 1400 and ENVR 1401	5							
	<b>20</b>		<b>18</b>		<b>9</b>			<b>8</b>
Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
CS 1210		1 Co-op		0 Co-op		0 MATH 1251 or 1341		4
CHEM 1211 and CHEM 1212 and CHEM 1213	5					Elective	4	4
CS 3000	4							
ENVR 2515	4							
ENVR 2200 or 1200	4							
	<b>18</b>		<b>0</b>		<b>0</b>			<b>8</b>
Year 3								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
CHEM 1214 and CHEM 1215 and CHEM 1216	5	Co-op	0	Co-op	0	MATH 3081		4
MATH 1252 or 1342	4					ENGW 3302, 3303, 3307, or 3315		4
ENVR Oceans Course	4							
Khoury Elective	4							
	<b>17</b>		<b>0</b>		<b>0</b>			<b>8</b>

Year 4			
Fall	Hours	Spring	Hours
CS 3800		4 CS 4530	4
ENVR Conservation Course		4 ENVR society course	4
ENVR Sustainable Course		4 Integrative course	4
Elective		4 Computing and social issues	4
		<b>16</b>	<b>16</b>

Total Hours: 138

**Four Years, Two Co-ops in Summer 2/Fall**

Year 1							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CS 1200		1 CS 2510 and CS 2511		5 CS 3500 and CS 3501		5 Elective	4
CS 1800 and CS 1802		5 CS 3200		4 Elective		4 Elective	4
CS 2500 and CS 2501		5 ENVR Skills Coures		4			
ENGW 1111		4 EEMB 2302 and EEMB 2303		5			
ENVR 1400 and ENVR 1401		5					
		<b>20</b>	<b>18</b>			<b>9</b>	<b>8</b>

Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 1211 and CHEM 1212 and CHEM 1213		5 CHEM 1214 and CHEM 1215 and CHEM 1216		5 MATH 1252 or 1342		4 Co-op	0
CS 3000		4 CS 1210		1 Elective		4	
ENVR 2515		4 MATH 1251 or 1341		4			
ENVR 2200 or 1200		4 ENVR Earth oceans course		4			
		Khoury elective		4			
		<b>17</b>	<b>18</b>			<b>8</b>	<b>0</b>

Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		0 CS 3800		4 ENGW 3302, 3303, 3307, or 3315		4 Co-op	0
		ENVR conservation course		4 MATH 3081		4	
		ENVR sustainable course		4			
		Elective		4			
		<b>0</b>	<b>16</b>			<b>8</b>	<b>0</b>

Year 4			
Fall	Hours	Spring	Hours
Co-op		0 CS 4530	4
		ENVR society course	4
		Integrative course	4
		Computing and social issues	4
		<b>0</b>	<b>16</b>

Total Hours: 138