

# 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

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.

## University-Wide Requirements

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

## NUpath Requirements

All undergraduate students are required to complete the NUpath Requirements (<http://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	Database Design	4
CS 3500	Object-Oriented Design	4
CS 3800	Theory of Computation	4
CS 4500 or CS 4530	Software Development Fundamentals of Software Engineering	4

## Khoury Elective Courses

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:

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>		
ENVR 1400 and ENVR 1401	Foundations in Environmental and Sustainability Sciences and Lab for ENVR 1400	5
ENVR 2200 or ENVR 1200	Earth's Changing Cycles Dynamic Earth	4
EEMB 2302 and EEMB 2303	Ecology and Lab for EEMB 2302	5
ENVR 2515	Sustainable Development	4
Choose one from each category.		
<i>Skills</i>		4-5
ENVR 3300 and ENVR 3301 or EEMB 3555	Geographic Information Systems and Lab for ENVR 3300 Networks and Natural Systems	4-5
<i>Earth Oceans and Environmental Change</i>		4-5
ENVR 2310 and ENVR 2311	Earth Materials and Lab for ENVR 2310	
ENVR 3600	Oceanography	
ENVR 3125	Global Oceanic Change	
ENVR 4500 and ENVR 4501	Applied Hydrogeology and Lab for ENVR 4500	
<i>Conservation, Restoration, and Management</i>		4
EEMB 2400	Introduction to Evolution	
EEMB 3460	Conservation Biology	
EEMB 4001	Landscape and Restoration Ecology	
EEMB 3465	Ecological and Conservation Genomics	
<i>Sustainable Planning and Development</i>		4
ENVR 3200	Water Resources	
ENVR 3150	Food Security and Sustainability	
ENVR 5210	Environmental Planning	
ENVR 5350	Sustainable Energy and Climate Solutions	
<i>Environment and Society</i>		4
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
CY 5240	Cyberlaw: Privacy, Ethics, and Digital Rights	
ENGL 2150	Literature and Digital Diversity	
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	
PHIL 1145	Technology and Human Values	
SOCL 1280	The Twenty-First-Century Workplace	
SOCL 4528	Computers 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 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 credits of general electives.		20

**Khoury College GPA Requirement**

Minimum 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 Patterns**

**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	4	Elective	4
CS 1800 and CS 1802	5	CS 3200	4	Elective	4	Elective	4
CS 2500 and CS 2501	5	ENVR 2200	4				
ENGW 1111	4	ENVR skills course	4				
ENVR 1400 and ENVR 1401	5						
		20	17	8	8		
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	4
EEMB 2302 and EEMB 2303	5	MATH 1251 or 1341	4	Elective	4		
CS 3000	4	ENVR Earth oceans course	4				
ENVR 2515	4	Khoury elective	4				
		CS 1210	1				
		18	18	8	0		
Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		CS 3800	4	MATH 3081	4	Co-op	4
		ENVR conservation course	4	ENGW 3302	4		

ENVR sustainable course	4			
Elective	4			
	0	16	8	0

**Year 4**

Fall	Hours Spring	Hours		
Co-op	CS 4500	4		
	ENVR society course	4		
	Integrative course	4		
	Computing and social issues	4		
	0	16		

Total Hours: 137

**Five Years, Three 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 Vacation	Vacation	
CS 1800 and CS 1802	5 CS 3200	4		
CS 2500 and CS 2501	5 ENVR skills course	4		
ENGW 1111	4 Elective	4		
ENVR 1400 and ENVR 1401	5			
	20	17	0	0

**Year 2**

Fall	Hours Spring	Hours Summer 1	Hours Summer 2	Hours
CS 3500	4 CHEM 1214 and CHEM 1215 and CHEM 1216	5 Vacation	0 Co-op	
CHEM 1211 and CHEM 1212 and CHEM 1213	5 CS 3000	4		
ENVR 2200	4 ENVR 2515	4		
EEMB 2302 and EEMB 2303	5 Khoury elective	4		
	CS 1210	1		
	18	18	0	0

**Year 3**

Fall	Hours Spring	Hours Summer 1	Hours Summer 2	Hours
Co-op	MATH 1251 or 1341	4 MATH 3081	4 Co-op	
	ENVR Earth oceans course	4 Elective	4	

ENVR conservation course	4			
Elective	4			
	0	16	8	0

**Year 4**

Fall	Hours Spring	Hours Summer 1	Hours Summer 2	Hours
Co-op	CS 3800	4 Elective	4 Co-op	
	MATH 1252 or 1342	4 Elective	4	
	ENGW 3302	4		
	ENVR sustainable course	4		
	0	16	8	0

**Year 5**

Fall	Hours Spring	Hours
Co-op	CS 4500	4
	ENVR society course	4
	Integrative course	4
	Computing and social issues	4
	0	16

Total Hours: 137