Computer Science and Design, BS

The combined major in computer science and design integrates fundamental design courses with a strong programming foundation. Students will declare a concentration in interaction design, graphic and information design, or experience design. Students in this major often have an interest in human-centered design methods used in developing digital interfaces and applications.

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 (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
Computer Science Overview		
Must be taken in alignment with your home college:		
CS 1200	First Year Seminar	1
or ARTF 1000	Art and Design at Northeastern	
CS 1210	Professional Development for Khoury Co-op	1
or EEAM 2000	Professional Development for Co-op	
Computer Science Fundamental Courses		
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
Computer Science Required Courses		
CS 3000	Algorithms and Data	4
CS 3500 and CS 3501	Object-Oriented Design and Lab for CS 3500	5
CS 4500	Software Development	4
or CS 4530	Fundamentals of Software Engineering	
IS 4300	Human Computer Interaction	4
Computer Science Elective Courses		
With advisor approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.		
Complete 8 semester hours of CS, CY, DS, or IS classes that are not already required. Choose courses within the following ranges:		8
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		

Design Requirements

Code	Title	Hours
Art + Design Fundamentals		
ARTF 1122	Color and Composition (with optional ARTF 1123)	4
Art + Design Fundamentals Elective		
Complete one of the following:		4

ARTF 1124 and ARTF 1125	Form and Structure and Form and Structure Tools	
ARTF 2220 and ARTF 2221	Movement and Time and Movement and Time Tools	
ARTF 2223 and ARTF 2224	Experience and Interaction and Experience and Interaction Tools	
Design Required		
ARTG 1001 and ARTG 1002	Design Perspectives: An Introduction to Design in the World and Seminar for Design Perspectives	4
ARTG 1270 and ARTG 1271	Design: Process + Practices and Studio for Design: Process + Practices	4
ARTG 1290 and ARTG 1291	Typographic Systems and Studio for Typographic Systems	4
Design Elective		
Complete any one ARTG course, as long as prerequisites have been met and that is not used to fulfill other requirements of the program. ARTG 2262 and ARTG 2263 are recommended. [1]		4
Art + Design History Elective		
Complete any one ARTH course.		4
Art + Design Elective		
Complete any one ARTD, ARTE, ARTF, ARTG, ARTH, ARTS, or GAME course as long as prerequisites have been met.		4
Degree Capstone Project		
ARTG 4550	Design Degree Project	4

[1]   Instead of ARTG 2262 and ARTG 2263, ARTG 5330 is recommended for students considering the Plus One in Information Design and Data Visualization.

Design Option

Code	Title	Hours
Complete one of the following options:		8
Experience Design Option		
ARTG 3462	Experience Design Principles	
ARTG 3463	Experience Design 2	
Graphic Design Option		
ARTG 2252	Graphic Design Principles	
ARTG 3450	Graphic Design 2	
Information Design Option		
ARTG 2242	Information Design Principles	
ARTG 3444	Topics in Information Design Inquiry [2]	
Interaction Design Option		
ARTG 2400	Interaction Design Principles (with optional ARTG 2401)	
ARTG 3700	Interaction Design 2: Mobile	

[2]   Instead of ARTG 3444, ARTG 5100 is recommended for students considering the Plus One in Information Design and Data Visualization.

Degree-Focused Electives

Code	Title	Hours
Complete two courses from the following lists:		8
Art + Design		
Complete any ARTG course as long as prerequisites have been met. If ARTG 5000 (or any other topics course in the subject listed) is completed more than once, the additional completions may be allowed toward the electives.		
Psychology		
PSYC 1101	Foundations of Psychology	
PSYC 3452	Sensation and Perception	
PSYC 3464	Psychology of Language	
PSYC 3466	Cognition	

Computer Science

CS 3200	Database Design
CS 3520	Programming in C++
CS 3540	Game Programming
CS 3650	Computer Systems
CS 3800	Theory of Computation
CS 4100	Artificial Intelligence
CS 4150	Game Artificial Intelligence
CS 4300	Computer Graphics
CS 4400	Programming Languages
CS 4520	Mobile Application Development
CS 4550	Web Development
CS 4700	Network Fundamentals
CS 4730	Distributed Systems
CS 4850	Building Game Engines
CS 4991	Research
CS 4992	Directed Study
CS 4993	Independent Study
DS 3000	Foundations of Data Science
DS 4200	Information Presentation and Visualization
DS 4300	Large-Scale Information Storage and Retrieval
DS 4400	Machine Learning and Data Mining 1
DS 4420	Machine Learning and Data Mining 2
IS 2000	Principles of Information Science

Integrative Requirement

Code	Title	Hours
The following courses are used in the major but also count as the integrative requirement:		
IS 4300	Human Computer Interaction	
ARTG 4550	Design Degree Project	

Supporting Course

Code	Title	Hours
Computing and Social Issues		
Complete one of the following:		4
AFAM 2600	Issues in Race, Science, and Technology	
CY 4170	The Law, Ethics, and Policy of Data and Digital Technologies	
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	Knowledge in a Digital World	
or PHIL 1300	Knowledge in a Digital World	
PHIL 1145	Technology and Human Values	
SOCL 1280	The Twenty-First-Century Workplace	
SOCL 2485	Environment, Technology, and Society	
SOCL 4528	Computers and Society	

Computer Science Writing Requirement

Code	Title	Hours
College Writing		
ENGW 1111	First-Year Writing	4
Advanced Writing in the Disciplines		
ENGW 3302	Advanced Writing in the Technical Professions	4

or ENGW 3314	Advanced Writing in the Arts, Media, and Design
or ENGW 3315	Interdisciplinary Advanced Writing in the Disciplines

Required General Electives

Code	Title	Hours
Complete 24 semester hours of general electives.		24

NUpath Requirements Satisfied

- Engaging with the Natural and Designed World
- Exploring Creative Expression and Innovation
- 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.

Khoury College GPA Requirement

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

Computer Science and Design Major Credit Requirement

96 SH are required in the major.

Program Requirement

130 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
ARTF 1122 (with optional ARTF 1123)	4	ARTG 1270 and ARTG 1271	4	CS 3500 and CS 3501	5	Vacation	
ARTG 1001 and ARTG 1002	4	ARTG 1290 and ARTG 1291	4	A+D Fundamentals Elective	4		
CS 1200 or ARTF 1000	1	CS 2510 and CS 2511	5				
CS 1800 and CS 1802	5	ENGW 1111	4				
CS 2500 and CS 2501	5						
	19		**17**		**9**		**0**

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ARTG 2262 and ARTG 2263	4	Co-op		Co-op		Elective	4
CS 1210 or EEAM 2000	1					Elective	4
CS 3000	4						
Design Option level 1	4						
Degree-focused elective 1	4						
	17		**0**		**0**		**8**

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
IS 4300	4	Co-op		Co-op		Elective	4
Art+Design History elective	4			ENGW 3302	4	Elective	4

	Hours		Hours		Hours		Hours
Computing and social issues	4						
Design Option level 2	4						
	16		0		4		8

Year 4

Fall	Hours	Spring	Hours
CS 4500 or 4530	4	ARTG 4550	4
Art+Design elective	4	CS elective	4
Elective	4	CS elective	4
Elective	4	Degree-focused elective 2	4
	16		16

Total Hours: 130

FOUR YEARS, TWO CO-OPS IN SUMMER 2/FALL

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ARTG 1001 and ARTG 1002	4	ARTG 1270 and ARTG 1271	4	CS 3500 and CS 3501	5	Vacation	
ARTF 1122 (with optional ARTF 1123)	4	ARTG 1290 and ARTG 1291	4	A+D Fundamentals Elective	4		
CS 1200 or ARTF 1000	1	CS 2510 and CS 2511	5				
CS 1800 and CS 1802	5	ENGW 1111	4				
CS 2500 and CS 2501	5						
	19		17		9		0

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ARTG 2262 and ARTG 2263	4	CS 1210	1	Elective	4	Co-op	
CS 3000	4	IS 4300	4	Elective	4		
Design Option level 1	4	A+D History Elective	4				
Degree-focused elective 1	4	Computing and Social Issues	4				
		Design Option level 2	4				
	16		17		8		0

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		CS 4530	4	Elective	4	Co-op	
		Art + Design Elective	4	Elective	4	ENGW 3302	4
		Elective	4				
		Elective	4				
	0		16		8		4

Year 4

Fall	Hours	Spring	Hours
Co-op		ARTG 4550	4
		CS elective	4
		CS elective	4
		Degree-focused elective 2	4
	0		16

Total Hours: 130