

Data Science and Design, BS (Boston)

The Bachelor of Science in Data Science and Design integrates a technical degree with a practice-based discipline that poses important questions about—and provides significant answers to—how we live. Students study the collection, manipulation, storage, retrieval, and computational analysis of data in its various forms including numeric, textual, image, and video data. Information designers visualize concepts and data to enhance human understanding of complex and vital knowledge. Their work has an enlightening or instructive intent and is based on factual content.

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/nupath/>).

Data Science Requirements

| Code | Title | Hours |
|--|---|-------|
| Computer Science Overview | | |
| Must be taken in alignment with your home college: | | |
| CS 1200 or ARTF 1000 | First Year Seminar Art and Design at Northeastern | 1 |
| CS 1210 or EEAM 2000 | Professional Development for Khoury Co-op Professional Development for Co-op | 1 |
| Computer Science Required 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 4–5 semester hours of CS, CY, or DS coursework at the 3000 level or higher not otherwise required in the degree. | | |
| CS 1800 and CS 1802 | Discrete Structures and Seminar for CS 1800 | 5 |
| CS 2000 and CS 2001 | Introduction to Program Design and Implementation and Lab for CS 2000 | 5 |
| CS 3200 | Introduction to Databases | 4 |
| Programming Sequence Pathways | | |
| Complete one of the following options: | | 9 |
| <i>Computer Science Option</i> | | |
| CS 2100 and CS 2101 | Program Design and Implementation 1 and Lab for CS 2100 | |
| CS 3100 and CS 3101 | Program Design and Implementation 2 and Lab for CS 3100 | |
| <i>Data Science Option</i> | | |
| DS 2500 and DS 2501 | Intermediate Programming with Data and Lab for DS 2500 | |
| DS 3500 | Advanced Programming with Data | |
| Data Science Foundations | | |
| DS 3000 | Foundations of Data Science | 4 |
| DS 4300 | Large-Scale Information Storage and Retrieval | 4 |
| DS 4400 | Machine Learning and Data Mining 1 | 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 the following: | | 4 |
| CS 2500 or higher, except CS 5010 | | |

| | |
|-----------------------------------|---|
| CY 2000 or higher, except CY 4930 | |
| DS 2500 or higher, except DS 4900 | |
| MKTG 4606 | Digital, Analytics, Technology, and Automation Research Practicum |

Design Requirements

| Code | Title | Hours |
|--|--|-------|
| Art + Design Fundamentals Required | | |
| ARTF 1220 | Elements of Visual Composition (with optional ARTF 1221) | 2 |
| Art + Design Fundamentals Elective | | |
| Complete 6 semester hours from the following: | | 6 |
| ARTF 1200 | Representational Drawing | |
| ARTF 1210 | Abstract Drawing | |
| ARTF 1230 and ARTF 1231 | Making with Form and Materials and Making with Form and Materials Tools | |
| ARTF 1240 and ARTF 1241 | Making with Video, Sound, and Animation and Making with Video, Sound, and Animation Tools | |
| ARTF 1250 and ARTF 1251 | Designing Interactive Experiences and Designing Interactive Experiences 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 4 semester hours of ARTG courses, as long as prerequisites have been met and course has not been used to fulfill other requirements of the program. | | 4 |
| Art + Design History Elective | | |
| Complete 4 semester hours of ARTH courses. | | 4 |
| Art + Design Elective | | |
| Complete 4 semester hours of ARTD, ARTE, ARTG, ARTH, ARTS, or GAME courses as long as prerequisites have been met. | | 4 |
| Degree Capstone Project | | |
| ARTG 4550 | Design Degree Project | 4 |

Design Option

| Code | Title | Hours |
|--|---|-------|
| Complete one of the following options (information design is recommended): | | 8 |
| Creative Fabrication | | |
| ARTG 2810 | Creative Fabrication Design Principles | |
| ARTG 3810 | Topics in Creative Fabrication Inquiry | |
| Experience Design Option | | |
| ARTG 3462 | Experience Design Principles | |
| ARTG 3464 | Topics In Experience Design Inquiry | |
| Graphic Design Option | | |
| ARTG 2252 | Graphic Design Principles | |
| ARTG 3452 | Topics In Graphic Design Inquiry | |
| Information Design Option | | |
| ARTG 2242 | Information Design Principles | |
| ARTG 3444 | Topics in Information Design Inquiry ¹ | |
| Interaction Design Option | | |
| ARTG 2400 | Interaction Design Principles (with optional ARTG 2401) | |
| ARTG 3400 | Topics In Interaction Design Inquiry | |

¹ Instead of ARTG 3444, ARTG 5100 is recommended for students considering the PlusOne in Information Design and Data Visualization.

Integrative Requirements

| Code | Title | Hours |
|--------------|---|-------|
| ARTG 5330 | Visualization Technologies 1: Fundamentals ¹ | 4 |
| or ARTG 5150 | Information Visualization Principles and Practices | |
| DS 4200 | Information Presentation and Visualization | 4 |

¹ For students who choose Information Visualization Principles and Practices (ARTG 5150), concurrent registration in Information Design Critique Seminar (ARTG 5151) is recommended. It is suggested students consult with their academic advisor.

Supporting Courses

| Code | Title | Hours |
|------------------------------------|---|-------|
| Mathematics | | |
| ECON 2350 | Statistics for Economists | 4 |
| MATH 1341 | Calculus 1 for Science and Engineering | 4 |
| Computing and Social Issues | | |
| Complete one of the following: | | 4 |
| AFCS 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 | |
| DS 1300 | Knowledge in a Digital World | |
| or PHIL 1300 | Knowledge in a Digital World | |
| HIST 2220 | History of Technology | |
| INSH 2102 | Bostonography: The City through Data, Texts, Maps, and Networks | |
| JRNL 3700 | Data Storytelling | |
| PHIL 1145 | Technology and Human Values | |
| SOCL 1280 | The Twenty-First-Century Workplace | |
| SOCL 2485 | Environment, Technology, and Society | |
| SOCL 4528 | Technology and Society | |

Computer Science Writing Requirements

| 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 20 semester hours of general electives. | | 20 |

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

Program Requirement

130 total semester hours required

Plan of Study

Sample Plan of Study: Four Years, Two Co-ops in Spring/Summer First-Half

| Year 1 | | | | | | | |
|--|-------|----------------------------------|-------|-----------------|-------|----------------------------|-------|
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| ARTG 1001 and ARTG 1002 | | 4 ARTG 1290 and ARTG 1291 | | 4 ECON 2350 | | 4 General elective | 4 |
| ARTF 1220 (with optional ARTF 1221) | 2 | ENGW 1111 | | 4 ARTF elective | | 2 General elective | 4 |
| CS 1200 or ARTF 1000 | 1 | DS 2500 and DS 2501 | | 5 ARTF elective | 2 | | |
| CS 1800 and CS 1802 | 5 | MATH 1341 | | 4 | | | |
| CS 2000 and CS 2001 | 5 | EEAM 2000 (for CAMD students) | | 1 | | | |
| ARTF elective | 2 | | | | | | |
| | 19 | | | 18 | | 8 | 8 |
| Year 2 | | | | | | | |
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| CS 1210 (for Khoury students) | 1 | Co-op | | 0 Co-op | | 0 General elective | 4 |
| DS 3500 | 4 | | | | | General elective | 4 |
| CS 3200 | 4 | | | | | | |
| ARTG 1270 and ARTG 1271 | 4 | | | | | | |
| Design option 1 | 4 | | | | | | |
| | 17 | | | 0 | | 0 | 8 |
| Year 3 | | | | | | | |
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| DS 3000 | 4 | Co-op | | 0 Co-op | | 0 ENGW 3302, 3314, or 3315 | 4 |
| Design option 2 | 4 | | | | | General elective | 4 |
| ARTF elective | 4 | | | | | | |
| ARTG elective | 4 | | | | | | |
| | 16 | | | 0 | | 0 | 8 |
| Year 4 | | | | | | | |
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| DS 4200 | | 4 ARTG 4550 | | 4 | | | |
| DS 4300 | | 4 ARTG 5330 or 5150 | | 4 | | | |
| A+D elective | | 4 DS 4400 | | 4 | | | |
| Computing and social issues | | 4 Khoury elective | | 4 | | | |
| | 16 | | | 16 | | | |

Total Hours: 134

Sample Plan of Study: Four Years, Two Co-ops in Summer Second-Half/Fall

| Year 1 | | | | | | | |
|----------------------------|-------|------------------------------|-------|-------------|-------|--------------------|-------|
| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
| ARTG 1001 and ARTG 1002 | | 4 ARTG 1290 and ARTG 1291 | | 4 ECON 2350 | | 4 General elective | 4 |

