# Data Science and Economics, BS (Boston)

The combined major in data science and economics integrates fundamental economics courses with a strong programming foundation. 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. Utilizing these skill sets allows students to address complex issues in the behavior of individuals and the collective behavior of industries and governments.

## 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** | | |
| CS 1200 | First Year Seminar | 1 |
| or ECON 1000 | Economics at Northeastern | |
| CS 1210 | Professional Development for Khoury Co-op | 1 |
| or EESH 2000 | Professional Development for Co-op | |
| **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<br>and CS 1802 | Discrete Structures<br>and Seminar for CS 1800 | 5 |
| CS 2000<br>and CS 2001 | Introduction to Program Design and Implementation<br>and Lab for CS 2000 | 5 |
| CS 3200 | Introduction to Databases | 4 |
| **Programming Sequence Pathways** | | |
| Complete one of the following options: | | 9 |
| *Computer Science Option* | | |
| CS 2100<br>and CS 2101 | Program Design and Implementation 1<br>and Lab for CS 2100 | |
| CS 3100<br>and CS 3101 | Program Design and Implementation 2<br>and Lab for CS 3100 | |
| *Data Science Option* | | |
| DS 2500<br>and DS 2501 | Intermediate Programming with Data<br>and Lab for DS 2500 | |
| DS 3500 | Advanced Programming with Data | |
| **Data Science Foundations** | | |
| DS 3000 | Foundations of Data Science | 4 |
| DS 4200 | Information Presentation and Visualization | 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 within the following options: | | 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 |

## Economics Requirements

| Code | Title | Hours |
|---|---|---|
| **Required Economics Courses** | | |
| ECON 1115 | Principles of Macroeconomics | 4 |
| ECON 1116 | Principles of Microeconomics | 4 |
| ECON 2315 | Macroeconomic Theory | 4 |
| ECON 2316 | Microeconomic Theory | 4 |
| ECON 2350 | Statistics for Economists | 4 |
| **Economics Electives** | | |
| Complete five ECON elective courses that are found in the following ranges, with no more than two in the ECON 1200 to ECON 1999 range. Unless otherwise noted in specific combined majors, required core economics courses cannot be counted as electives by students completing Department of Economics programs: | | 20 |
| ECON 1200–ECON 1999 | | |
| ECON 2990 - ECON 3559 | | |
| ECON 3561 - ECON 4689 | | |
| ECON 4900–ECON 4996 | | |
| ECON 5200–ECON 5999 | | |
| **Economics Capstone** | | |
| ECON 4692 | Senior Economics Seminar | 4 |
| or ECON 4997 | Senior Economics Thesis | |

## Integrative Course Requirement

| Code | Title | Hours |
|---|---|---|
| ECON 2560 | Applied Econometrics | 4 |

## Supporting Course Requirements

| Code | Title | Hours |
|---|---|---|
| **Mathematics** | | |
| MATH 1231 | Calculus for Business and Economics (It is highly recommended that students who take MATH 1231 take sections devoted to Economics students only.) | 4 |
| or MATH 1241 | Calculus 1 | |
| or MATH 1245 | Calculus with Applications | |
| or MATH 1251 | Calculus and Differential Equations for Biology 1 | |
| or MATH 1340 | Intensive Calculus for Engineers | |
| or MATH 1341 | Calculus 1 for Science and Engineering | |
| **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 | |
| 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 | |

## 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 3308 | Advanced Writing in the Social Sciences | |
| ENGW 3315 | Interdisciplinary Advanced Writing in the Disciplines | |

## Required General Electives

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

## Khoury College GPA Requirement

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

## Economics GPA Requirement

Grades in the following four courses must average to a minimum of C (2.000):

| Code | Title | Hours |
|---|---|---|
| ECON 2315 | Macroeconomic Theory | |
| ECON 2316 | Microeconomic Theory | |
| ECON 2350 | Statistics for Economists | |
| ECON 2560 | Applied Econometrics | |

## NUpath Requirements Satisfied

- Engaging with the Natural and Designed World
- Conducting Formal and Quantitative Reasoning
- Analyzing and Using Data
- Understanding Societies and Institutions
- 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

130 total semester hours required

## Plan of Study

## Sample Plans of Study

**FOUR YEARS, TWO CO-OPS IN SUMMER SECOND HALF/FALL**

**Year 1**

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|---|---|---|---|---|---|---|---|
| CS 1200 | 1 | DS 2500 and DS 2501 | 5 | CS 3200 | 4 | General Elective | 4 |
| CS 1800 and CS 1802 | 5 | ECON 1116 | 4 | General Elective | 4 | General Elective | 4 |
| CS 2000 and CS 2001 | 5 | MATH 1231, 1241, 1245, 1251, 1340, or 1341 | 4 | | | | |
| ECON 1115 | 4 | General Elective | 4 | | | | |
| ENGW 1111 | 4 | | | | | | |
| | **19** | | **17** | | **8** | | **8** |

**Year 2**

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|---|---|---|---|---|---|---|---|
| DS 3000 | 4 | CS 1210 | 1 | General Elective | 4 | Co-op | 0 |
| DS 3500 | 4 | DS 4200 | 4 | General Elective | 4 | | |
| ECON 2315 | 4 | DS 4300 | 4 | | | | |
| ECON 2350 | 4 | ECON 2316 | 4 | | | | |
| | | ECON elective 1 | 4 | | | | |
| | **16** | | **17** | | **8** | | **0** |

**Year 3**

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|---|---|---|---|---|---|---|---|
| Co-op | 0 | DS 4400 | 4 | ENGW 3302, 3308, or 3315 | 4 | Co-op | 0 |
| | | ECON 2560 | 4 | ECON elective 3 | 4 | | |
| | | ECON elective 2 | 4 | | | | |
| | | Khoury Elective | 4 | | | | |
| | **0** | | **16** | | **8** | | **0** |

**Year 4**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| Co-op | 0 | ECON 4692 or 4997 | 4 |
| | | Computing and social issues | 4 |
| | | ECON elective 4 | 4 |
| | | ECON elective 5 | 4 |
| | **0** | | **16** |

**Total Hours: 133**

## FOUR YEARS, TWO CO-OPS IN SPRING/SUMMER FIRST HALF

**Year 1**

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|---|---|---|---|---|---|---|---|
| CS 1200 | 1 | DS 2500 and DS 2501 | 5 | CS 3200 | 4 | General Elective | 4 |
| CS 1800 and CS 1802 | 5 | Elective | 4 | General Elective | 4 | General Elective | 4 |
| CS 2000 and CS 2001 | 5 | ECON 1116 | 4 | | | | |
| ECON 1115 | 4 | MATH 1231, 1241, 1245, 1251, 1340, or 1341 | 4 | | | | |
| ENGW 1111 | 4 | | | | | | |
| | **19** | | **17** | | **8** | | **8** |

**Year 2**

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|---|---|---|---|---|---|---|---|
| CS 1210 | 1 | Co-op | 0 | Co-op | 0 | General Elective | 4 |
| DS 3000 | 4 | | | | | General Elective | 4 |
| DS 3500 | 4 | | | | | | |
| ECON 2315 | 4 | | | | | | |
| ECON 2350 | 4 | | | | | | |
| | **17** | | **0** | | **0** | | **8** |

**Year 3**

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|---|---|---|---|---|---|---|---|
| DS 4200 | 4 | Co-op | 0 | Co-op | 0 | ENGW 3302, 3308, or 3315 | 4 |
| DS 4300 | 4 | | | | | ECON elective 2 | 4 |
| ECON 2316 | 4 | | | | | | |
| ECON elective 1 | 4 | | | | | | |
| | **16** | | **0** | | **0** | | **8** |

**Year 4**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| DS 4400 | 4 | ECON 4692 or 4997 | 4 |
| ECON 2560 | 4 | Computing and social issues | 4 |
| Khoury Elective | 4 | ECON elective 4 | 4 |
| ECON elective 3 | 4 | ECON elective 5 | 4 |
| | **16** | | **16** |

**Total Hours: 133**