The data science and mathematics combined major combines computer science, data science, and mathematics into an integrated curriculum. The program provides the rigorous theoretical background necessary for success in the data science field.

**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**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1200</td>
<td>First Year Seminar</td>
<td>1</td>
</tr>
<tr>
<td>CS 1210</td>
<td>Professional Development for Khoury Co-op</td>
<td>1</td>
</tr>
</tbody>
</table>

**Computer Science Fundamental Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1800 and CS 1802</td>
<td>Discrete Structures and Seminar for CS 1800 (Integrative course)</td>
<td>5</td>
</tr>
<tr>
<td>CS 2500 and CS 2501</td>
<td>Fundamentals of Computer Science 1 and Lab for CS 2500</td>
<td>5</td>
</tr>
<tr>
<td>CS 2510 and CS 2511</td>
<td>Fundamentals of Computer Science 2 and Lab for CS 2510</td>
<td>5</td>
</tr>
<tr>
<td>CS 2810</td>
<td>Mathematics of Data Models</td>
<td>4</td>
</tr>
</tbody>
</table>

**Computer Science Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 3200</td>
<td>Database Design</td>
<td>4</td>
</tr>
<tr>
<td>CS 3500</td>
<td>Object-Oriented Design</td>
<td>4</td>
</tr>
</tbody>
</table>

**Presentation Requirement**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>THTR 1170</td>
<td>The Eloquent Presenter</td>
<td>1</td>
</tr>
</tbody>
</table>

**Data Science Foundations**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS 3000</td>
<td>Foundations of Data Science</td>
<td>4</td>
</tr>
<tr>
<td>DS 4200</td>
<td>Information Presentation and Visualization</td>
<td>4</td>
</tr>
<tr>
<td>DS 4300</td>
<td>Large-Scale Information Storage and Retrieval</td>
<td>4</td>
</tr>
<tr>
<td>DS 4900</td>
<td>Data Science Senior Project</td>
<td>4</td>
</tr>
</tbody>
</table>

**Khoury Elective Courses**

With adviser approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.

Complete four credits of CS, CY, DS, or IS classes that are not already required. Choose courses within the following ranges:

**Mathematics Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1365</td>
<td>Introduction to Mathematical Reasoning</td>
<td>4</td>
</tr>
</tbody>
</table>

**Calculus Requirement**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1341</td>
<td>Calculus 1 for Science and Engineering (a grade of C– or higher is required)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1342</td>
<td>Calculus 2 for Science and Engineering (a grade of C– or higher is required)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2321</td>
<td>Calculus 3 for Science and Engineering</td>
<td>4</td>
</tr>
</tbody>
</table>

**Intermediate and Advanced Math Requirement**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2331</td>
<td>Linear Algebra</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2341</td>
<td>Differential Equations and Linear Algebra for Engineering</td>
<td>4</td>
</tr>
<tr>
<td>MATH 3081</td>
<td>Probability and Statistics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 3175</td>
<td>Group Theory</td>
<td>4</td>
</tr>
<tr>
<td>MATH 3527</td>
<td>Number Theory 1</td>
<td>4</td>
</tr>
</tbody>
</table>

**Mathematics Elective Requirement**

Complete four courses in the following range:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 3001 to MATH 4999 but not MATH 4000</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

**Integrative Requirement**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS 4400</td>
<td>Machine Learning and Data Mining</td>
<td>4</td>
</tr>
</tbody>
</table>

**Computer Science Writing Requirement**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGW 1111</td>
<td>First-Year Writing</td>
<td>4</td>
</tr>
<tr>
<td>ENGW 3302</td>
<td>Advanced Writing in the Technical Professions</td>
<td>4</td>
</tr>
<tr>
<td>or ENGW 3315</td>
<td>Interdisciplinary Advanced Writing in the Disciplines</td>
<td>4</td>
</tr>
</tbody>
</table>

**Required General Electives**

Complete 20 credits of general electives.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
</table>

**Khoury College GPA Requirement**
Minimum 2.000 GPA required in all CS, CY, DS, and IS courses

**NUpath Requirements Satisfied**

- Engaging with the Natural and Designed World
Data Science and Mathematics, BS

• 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
133 total semester hours required

Plan of Study
Sample Patterns:
Four Years, Two Co-ops in Summer 2/Fall

Year 1
Fall | Hours | Spring | Summer 1 | Summer 2 | Hours
---|---|---|---|---|---
CS 1200 | 1 | CS 2510 and CS 2511 | 5 | MATH 2321 | 4
CS 1800 and CS 1802 | 5 | MATH 1342 | 4 | CS 3500 | 4
CS 2500 and CS 2501 | 5 | MATH 1365 | 4
MATH 1341 | 4 | Elective | 4
ENGW 1111 | 4
---|---|---|---|---|---
19 | 17 | 8

Year 2
Fall | Hours | Spring | Summer 1 | Summer 2 | Hours
---|---|---|---|---|---
MATH 2331 | 4 | CS 1210 | 1 | MATH 3081 | 4
MATH 2341 | 4 | MATH 3527 | 4 | Elective | 4
CS 3200 | 4 | CS 2810 | 4
DS 3000 | 4 | DS 4200 | 4
---|---|---|---|---|---
16 | 17 | 8 | 0 | 0

Year 3
Fall | Hours | Spring | Summer 1 | Summer 2 | Hours
---|---|---|---|---|---
Co-op | 0 | MATH 3175 | 4 | ENGW 3302 | 4 | Co-op | 0
---|---|---|---|---|---
DS 4200 | 4 | Elective | 4
DS 4300 | 4
THTR 1170 | 1
Elective | 4
---|---|---|---|---|---
0 | 17 | 8 | 0 | 0

Year 4
Fall | Hours | Spring | Summer 1 | Summer 2 | Hours
---|---|---|---|---|---
Co-op | 0 | MATH 3527 | 4 | Elective | 4 | Co-op | 0
---|---|---|---|---|---
DS 4400 | 4 | Elective | 4
---|---|---|---|---|---
MATH elective | 4
---|---|---|---|---|---
0 | 16 | 8 | 0 | 0

Year 5
Fall | Hours | Spring | Hours
---|---|---|---
Co-op | 0 | DS 4900 | 4
---|---|---|---
Khoury elective | 4
---|---|---|---
MATH elective | 4

Total Hours: 134

Five Years, Three Co-ops in Summer 2/Fall

Year 1
Fall | Hours | Spring | Summer 1 | Summer 2 | Hours
---|---|---|---|---|---
CS 1800 and CS 1802 | 5 | CS 2510 and CS 2511 | 5 | Vacation | 0 | Vacation | 0
CS 2500 and CS 2501 | 5 | MATH 1342 | 4
MATH 1341 | 4 | MATH 1365 | 4
ENGW 1111 | 4 | Elective | 4
---|---|---|---|---|---
19 | 17 | 0 | 0

Year 2
Fall | Hours | Spring | Summer 1 | Summer 2 | Hours
---|---|---|---|---|---
CS 3500 | 4 | CS 1210 | 1 | Vacation | 0 | Co-op | 0
MATH 2321 | 4 | CS 3200 | 4
DS 3000 | 4 | CS 2810 | 4
MATH 2341 | 4 | MATH 2331 | 4
---|---|---|---|---|---
16 | 17 | 0 | 0

Year 3
Fall | Hours | Spring | Summer 1 | Summer 2 | Hours
---|---|---|---|---|---
Co-op | 0 | MATH 3175 | 4 | ENGW 3302 | 4 | Co-op | 0
---|---|---|---|---|---
DS 4200 | 4 | Elective | 4
---|---|---|---|---|---
MATH elective | 4
---|---|---|---|---|---
0 | 17 | 8 | 0 | 0

Year 4
Fall | Hours | Spring | Summer 1 | Summer 2 | Hours
---|---|---|---|---|---
Co-op | 0 | MATH 3527 | 4 | Elective | 4 | Co-op | 0
---|---|---|---|---|---
DS 4400 | 4 | Elective | 4
---|---|---|---|---|---
MATH elective | 4
---|---|---|---|---|---
0 | 16 | 8 | 0 | 0

Year 5
Fall | Hours | Spring | Hours
---|---|---|---
Co-op | 0 | DS 4900 | 4
---|---|---|---
Khoury elective | 4
---|---|---|---
MATH elective | 4
<table>
<thead>
<tr>
<th>MATH elective</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Total Hours: 134