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/Cyber Operations Major Requirements

**Computer Science Overview**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1200</td>
<td>Computer Science/Information Science</td>
<td>1</td>
</tr>
<tr>
<td>CS 1210</td>
<td>Computer Science/Information Science</td>
<td>1</td>
</tr>
<tr>
<td>CS 1800</td>
<td>Discrete Structures and Recitation for CS 1800</td>
<td>4</td>
</tr>
<tr>
<td>CS 2500</td>
<td>Fundamentals of Computer Science 1 and Lab for CS 2500</td>
<td>5</td>
</tr>
<tr>
<td>CS 2510</td>
<td>Fundamentals of Computer Science 2 and Lab for CS 2510</td>
<td>5</td>
</tr>
<tr>
<td>CS 2800</td>
<td>Logic and Computation and Lab for CS 2800</td>
<td>5</td>
</tr>
<tr>
<td>CS 3500</td>
<td>Object-Oriented Design</td>
<td>4</td>
</tr>
<tr>
<td>CS 3650</td>
<td>Computer Systems</td>
<td>4</td>
</tr>
<tr>
<td>CS 3700</td>
<td>Networks and Distributed Systems</td>
<td>4</td>
</tr>
<tr>
<td>CS 3800</td>
<td>Theory of Computation</td>
<td>4</td>
</tr>
<tr>
<td>CS 4400</td>
<td>Programming Languages</td>
<td>4</td>
</tr>
<tr>
<td>CS 4500</td>
<td>Software Development</td>
<td>4</td>
</tr>
<tr>
<td>CS 4800</td>
<td>Algorithms and Data</td>
<td>4</td>
</tr>
<tr>
<td>CS 4000</td>
<td>Senior Seminar</td>
<td>1</td>
</tr>
<tr>
<td>or THTR 1170</td>
<td>The Eloquent Presenter</td>
<td></td>
</tr>
</tbody>
</table>

**Computer Science Seminar**

- CS 4000 Senior Seminar
- or THTR 1170 The Eloquent Presenter

**Computer Science Capstone**

Complete one of the following: 4-5
- CS 4100 Artificial Intelligence
- CS 4300 Computer Graphics
- CS 4410 Compilers
- CS 4150 Game Artificial Intelligence
- CS 4550 Web Development
- CS 4650 High Performance Computing

**Required Courses for Cyber Operations Concentration**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 4700</td>
<td>Network Fundamentals</td>
<td>4</td>
</tr>
<tr>
<td>CS 4740</td>
<td>Network Security</td>
<td>4</td>
</tr>
<tr>
<td>CS 5770</td>
<td>Software Vulnerabilities and Security</td>
<td>4</td>
</tr>
<tr>
<td>CS 6710</td>
<td>Wireless Network</td>
<td>4</td>
</tr>
<tr>
<td>IA 5010</td>
<td>Foundations of Information Assurance</td>
<td>4</td>
</tr>
</tbody>
</table>

**Additional Courses for BS**

**Mathematics Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1341</td>
<td>Calculus 1 for Science and Engineering</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(a grade of C– or higher is required)</td>
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<tr>
<td>MATH 1342</td>
<td>Calculus 2 for Science and Engineering</td>
<td>4</td>
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<td>(a grade of C– or higher is required)</td>
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<tr>
<td>MATH 2331</td>
<td>Linear Algebra</td>
<td>4</td>
</tr>
<tr>
<td>MATH 3081</td>
<td>Probability and Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Computing and Social Issues**

Complete one of the following: 4
- PHIL 1145 Technology and Human Values
- SOCL 1280 The Twenty-First-Century Workplace
- SOCL 4528 Computers and Society
- SOCL 3485 Environment, Technology, and Society
- ANTH 3418 Wired/Unwired: Cybercultures and Technopolitics
- IA 5240 Cyberlaw: Privacy, Ethics, and Digital Rights

**Electrical Engineering**

- EECE 2160 Embedded Design Enabling Robotics and Lab for EECE 2160

**Science Requirement**

Complete two courses for one of the following sciences: 10

**Biology**

- BIOL 1111 and BIOL 1112 General Biology 1 and Lab for BIOL 1111

Then complete one of the following:

- BIOL 1113 and BIOL 1114 General Biology 2 and Lab for BIOL 1113
- BIOL 2301 and BIOL 2302 Genetics and Molecular Biology and Lab for BIOL 2301

**Chemistry**

- CHEM 1211 and CHEM 1212 General Chemistry 1 and Lab for CHEM 1211
CHEM 1214 and CHEM 1215 and CHEM 1216

Geology/Environmental Science (Option 1)

ENVR 1200 and ENVR 1201
ENVR 1202 and ENVR 1203
Then complete one of the following:

ENVR 2310 and ENVR 2311
ENVR 4106 and ENVR 4107
ENVR 4500 and ENVR 4501
ENVR 5244 and ENVR 5245

Geology/Environmental Science (Option 2)

ENVR 1200 and ENVR 1201
ENVR 1202 and ENVR 1203

ENVR 2310 and ENVR 2311
ENVR 4106 and ENVR 4107
ENVR 4500 and ENVR 4501
ENVR 5244 and ENVR 5245

Geology/Environmental Science (Option 3)

ENVR 1200 and ENVR 1201
ENVR 1202 and ENVR 1203
ENVR 5242 and ENVR 5243

Physics

Complete one of the following sequences:

Sequence A

PHYS 1145 and PHYS 1146
PHYS 1147 and PHYS 1148

Sequence B

PHYS 1151 and PHYS 1152 and PHYS 1153

PHYS 1155 and PHYS 1156 and PHYS 1157

Sequence C

PHYS 1161 and PHYS 1162 and PHYS 1163

PHYS 1165 and PHYS 1166 and PHYS 1167

Computer Science English Requirement

College Writing

ENGW 1111  First-Year Writing

Advanced Writing in the Disciplines

ENGW 3302 Advanced Writing in the Technical Professions

or ENGW 3315 Interdisciplinary Advanced Writing in the Disciplines

Required General Electives

Complete five general electives.

Major GPA Requirement

Minimum 2.000 GPA required in all CS and IS courses

Computer Science Credit Requirement

Complete 72 semester hours in the major. Acceptable courses for this requirement include all CS courses (except CS 5010) and IA 5010.

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

135 total semester hours required

Plan of Study

Five Years, Three Co-ops in Spring/Summer 1

Year 1

Fall  Hours  Spring  Hours  Summer 1  Hours  Summer 2  Hours
CS 1200  1  CS 2510  4  Vacation  0  Vacation  0
CS 1800  4  CS 2511  1
CS 1801  0  CS 2800  4
CS 2500  4  CS 2801  1
CS 2501  1  Elective  4
ENGW 1111  4  Elective  4
Elective  4

18  18  0  0

Year 2

Fall  Hours  Spring  Hours  Summer 1  Hours  Summer 2  Hours
CS 3500  4  Co-op  0  Co-op  0  Vacation  0
CS 3650  4
MATH 1341  4
CS 1210  1
Elective  4

17  0  0  0

Year 3

Fall  Hours  Spring  Hours  Summer 1  Hours  Summer 2  Hours
CS 3700  4  Co-op  0  Co-op  0  MATH 2331  4
CS 4800  4  Elective  4
MATH 1342  4
### Year 4

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer 1</th>
<th>Hours</th>
<th>Summer 2</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CS 3800</td>
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<td>Co-op</td>
<td>0</td>
<td>Co-op</td>
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<td>MATH 3081</td>
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<td>CS 4400</td>
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<td>ENGW 3302</td>
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<td>CS 4700</td>
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<td>Science elective with lab</td>
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### Year 5

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CS 4740</td>
<td>4</td>
<td>CS 4000</td>
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<tr>
<td>SOCL 4528</td>
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<td>CS 4500</td>
<td>4</td>
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<td>IA 5010</td>
<td>4</td>
<td>CS 5770</td>
<td>4</td>
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<tr>
<td>EECE 2160</td>
<td>3</td>
<td>CS 6710</td>
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<tr>
<td>Capstone</td>
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Total Hours: 135