Computer Science

Department Information

- **Department Web Site:**
  - www.ndsu.edu/cs/ (http://www.ndsu.edu/cs/)
- **Credential Offered:**
  - B.S.; B.A.; Minor
- **Sample Program Guide:**
  - catalog.ndsu.edu/programs-study/undergraduate/computer-science/ (http://catalog.ndsu.edu/programs-study/undergraduate/computer-science/)

Major Requirements

Major: Computer Science

Degree Type: B.S.
Minimum Degree Credits to Graduate: 120

University Degree Requirements

1. Satisfactory completion of all requirements of the curriculum in which one is enrolled.
2. Earn a minimum total of 120 credits in approved coursework. Some academic programs exceed this minimum.
3. Satisfactory completion of the general education requirements as specified by the university.
4. A minimum institutional GPA of 2.00 based on work taken at NDSU.
5. At least 30 credits must be NDSU resident credits. Resident credits include credits registered and paid for at NDSU.
6. At least 36 credits presented for graduation must be in courses numbered 300 or higher.
7. Students presenting transfer credit must meet the NDSU residence credits and the minimum upper level credit. Of the 30 credits earned in residence, a minimum of 15 semester credits must be in courses numbered 300 or above, and 15 semester credits must be in the student’s curricula for their declared major.

For complete information, please refer to the Degree and Graduation Requirements (http://catalog.ndsu.edu/academic-policies/undergraduate-policies/degree-and-graduation/) section of this Bulletin.

University General Education Requirements

A list of university approved general education courses and administrative policies are available here (http://catalog.ndsu.edu/academic-policies/undergraduate-policies/general-education/#genedcoursestext).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 110</td>
<td>College Composition I</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 120</td>
<td>College Composition II</td>
<td>4</td>
</tr>
<tr>
<td>COMM 110</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
</tbody>
</table>

Category C: Communication

12 credits

Category R: Quantitative Reasoning

3 credits

Category S: Science and Technology

10 credits

Category A: Humanities and Fine Arts

6 credits

Category B: Social and Behavioral Sciences

6 credits

Category W: Wellness

2 credits

Category D: Cultural Diversity

5 credits

Category G: Global Perspectives

5 credits

Total Credits

39 credits

* Courses for category D & G are satisfied by completing D & G designated courses in another general education category.
General education courses may be used to satisfy requirements for both general education and the major, minor, and program emphases, where applicable. Students should carefully review major requirements to determine if specific courses can also satisfy these general education categories.

### Major Requirements

A Grade of 'C' or better is required for all CSCI prefix courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B.S. Computer Science Core Requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSCI 160</td>
<td>Computer Science I</td>
<td>4 or 6</td>
</tr>
<tr>
<td>or CSCI 227</td>
<td>Computing Fundamentals in Python I</td>
<td></td>
</tr>
<tr>
<td>&amp; CSCI 228</td>
<td>and Computing Fundamentals in Python II</td>
<td></td>
</tr>
<tr>
<td>CSCI 161</td>
<td>Computer Science II</td>
<td>4</td>
</tr>
<tr>
<td>CSCI 213</td>
<td>Modern Software Development</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 222</td>
<td>Discrete Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 313</td>
<td>Software Development with Frameworks</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 336</td>
<td>Theoretical Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 366</td>
<td>Database Systems</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 372</td>
<td>Comparative Programming Languages</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 374</td>
<td>Computer Organization and Architecture</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 445</td>
<td>Software Projects Capstone</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 455</td>
<td>Networking and Parallel Computation</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 467</td>
<td>Algorithm Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 474</td>
<td>Operating Systems Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 489</td>
<td>Social Implications of Computers</td>
<td>3</td>
</tr>
<tr>
<td>MATH 165</td>
<td>Calculus I (May satisfy general education category R)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 166</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>STAT 367</td>
<td>Probability</td>
<td>3</td>
</tr>
<tr>
<td>STAT 368</td>
<td>Statistics</td>
<td>3 or 5</td>
</tr>
<tr>
<td>or STAT 330</td>
<td>Introductory Statistics</td>
<td></td>
</tr>
<tr>
<td>&amp; STAT 331</td>
<td>and Regression Analysis</td>
<td></td>
</tr>
</tbody>
</table>

**Track: Select one track from the four listed below**

<table>
<thead>
<tr>
<th>Track</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STANDARD TRACK</strong></td>
<td>70-74</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td>MATH 129</td>
<td>Basic Linear Algebra</td>
</tr>
<tr>
<td>CSCI 277</td>
<td>Introduction to UNIX</td>
</tr>
<tr>
<td>Computer Science Electives:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Select 3 didactic courses from any 300-400 level CSCI prefix courses that are not part of the core requirement.</td>
<td></td>
</tr>
</tbody>
</table>

**CYBERSECURITY TRACK**

<table>
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<tbody>
<tr>
<td>CSCI 277</td>
<td>Introduction to UNIX</td>
<td>3</td>
</tr>
<tr>
<td>Cybersecurity Electives:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSCI 403</td>
<td>Defensive Network Security</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 404</td>
<td>Ethical Hacking</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 405</td>
<td>Principles of Cybersecurity</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 408</td>
<td>Malware Detection, Analysis and Threat Mechanisms</td>
<td></td>
</tr>
<tr>
<td>CSCI 409</td>
<td>Cybersecurity Law and Policy</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 410</td>
<td>Computer Crime and Forensics</td>
<td>3</td>
</tr>
</tbody>
</table>
CSCI 411 Secure Software Development
CSCI 469 Network Security
CSCI 473 Foundations of the Digital Enterprise

Total Credits 12

## DATA SCIENCE TRACK

<table>
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<tbody>
<tr>
<td>MATH 129</td>
<td>Basic Linear Algebra</td>
<td>3</td>
</tr>
</tbody>
</table>

Data Science Electives: 9

- CSCI 411 Secure Software Development
- CSCI 420 Introduction to Data Science in Python
- CSCI 422 Fundamentals of Data Engineering
- CSCI 425 Machine Learning
- CSCI 426 Introduction to Artificial Intelligence
- CSCI 428 Artificial Intelligence, Ethics, and the Environment
- CSCI 436 Intelligent Agents
- CSCI 450 Cloud Computing
- CSCI 479 Introduction to Data Mining

Total Credits 12

## SOFTWARE ENGINEERING TRACK

<table>
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<tr>
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<tr>
<td>MATH 129</td>
<td>Basic Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 277</td>
<td>Introduction to UNIX</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 3

- CSCI 411 Secure Software Development
- CSCI 412 Mobile Software Engineering
- CSCI 413 Principles of Software Engineering
- CSCI 416 Software Architecture and Design
- CSCI 419 Software Testing and Debugging
- CSCI 422 Fundamentals of Data Engineering
- CSCI 450 Cloud Computing
- CSCI 473 Foundations of the Digital Enterprise
- CSCI 488 Human-Computer Interaction

Software Engineering Electives: 9

Total Credits 12

1

Department Capstone: CSCI 445 Software Projects Capstone (typically taken during the last spring semester prior to degree completion) & CSCI 489 Social Implications of Computers (typically taken during the last fall semester prior to degree completion)