# Computer Science, B.S.

The courses in the Computer Science Department are designed to teach the foundations of computing rather than a particular technology, so that the student is prepared to adapt to changing technology. Students are exposed to various programming languages and computing systems.

The job market in computer science is strong. A student completing a bachelor’s degree with a strong academic record can expect job offers as a systems programmer or analyst, applications programmer, systems support staff member, technical staff member, or similar positions. The undergraduate curriculum has also been designed to prepare students for graduate studies (master’s and doctoral degrees) in computer science. Qualified students who have an interest in research will have opportunities to participate in projects with department faculty during undergraduate or graduate studies.

In addition to the regular B.S. program, students may pursue a concentration in Data Science and Big Data, which is designed to provide Computer Science B.S. students with key knowledge of appropriate theories, algorithms, and technologies, towards development of analytical systems/models for disparate, complex, and small/large scale datasets. Students completing this concentration will have learned skills necessary to tackle a wide variety of data-focused scientific, social, and environmental challenges.

Because computer science courses change rapidly, it is recommended that the sequence CSC 130, CSC 230, CSC 330 be completed within 4 consecutive semesters.

The B.S. degree in Computer Science program is accredited by the Computing Accreditation Commission of ABET (https://www.abet.org).

## Overall Requirements

- 120 credit hours, to include at least 36 credits at or above the 300 course level
- Students must maintain a grade point average of at least 2.0 in the core courses, required electives, and required supporting discipline courses.

## Degree Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

University Requirements (https://catalog.uncg.edu/academic-regulations-policies/undergraduate-requirements/undergraduate-degrees-and-degree-requirements/)

General Education Requirements (MAC) (https://catalog.uncg.edu/academic-regulations-policies/undergraduate-requirements/general-education-program/#generaleducationcorerequirementstext)

College of Arts and Sciences Additional Requirements (CIC) (https://catalog.uncg.edu/arts-sciences/#additionalundergraduaterequirementstext)

## Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 130</td>
<td>Introduction to Computer Science</td>
<td>39</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 230</td>
<td>Elementary Data Structures and Algorithms</td>
<td></td>
</tr>
<tr>
<td>CSC 250</td>
<td>Foundations of Computer Science I</td>
<td></td>
</tr>
<tr>
<td>CSC 261</td>
<td>Computer Organization and Assembly Language</td>
<td></td>
</tr>
<tr>
<td>CSC 330</td>
<td>Advanced Data Structures</td>
<td></td>
</tr>
<tr>
<td>CSC 339</td>
<td>Concepts of Programming Languages</td>
<td></td>
</tr>
<tr>
<td>CSC 340</td>
<td>Software Engineering</td>
<td></td>
</tr>
<tr>
<td>CSC 350</td>
<td>Foundations of Computer Science II</td>
<td></td>
</tr>
<tr>
<td>CSC 362</td>
<td>System Programming</td>
<td></td>
</tr>
<tr>
<td>CSC 452</td>
<td>Theory of Computation</td>
<td></td>
</tr>
<tr>
<td>CSC 462</td>
<td>Principles of Operating Systems</td>
<td></td>
</tr>
<tr>
<td>CSC 471</td>
<td>Principles of Database Systems</td>
<td></td>
</tr>
<tr>
<td>CSC 490</td>
<td>Senior Capstone</td>
<td></td>
</tr>
</tbody>
</table>

### CSC Electives

Select an additional 12 credits from any CSC course at the 300 level or above.

### Supporting Discipline Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 196</td>
<td>Calculus A</td>
<td></td>
</tr>
<tr>
<td>or MAT 191</td>
<td>Calculus I</td>
<td></td>
</tr>
<tr>
<td>MAT 296</td>
<td>Calculus B</td>
<td></td>
</tr>
<tr>
<td>or MAT 292</td>
<td>Calculus II</td>
<td></td>
</tr>
<tr>
<td>PHI 222</td>
<td>Ethics in the Computer Age</td>
<td></td>
</tr>
<tr>
<td>STA 271</td>
<td>Fundamental Concepts of Statistics</td>
<td></td>
</tr>
<tr>
<td>or STA 290</td>
<td>Introduction to Probability and Statistical Inference</td>
<td></td>
</tr>
</tbody>
</table>

### Science Requirements

Select two of the following options:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 111</td>
<td>Principles of Biology I</td>
<td></td>
</tr>
<tr>
<td>&amp; 111L</td>
<td>and Principles of Biology I Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIO 112</td>
<td>Principles of Biology II</td>
<td></td>
</tr>
<tr>
<td>&amp; 112L</td>
<td>and Principles of Biology II Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHE 111</td>
<td>General Chemistry I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHE 112</td>
<td>General Chemistry I Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHE 114</td>
<td>General Chemistry II</td>
<td></td>
</tr>
<tr>
<td>&amp; CHE 115</td>
<td>General Chemistry II Laboratory</td>
<td></td>
</tr>
<tr>
<td>PHY 291</td>
<td>General Physics I with Calculus</td>
<td></td>
</tr>
<tr>
<td>&amp; 291L</td>
<td>General Physics I with Calculus Lab</td>
<td></td>
</tr>
<tr>
<td>PHY 292</td>
<td>General Physics II with Calculus</td>
<td></td>
</tr>
<tr>
<td>&amp; 292L</td>
<td>General Physics II with Calculus Lab</td>
<td></td>
</tr>
</tbody>
</table>

* Three of these credit hours may be satisfied by one of the following courses: MAT 293, MAT 310, MAT 390, MAT 396, STA 301, or STA 352

** When registering for the science course, students must concurrently register for the lab component of the course.

## Optional Concentration

The optional concentration as detailed following the major requirements may be added, but is not required.

- Data Science and Big Data

### Electives

Electives sufficient to complete the 120 credit hours required for the degree.
Data Science and Big Data Concentration Requirements

- 9 credit hours as defined below
- Students in the Data Science and Big Data Concentration must satisfy all requirements for the B.S. in Computer Science, and must complete the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 405</td>
<td>Data Science</td>
<td>3</td>
</tr>
<tr>
<td>CSC 410</td>
<td>Big Data and Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>Select 3 credits from the elective courses below</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSC 407</td>
<td>Network Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CSC 416</td>
<td>Digital Image Processing</td>
<td>3</td>
</tr>
<tr>
<td>CSC 417</td>
<td>Deep Learning in Computer Vision</td>
<td>3</td>
</tr>
<tr>
<td>CSC 425</td>
<td>Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>CSC 429</td>
<td>Artificial Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>CSC 454</td>
<td>Algorithm Analysis/Design</td>
<td>3</td>
</tr>
<tr>
<td>CSC 474</td>
<td>Principles of Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>STA 431</td>
<td>Introduction to Probability</td>
<td>3</td>
</tr>
<tr>
<td>STA 435</td>
<td>Theory Linear Regression</td>
<td>3</td>
</tr>
</tbody>
</table>

Disciplinary Honors in Computer Science Requirements

- A minimum of 12 credit hours as defined below.
- A grade of B or higher in all course work used to satisfy the Honors requirements in Computer Science and at least a 3.30 overall GPA at graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 493</td>
<td>Honors Work in Computer Science *</td>
<td>6</td>
</tr>
<tr>
<td>HSS 490</td>
<td>Senior Honors Project **</td>
<td>6</td>
</tr>
<tr>
<td>Select 6 credits from the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>CSC 415</td>
<td>Computer Graphics</td>
<td></td>
</tr>
<tr>
<td>CSC 416</td>
<td>Digital Image Processing</td>
<td></td>
</tr>
<tr>
<td>CSC 425</td>
<td>Bioinformatics</td>
<td></td>
</tr>
<tr>
<td>CSC 427</td>
<td>Numerical Analysis and Computing</td>
<td></td>
</tr>
<tr>
<td>CSC 429</td>
<td>Artificial Intelligence</td>
<td></td>
</tr>
<tr>
<td>CSC 439</td>
<td>Introduction to Compiler Design</td>
<td></td>
</tr>
<tr>
<td>CSC 442</td>
<td>Human-Computer Interface Dev</td>
<td></td>
</tr>
<tr>
<td>CSC 454</td>
<td>Algorithm Analysis/Design</td>
<td></td>
</tr>
<tr>
<td>CSC 461</td>
<td>Principles of Computer Architecture</td>
<td></td>
</tr>
<tr>
<td>CSC 471</td>
<td>Principles of Database Systems</td>
<td></td>
</tr>
<tr>
<td>CSC 477</td>
<td>Principles of Computer Networks</td>
<td></td>
</tr>
<tr>
<td>CSC 478</td>
<td>Principles of Wireless Networks</td>
<td></td>
</tr>
</tbody>
</table>

* Taken first in the sequence.
** Taken second in the sequence.

Accelerated B.S. to M.S.
Application and Admission

Qualified UNC Greensboro undergraduate students who are pursuing the Bachelor of Science (B.S.) in Computer Science may apply for admission to the Accelerated Master’s Program (AMP). A cumulative undergraduate GPA of at least 3.5 based on at least 30 credits earned at UNC Greensboro is required. Applicants must have completed at least 60 credits and may not apply for admission to the AMP before the first semester of the junior year. Applicants will not be required to take the GRE. All applicants must complete the Accelerated Master’s Program information along with their application for admission to the graduate degree program.

Courses

Admitted students may apply the following 12 credits of graduate-level course work toward completion of both the undergraduate and graduate degree, provided that they earn a grade of B (3.0) or better in the course and fulfill graduate-level requirements:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 652</td>
<td>Theory of Computation</td>
<td>3</td>
</tr>
<tr>
<td>CSC 654</td>
<td>Algorithm Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>CSC 662</td>
<td>Principles of Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>CSC 677</td>
<td>Principles of Computer Networks</td>
<td>3</td>
</tr>
</tbody>
</table>

Please consult with an advisor to determine how the course taken at the graduate level will meet requirements in the bachelor’s degree program. All degree requirements for the M.S. in Computer Science remain the same.

Recognition

Receive a Certificate of Disciplinary Honors in Computer Science; have that accomplishment, along with the title of the Senior Honors Project, noted on the official transcript; and be recognized at a banquet held at the end of the spring semester.

Honors Advisor

Contact Lixin Fu at l_fu@uncg.edu for further information and guidance about Honors in Computer Science. To apply: http://honorscollege.uncg.edu/forms/disc-application.pdf