COMPUTER SCIENCE MAJOR, B.A.

Contact Information
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The bachelor of arts degree with a major in computer science will prepare students for a career in either a traditional computing field or a field in which computing is a significant enabling technology. The B.A. degree is the preferred degree for those who wish more flexibility in their program of study.

Department Programs
Majors

• Computer Science Major, B.A. (p. 1)
• Computer Science Major, B.S. (http://catalog.unc.edu/undergraduate/programs-study/computer-science-major-bs)

Minor

• Computer Science Minor (http://catalog.unc.edu/undergraduate/programs-study/computer-science-minor)

Graduate Programs

• M.S. in Computer Science (http://catalog.unc.edu/graduate/schools-departments/computer-science)
• Ph.D. in Computer Science (http://catalog.unc.edu/graduate/schools-departments/computer-science)

Student Learning Outcomes

Upon completion of the computer science program (B.A.), students should be able to:

• Understand major concepts, theoretical perspectives, empirical findings, and historical trends in the core of computer science
• Gain employment in highly competitive industries and companies and be successful in those positions
• Use critical and creative thinking skills in their approach to analyzing and solving computational problems
• Apply their knowledge in the completion of a significant real-world experience

Requirements

In addition to the program requirements listed below, students must

• complete a minimum of 45 academic credit hours earned from UNC-Chapel Hill courses
• take at least half of their major course requirements (courses and credit hours) at UNC-Chapel Hill
• earn a minimum of 18 hours of C or better in the major core requirements (some majors require 21 hours).

For more information, please consult the degree requirements section of the catalog (http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements/#degreerequirementstext).

Core Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 401</td>
<td>Foundation of Programming H</td>
<td>4</td>
</tr>
<tr>
<td>COMP 410</td>
<td>Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>COMP 411</td>
<td>Computer Organization</td>
<td>4</td>
</tr>
</tbody>
</table>

Six additional elective courses chosen from the following, with no more than two courses from other departments:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP courses numbered 426 - 599 (excluding courses for honors thesis, internships, and independent study)</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Any single offering of COMP 590</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Graduate level courses (600 or higher) other than COMP 790</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>BIOL 525</td>
<td>Analysis and Interpretation of Sequence-Based Functional Genomics Experiments</td>
<td></td>
</tr>
<tr>
<td>INLS 318</td>
<td>Human Computer Interaction</td>
<td></td>
</tr>
<tr>
<td>INLS 609</td>
<td>Experimental Information Retrieval</td>
<td></td>
</tr>
<tr>
<td>INLS 613</td>
<td>Text Mining</td>
<td></td>
</tr>
<tr>
<td>LING 540</td>
<td>Mathematical Linguistics</td>
<td></td>
</tr>
<tr>
<td>MATH 566</td>
<td>Introduction to Numerical Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH/ENVR 661</td>
<td>Scientific Computation I</td>
<td></td>
</tr>
<tr>
<td>PHYS 231</td>
<td>Physical Computing</td>
<td></td>
</tr>
<tr>
<td>PHYS 331</td>
<td>Introduction to Numerical Techniques in Physics</td>
<td></td>
</tr>
</tbody>
</table>

Other courses must be approved by the director of undergraduate studies and must have a significant computer or computing technology component.

Additional Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 283</td>
<td>Discrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 381</td>
<td>Discrete Mathematics</td>
<td></td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Functions of One Variable I</td>
<td>4</td>
</tr>
<tr>
<td>STOR 155</td>
<td>Introduction to Data Models and Inference</td>
<td>3</td>
</tr>
<tr>
<td>or STOR 435</td>
<td>Introduction to Probability</td>
<td></td>
</tr>
</tbody>
</table>

B.A. majors in computer science must fulfill all Foundations, Approaches (http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements), Connections (http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements), and Supplemental General Education (http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements) requirements.

Total Hours 39

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

1 Additional offerings of COMP 590 may be counted toward this requirement with the approval of the director of undergraduate studies.
COMP 790 courses are general seminar courses that are not appropriate for this requirement and may only be counted with the approval of the director of undergraduate studies.

Computer science (COMP) course descriptions (http://catalog.unc.edu/undergraduate/departments/computer-science/#coursestext).

Sample Plan of Study

Sample plans can be used as a guide to identify the courses required to complete the major and other requirements needed for degree completion within the expected eight semesters. The actual degree plan may differ depending on the course of study selected (second major, minor, etc.). Students should meet with their academic advisor to create a degree plan that is specific and unique to their interests. The sample plans represented in this catalog are intended for first-year students entering UNC–Chapel Hill in the fall term. Some courses may not be offered every term.

The following is a suggested four-year plan of study for B.A. majors.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 105</td>
<td>English Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>Foreign language level 2 and 3 (Foundations)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Lifetime fitness</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>One of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>First-year seminar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP 110</td>
<td>Introduction to Programming (if needed)</td>
<td>4</td>
</tr>
<tr>
<td>COMP 116</td>
<td>Introduction to Scientific Programming (if needed)</td>
<td>4</td>
</tr>
<tr>
<td>COMP 401</td>
<td>Foundation of Programming</td>
<td>4</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Functions of One Variable I (quantitative reasoning Foundations course)</td>
<td>4</td>
</tr>
<tr>
<td>Additional General Education (<a href="http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements">http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements</a>) and elective courses</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td><strong>Sophomore Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An appropriate physical and life sciences Approaches (<a href="http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements">http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements</a>) course</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>COMP 283</td>
<td>Discrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>COMP 410</td>
<td>Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>COMP 411</td>
<td>Computer Organization</td>
<td>4</td>
</tr>
<tr>
<td>Four additional Approaches (<a href="http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements">http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements</a>) and Connections (<a href="http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements">http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements</a>) courses</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Free elective</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Junior Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOR 155 or STOR 435</td>
<td>Introduction to Data Models and Inference or Introduction to Probability</td>
<td>3</td>
</tr>
<tr>
<td>COMP 401</td>
<td>Foundation of Programming</td>
<td>4</td>
</tr>
<tr>
<td>COMP 283</td>
<td>Discrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>STOR 155</td>
<td>Introduction to Data Models and Inference</td>
<td>3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Functions of One Variable I (if needed)</td>
<td>4</td>
</tr>
<tr>
<td>COMP 410</td>
<td>Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>COMP 411</td>
<td>Computer Organization</td>
<td>4</td>
</tr>
<tr>
<td>Supplemental General Education (<a href="http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements">http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements</a>)</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td><strong>Senior Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six COMP courses numbered 426 or higher</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Connections (<a href="http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements">http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements</a>) and free elective courses</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Free elective</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td></td>
<td>120</td>
</tr>
</tbody>
</table>

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

The following is a suggested plan of study for students initiating coursework for the B.A. major in their junior years. This is an accelerated plan appropriate for students who have already completed most if not all of their general education requirements and COMP 110 or COMP 116 (if needed). Students without prior programming experience are highly encouraged to complete COMP 110 or COMP 116 (or equivalent) prior to starting the program.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Junior Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP 401</td>
<td>Foundation of Programming</td>
<td>4</td>
</tr>
<tr>
<td>COMP 283</td>
<td>Discrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>STOR 155 or STOR 435</td>
<td>Introduction to Data Models and Inference or Introduction to Probability</td>
<td>3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Functions of One Variable I (if needed)</td>
<td>4</td>
</tr>
<tr>
<td>COMP 410</td>
<td>Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>COMP 411</td>
<td>Computer Organization</td>
<td>4</td>
</tr>
<tr>
<td>Supplemental General Education (<a href="http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements">http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements</a>)</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td><strong>Senior Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six COMP courses numbered 426 or higher</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Connections (<a href="http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements">http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements</a>) and free elective courses</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Free elective</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td></td>
<td>60</td>
</tr>
</tbody>
</table>

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.
Notes on the Suggested Plan of Study

A first formal course in computer programming (such as COMP 110) is a prerequisite for COMP 401. Students with no programming experience should begin their program of study with COMP 110. Students who are unsure if their background preparation enables them to begin their studies with COMP 401 are encouraged to consult a departmental advisor.

Students who are able to begin with COMP 401 may take it in their first semester and either advance the suggested program of study by one semester (giving themselves an extra free elective in their junior/senior years) or take another appropriate course such as a first-year seminar. In either case, neither COMP 110 nor a first-year seminar is a required course in the major.

This plan of study further assumes that students will place out of foreign language 1. If this is not the case, then the student should start with foreign language 1 (and have one fewer free elective in the senior year).

Special Opportunities in Computer Science

Honors in Computer Science

Students are eligible for graduation with honors if they complete the following requirements:

- A cumulative grade point average of 3.3 or better
- A grade point average of 3.3 or better from among the set of COMP, MATH, PHYS, and STOR courses taken to fulfill the graduation requirements for the major
- Graduation with honors requires the completion of two semesters of research (COMP 691H and COMP 692H). As part of COMP 692H, students must submit a written honors thesis and complete an oral public presentation of the thesis. Graduation with highest honors in computer science is possible for those students whose honors project and thesis are judged by a faculty committee to be particularly distinguished.

Students interested in pursuing honors in computer science are encouraged to contact the director of undergraduate studies.

Experiential Education

When arranged in advance with a supervising faculty member, COMP 293 can be used to earn credit for appropriate work experience in the summer. COMP 293 satisfies the experiential education requirement. COMP 495 and COMP 691H can also be used to satisfy the experiential education requirement. Another possibility is through study abroad (see below).

Assistantships and Internships

In addition to their classroom experiences, undergraduates may enhance their learning experience as research assistants or teaching assistants. Students also can participate in nationally recognized research programs or use the department's facilities to pursue self-directed research with a faculty member.

Work-study students can gain valuable work experience as assistants on the department's computer services staff. The department also encourages students to pursue internship experiences. Carolina's proximity to Research Triangle Park means that computer science majors have many internship and postgraduation opportunities available in their own backyard.

Study Abroad

Study abroad opportunities with priority for computer science students are offered through University College London (UCL) and the National University of Singapore (NUS) School of Computing.

UCL can accept UNC-Chapel Hill students for either a semester or yearlong exchange. For semester-only programs, UCL recommends registering for spring semester rather than fall as it better matches their academic calendar. Many courses satisfying the computer science B.A. or B.S. requirements can be completed at UCL. UCL is located in the heart of London and is just a few blocks away from UNC-Chapel Hill's European Study Center in Winston House.

NUS can accept UNC-Chapel Hill students for fall or spring semester, or a yearlong exchange. This exchange allows Carolina students to enroll directly into the NUS School of Computing and choose their courses from among the full offering. On a case-by-case basis, students may also be able to take other courses at NUS outside of the School of Computing. Study abroad at NUS is eligible for the Phillips Ambassadors Scholarship. Please see the Phillips Ambassadors Web site (http://phillips.unc.edu) for more information.

Specific course equivalences for both schools are posted on the department's Web site. Students interested in taking a course not listed should contact the director of undergraduate studies before registering for courses at the school.

Application for both programs is through the University's Study Abroad Office. Application to the UCL programs and the NUS fall and yearlong programs takes place early in the spring of each year. Application for the NUS spring program takes place early in the fall of each year. Applicants for exchange participation must have completed at least one year of study at UNC-Chapel Hill and must have declared a computer science or precomputer science major. Study abroad satisfies the experiential education General Education requirement of the undergraduate curriculum.

Undergraduate Awards

The department awards two yearly prizes to computer science majors. In conjunction with SAS Institute, the department annually presents the Charles H. Dunham Scholarship. The Dunham scholarship includes a cash award to the student and a summer internship at SAS and is awarded in the spring semester to a student in their junior year. The department also annually presents the Stephen F. Weiss Award for Outstanding Achievement in Computer Science, which includes a cash prize. The Weiss award is presented to a student in the fall of the senior year.