COMPUTER SCIENCE MAJOR, B.A.

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.

Admission to the Major

The demand for concentrating in a computer science program has grown significantly at UNC–Chapel Hill over the past decade. In order to maintain the quality of educational experiences that Carolina students studying computer science deserve, we must restrict the number of students majoring in computer science relative to our faculty size's ability to sustain the programs.

Those wishing to concentrate in computer science must be admitted to a major program (B.A. or B.S.). Students are eligible to apply in the spring semester after completing or while currently enrolled in COMP 210. Students who are admitted to the program continue through the introductory course sequence with COMP 301 and COMP 211 and will have access to upper-division electives to complete their degree programs. Please see the department's website (https://cs.unc.edu/undergraduate/cs-admissions/) for the most up-to-date information about the admission to the major process.

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, students must

- earn a minimum final cumulative GPA of 2.000
- complete a minimum of 45 academic credit hours earned from UNC–Chapel Hill courses
- take at least half of their major core requirements (courses and credit hours) at UNC–Chapel Hill
- earn a minimum cumulative GPA of 2.000 in the major core requirements. Some programs may require higher standards for major or specific courses.

For more information, please consult the degree requirements section of the catalog (https://catalog.unc.edu/undergraduate/degree-requirements/).

Code	Title	Hours
Core Requirements		
COMP 210	Data Structures and Analysis [1]	3
COMP 211	Systems Fundamentals [1]	3
COMP 301	Foundations of Programming [1]	3
COMP 311	Computer Organization [1]	3
COMP 283	Discrete Structures [1, H]	3
or MATH 381	Discrete Mathematics	
or STOR 315	Discrete Mathematics for Data Science	
Two additional COMP elective courses numbered 420 or higher (at least three credits each) [2]		6
Four additional elective courses chosen from the following, with no more than two courses from other departments:		12
COMP courses numbered 420 - 599 (excluding COMP 496)		
Graduate level courses (600 or higher) excluding COMP 690, COMP 692H, and COMP 790 [3]		
BIOL 525	Analysis and Interpretation of Sequence-Based Functional Genomics Experiments	
BIOL 554	Introduction to Computational Neuroscience	
BIOS 512	Data Science Basics	
BIOS 611	Introduction to Data Science	
BIOS 635	Introduction to Machine Learning	
ECON 525	Advanced Financial Economics	
ECON 573	Machine Learning and Econometrics	
INLS 318	Human Computer Interaction	
INLS 418	Human Factors in System Design	
INLS 509	Information Retrieval	
INLS 512	Applications of Natural Language Processing	
INLS 523	Introduction to Database Concepts and Applications	
INLS 609	Experimental Information Retrieval	
INLS 613	Text Mining	
INLS 623	Database Systems II: Intermediate Databases	
INLS 672	Web Development II	
INLS 718	User Interface Design	
LING 401	Language and Computers	
LING 540	Mathematical Linguistics	
MATH 566	Introduction to Numerical Analysis	
MATH/ENVR 661	Scientific Computation I	
PHYS 231	Physical Computing [H]	
PHYS 331	Numerical Techniques for the Sciences I	
PSYC 559	Applied Machine Learning in Psychology	
STOR 520	Statistical Computing for Data Science	
STOR 565	Machine Learning	
STOR 566	Introduction to Deep Learning	
Other courses must be approved by the director of undergraduate studies and must have a significant computer or computing technology component.		
Additional Requirements		
MATH 231	Calculus of Functions of One Variable I (A grade of C or better is required) [1, H, F]	4

STOR 155	Introduction to Data Models and Inference [4, F]	3
or STOR 435	Introduction to Probability	
or STOR 535	Probability for Data Science	
or PSYC 210	Statistical Principles of Psychological Research	
or EMES 520	Data Analysis for Earth and Marine Sciences	
or BIOS 650	Basic Elements of Probability and Statistical Inference [I]	
B.A. majors in computer science must fulfill all General Education requirements, including the Supplemental General Education requirement.		
Total Hours		**40**

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

[F]   FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

[1]   A grade of C or better is required in each of COMP 283 (or MATH 381), COMP 210, COMP 211, COMP 301, COMP 311, and MATH 231.

[2]   Excluding COMP 496, COMP 690, and COMP 692H

[3]   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.

[4]   PSYC 210 requires PSYC 101 as a prerequisite. Both STOR 435 and STOR 535 require MATH 233 as a prerequisite.

Computer science (COMP) course descriptions (https://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.

First Year		Hours
First-Year Foundation Courses		
IDST 101	College Thriving	1
ENGL 105 or ENGL 105I	English Composition and Rhetoric or English Composition and Rhetoric (Interdisciplinary)	3
First-Year Seminar or First-Year Launch (https://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/) [F]		3
Triple-I and Data Literacy (https://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/)		4

Global Language through level 3 (https://catalog.unc.edu/undergraduate/ideas-in-action/global-language/)		varies
Major Courses		
COMP 110	Introduction to Programming and Data Science (if needed) [H]	3
COMP 283 or MATH 381 or STOR 315	Discrete Structures [H] or Discrete Mathematics or Discrete Mathematics for Data Science	3
COMP 210	Data Structures and Analysis	3
MATH 231	Calculus of Functions of One Variable I (fulfills FC-QUANT) [H, F]	4
Additional Courses		
Lifetime Fitness (https://catalog.unc.edu/undergraduate/ideas-in-action/lifetime-fitness/)		1
Electives or IDEAs in Action Requirements		5
Hours		**30**
Sophomore Year		
COMP 211	Systems Fundamentals	3
COMP 301	Foundations of Programming	3
COMP 311	Computer Organization	3
An appropriate physical and life sciences IDEAs in Action course		4
Two additional IDEAs in Action courses		6
Free elective		11
Hours		**30**
Junior Year		
STOR 155	Introduction to Data Models and Inference [F]	3
Three upper division COMP electives or approved non-COMP electives		9
Four additional IDEAs in Action courses		12
Two supplemental General Education courses		6
Hours		**30**
Senior Year		
Three COMP courses numbered 420 or higher		9
One Supplemental General Education course		3
IDEAs in Action and free elective courses		18
Hours		**30**
Total Hours		**120**

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

[F]   FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

Notes on the Suggested Plan of Study

A first formal course in computer programming (such as COMP 110) is a prerequisite for COMP 210. 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 210 are encouraged to consult a departmental advisor. Placement exams for COMP 110 and COMP 210 may be available, please consult the department's website.

Students are required to apply fo the major in the Spring semester after taking COMP 210. The plan of study reflects applying at the end of the first year and presumes acceptance into the program. Students who take COMP 210 in their sophomore year would apply at the end of their sophomore year. In this case, COMP 211, COMP 301, and all subsequent upper division electives would move to the junior and senior years; and electives and general education courses would come forward.

This plan of study further assumes that students will place out of Global Language 1. If this is not the case, then the student should start with Global 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.

High-Impact Experiences

Courses arranged in advance with a supervising faculty member offer a number of high-impact experiences. These courses include:

- COMP 227, earning credit for serving as an undergraduate learning assistant;
- COMP 293, earning credit for appropriate work experience;
- COMP 495, conducting mentored research with a faculty member;
- and study abroad while earning credit that counts toward the major (see below).

Assistantships and Internships

In addition to their classroom experiences, undergraduates may enhance their learning experience as research assistants or learning 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 or on development or research activities with faculty. 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 a number of international institutions including the National University of Singapore (NUS) School of Computing, Lancaster University, Trinity University–Dublin, University of New South Wales, and Seoul National University. Study abroad at NUS is eligible for the Phillips Ambassadors Scholarship. Please see the Phillips Ambassadors website (http://phillips.unc.edu) for more information. Availability of these programs may vary and additional programs may be available. Application for study abroad is through the University's Study Abroad Office.

Study abroad satisfies the experiential education General Education requirement of the undergraduate curriculum. Up to two computer science courses taken at these institutions may be counted toward the major as computer science electives beyond the introductory sequence. Specific course equivalencies for some programs are posted on the department's website (https://cs.unc.edu/). Students interested in taking a course not listed should contact the director of undergraduate studies before registering for courses at the school.

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 scholarship and a summer internship at SAS and is awarded in the fall 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 spring of their senior year.

Department Programs

Majors

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

Minor

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

Graduate Programs

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

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