

Computer Science

Computer science is now a critical tool for pursuing an ever-broadening range of topics, from outer space to the workings of the human mind. In most areas of science and in many liberal arts fields, cutting-edge work depends increasingly on computational approaches. The undergraduate program at Brown is designed to combine breadth in practical and theoretical computer science with depth in specialized areas. These areas range from traditional topics, such as analysis of algorithms, artificial intelligence, databases, distributed systems, graphics, mobile computing, networks, operating systems, programming languages, robotics and security, to novel areas including games and scientific visualization.

Our requirements are built on a core set of foundation courses, each representing an essential area within computer science. Concentrators choose the upper-level courses that align with their interests. Students may not use more than two CSCI 1970 courses to complete the requirements for the Sc.B. and one CSCI 1970 course for the A.B. requirements.

For up-to-date information on our concentration requirements please see <https://cs.brown.edu/degrees/undergrad/concentrating-in-cs/concentration-requirements-2024>. Please see <https://cs.brown.edu/degrees/undergrad/concentrating-in-cs/concentration-handbook/> for additional information regarding our concentration requirements (including allowed substitutions and policies).

Requirements for the Standard Track of the Sc.B. degree

Requirements for the Standard Track of the Sc.B. degree

Prerequisites (0-3 courses)

Calculus prerequisite: students must complete or place out of second semester calculus.

MATH 0100	Single Variable Calculus, Part II
or MATH 0170	Single Variable Calculus, Part II (Accelerated)
or MATH 0190	Single Variable Calculus, Part II (Physics/Engineering)

Concentration Requirements

Core-Computer Science:

Select one of the following introductory course Series: 2

Series A

CSCI 0150 & CSCI 0200	Introduction to Object-Oriented Programming and Computer Science and Program Design with Data Structures and Algorithms
-----------------------	---

Series B

CSCI 0170 & CSCI 0200	Computer Science: An Integrated Introduction and Program Design with Data Structures and Algorithms
-----------------------	---

Series C

CSCI 0190	Accelerated Introduction to Computer Science
-----------	--

AND

an additional CS course numbered 200 or above not otherwise used to satisfy a concentration requirement; this course may be CSCI 0200, a Foundations course, or a 1000-level course.

Series D ¹

CSCI 0111 & CSCI 0200	Computing Foundations: Data and Program Design with Data Structures and Algorithms
-----------------------	--

Introductory Math Foundations 1

CSCI 0220	Introduction to Discrete Structures and Probability
or MATH 1530	Abstract Algebra

Foundations Courses

ScB students must take one course from each foundation area.

Foundations Areas

a. Algorithms/Theory Foundations	1
CSCI 0500	Data Structures, Algorithms, and Intractability: An Introduction
b. AI/Machine Learning/Data Science Foundations	1
CSCI 0410	Foundations of AI
c. Systems Foundations, Concentration credit for only one of 300/330	1
CSCI 0300	Fundamentals of Computer Systems
or CSCI 0330	Introduction to Computer Systems

CSCI Electives 5

Five CSCI courses at the 1000 level ²

Four Additional Electives. These can include: 4

CSCI 0320	Introduction to Software Engineering
1000-level and 2000-level CSCI courses (no more than three non-technical courses as defined in concentration handbook)	
Linear algebra (MATH 0520, MATH 0540, or APMA 0260)	
Up to three approved 1000-level courses outside of CS (see the concentration handbook for the current list. Note that concentration credit for only one APMA 1650, 1655).	

Capstone

A capstone taken in the senior year (from the list of approved capstone courses in the concentration handbook). The capstone may also be used to satisfy another requirement.

Total Credits 15

¹ Students wishing to go directly from CSCI 0111 to CSCI 0200 will need to successfully complete additional exercises to receive an instructor override code for CSCI 0200.

² None of these can be CS non-technical courses. The list is in the concentration handbook. [<https://cs.brown.edu/degrees/undergrad/concentrating-in-cs/concentration-handbook/>]

Requirements for the Professional Track of the both the Sc. B. and A.B. degrees.

The requirements for all undergraduate professional tracks within concentrations are standardized and additional information can be found here:

<https://bulletin.brown.edu/undergradprotrack/>

Honors

Honors in CS requires a two-semester research project (including writeup and presentation) during the last two semesters. In addition, honors candidates must have earned A's or S-with-distinction in 2/3 (rounding up) of the courses used towards the concentration, excluding introductory-sequence courses (CS courses numbered 0200 or below) and the calculus prerequisite. See the department's honors webpage (<https://cs.brown.edu/degrees/undergrad/concentrating-in-cs/honors/>) for more details.

Requirements for the Standard Track of the A.B. degree

Concentration Requirements (10 courses)

Core Computer Science:

Select one of the following series: 2

Series A

CSCI 0150 & CSCI 0200	Introduction to Object-Oriented Programming and Computer Science and Program Design with Data Structures and Algorithms	
Series B		
CSCI 0170 & CSCI 0200	Computer Science: An Integrated Introduction and Program Design with Data Structures and Algorithms	
Series C		
CSCI 0190	Accelerated Introduction to Computer Science	
AND		
An additional CS course 200 or above not otherwise used to satisfy a concentration requirement; this course may be CSCI 0200, a Foundations course, or a 1000-level course.		
Series D ¹		
CSCI 0111 & CSCI 0200	Computing Foundations: Data and Program Design with Data Structures and Algorithms	
Introductory Math Foundations		1
CSCI 0220	Introduction to Discrete Structures and Probability	
Foundations Courses		
AB students must take one course from each foundation area		
Foundation Areas		
a. Algorithms/Theory Foundations		1
CSCI 0500	Data Structures, Algorithms, and Intractability: An Introduction	
b. AI/Machine Learning/Data Science Foundations		1
CSCI 0410	Foundations of AI	
c. Systems Foundations		1
CSCI 0300	Fundamentals of Computer Systems	
or CSCI 0320	Introduction to Software Engineering	
or CSCI 0330	Introduction to Computer Systems	
CSCI Electives		2
Two CSCI courses at the 1000 level. ²		
Two additional electives. These can include:		2
CSCI 0320	Introduction to Software Engineering (if not used towards System Foundations)	
1000-level and 2000-level CSCI courses (at most one can be a non-technical course as defined in concentration handbook).		
Linear algebra (MATH 0520, MATH 0540, or APMA 0260)		
One approved 1000-level course outside of CS (see the concentration handbook for the current list)		
Capstone		
A capstone taken in the senior year (from the list of approved capstone courses in the concentration handbook). The capstone may also be used to satisfy another requirement.		
Total Credits		10

¹ Students wishing to go directly from CSCI 0111 to CSCI 0200 will need to successfully complete additional exercises to receive an instructor override code for CSCI 0200.

² Neither of these can be non-technical courses. The list is in the concentration handbook. [<https://cs.brown.edu/degrees/undergrad/concentrating-in-cs/concentration-handbook/>]

Requirements for the Professional Track of the both the Sc. B. and A.B. degrees.

The requirements for all undergraduate professional tracks within concentrations are standardized and additional information can be found here:

<https://bulletin.brown.edu/undergradprotrack/>

Honors

Honors in CS requires a two-semester research project (including writeup and presentation) during the last two semesters. In addition, honors candidates must have earned A's or S-with-distinction in 2/3 (rounding up) of the courses used towards the concentration, excluding introductory-sequence courses (CS courses numbered 0200 or below) and the calculus prerequisite. See the department's honors webpage (<https://cs.brown.edu/degrees/undergrad/concentrating-in-cs/honors/>) for more details.