

# Mathematics-Computer Science

Students may opt to pursue an interdisciplinary Bachelor of Science degree in Math-Computer Science, a concentration administered cooperatively between the mathematics and computer science departments. Course requirements include math- and systems-oriented computer science courses, as well as computational courses in applied math. Students must identify a series of electives that cohere around a common theme. As with other concentrations offered by the Computer Science department, students have the option to pursue the professional track of the ScB program in Mathematics-Computer Science.

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

### Prerequisites

Three semesters of Calculus to the level of MATH 0180, MATH 0200, or MATH 0350 3

MATH 0520	Linear Algebra	1
or MATH 0540	Linear Algebra With Theory	
or CSCI 0530	Coding the Matrix: An Introduction to Linear Algebra for Computer Science	

### Core Courses

MATH 1530 Abstract Algebra 1  
 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 numbered 200 or above not otherwise used to satisfy a concentration requirement; a Foundations course, or a 1000-level CS course)

Series D <sup>1</sup>  
 CSCI 0111 & CSCI 0200 Computing Foundations: Data and Program Design with Data Structures and Algorithms

Foundations Courses: Two courses, touching two different Foundations areas: 2

a. Algorithms/Theory Foundations  
 CSCI 0500 Data Structures, Algorithms, and Intractability: An Introduction

b. AI/Machine Learning/Data Science Foundations.  
 CSCI 0410 Foundations of AI

c. Systems Foundations. Concentration credit for only one of 300/330  
 CSCI 0300 Fundamentals of Computer Systems  
 or CSCI 0320 Introduction to Software Engineering  
 or CSCI 0330 Introduction to Computer Systems

Three 1000-level Mathematics courses 3

Three courses in Computer Science at the 1000-level or higher. One of these can be an additional 100-level Foundations course or a CSCI non-technical course, as defined by the concentration handbook. 3

Three additional courses different from any of the above chosen from Mathematics, Computer Science, Applied Mathematics, or related areas <sup>4</sup> 3

A capstone course in Computer Science or Mathematics <sup>5</sup> 1

**Total Credits 19**

<sup>1</sup> 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.

<sup>2</sup> These must be CSCI courses at the 1000-level or higher. Credit will only be given for one of CSCI 410, CSCI 1410, CSCI 1411, and only one credit for CSCI 300, CSCI 330. See current handbook for list. <https://cs.brown.edu/degrees/undergrad/concentrating-in-cs/concentration-handbook/>

<sup>3</sup> Concentration credit will be given for only one of APMA 1650, APMA 1655, and CSCI 1450. These must be approved by a concentration advisor.

<sup>4</sup> A one-semester course, taken in the student's last undergraduate year, in which the student (or group of students) use a significant portion of their undergraduate education, broadly interpreted, in studying some current topic in depth. A senior thesis which involves two semesters of work may count as a Capstone. Course-based capstones are currently only available through CS. Approved capstone courses and instructions may be found in the CS concentration handbook (<https://cs.brown.edu/degrees/undergrad/concentrating-in-cs/concentration-handbook/>)

## Requirements for the Professional Track of the Sc.B. degree.

The requirements for the professional track include all those of the standard track, as well as the following:

Students must complete full-time professional experiences doing work that is related to their concentration programs, totaling 2-6 months, whereby each internship must be at least one month in duration in cases where students choose to do more than one internship experience. Such work is normally done at a company, but may also be at a university under the supervision of a faculty member. Internships that take place between the end of the fall and the start of the spring semesters cannot be used to fulfill this requirement.

On completion of each professional experience, the student must write and upload to ASK a reflective essay about the experience addressing the following prompts, to be approved by the student's concentration advisor:

- Which courses were put to use in your summer's work? Which topics, in particular, were important?
- In retrospect, which courses should you have taken before embarking on your summer experience? What are the topics from these courses that would have helped you over the summer if you had been more familiar with them?
- Are there topics you should have been familiar with in preparation for your summer experience, but are not taught at Brown? What are these topics?
- What did you learn from the experience that probably could not have been picked up from course work?
- Is the sort of work you did over the summer something you would like to continue doing once you graduate? Explain.
- Would you recommend your summer experience to other Brown students? Explain.
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