Applied Mathematics-Computer Science

The Sc.B. concentration in Applied Math-Computer Science provides a foundation of basic concepts and methodology of mathematical analysis and computation and prepares students for advanced work in computer science, applied mathematics, and scientific computation. Concentrators must complete courses in mathematics, applied math, computer science, and an approved English writing course. While the concentration in Applied Math-Computer Science allows students to develop the use of quantitative methods in thinking about and solving problems, knowledge that is valuable in all walks of life, students who have completed the concentration have pursued graduate study, computer consulting and that is valuable in all walks of life, students who have completed the concentration have pursued graduate study, computer consulting and information industries, and scientific and statistical analysis careers in industry or government. This degree offers a standard track and a professional track.

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

Prerequisites - two semesters of Calculus, for example

MATH 0090 & MATH 0100 and Introductory Calculus, Part II
MATH 0170 Advanced Placement Calculus

Concentration Requirements (17 courses)

Core-Math:
MATH 0180 Intermediate Calculus 1
or MATH 0350 Honors Calculus 1
MATH 0520 Linear Algebra 1
or MATH 0540 Honors Linear Algebra 1
or CSCI 0530 Directions: The Matrix in Computer Science 1

Core-Applied Mathematics:
APMA 0350 Applied Ordinary Differential Equations 1
APMA 0360 Applied Partial Differential Equations I 1
APMA 1170 Introduction to Computational Linear Algebra 1
or APMA 1180 Introduction to Numerical Solution of Differential Equations 1

Core-Computer Science:
Select one of the following Series: 2

Series A
CSCI 0150 Introduction to Object-Oriented Programming and Computer Science
& CSCI 0160 and Introduction to Algorithms and Data Structures

Series B
CSCI 0170 & CSCI 0180 Computer Science: An Integrated Introduction

Series C
CSCI 0190 Accelerated Introduction to Computer Science (and an additional CS course not otherwise used to satisfy a concentration requirement; this course may be CSCI 0180, an intermediate-level CS course, or a 1000-level course)

Select three of the following intermediate-level courses, one of which must be math-oriented and one systems-oriented: 3
CSCI 0220 Introduction to Discrete Structures and Probability (math)

Total Credits 17

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 two two-to-four-month full-time professional experiences, doing work that is related to their concentration programs. Such work is normally done within an industrial organization, but may also be at a university under the supervision of a faculty member. 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.

Three 1000-level Computer Science courses. These three courses must include a pair of courses with a coherent theme. A list of approved pairs may be found at the approved-pairs web page. You are not restricted to the pairs on this list, but any pair not on the list must be approved by the director of undergraduate studies.

Three 1000-level Applied Mathematics courses approved by the concentration advisor, of which two should constitute a standard sequence or address a common theme. Typical sequences include: APMA 1200/1210 and APMA 1650 or 1655/1660.

A capstone course: a one-semester course, normally 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, to produce a culminating artifact such as a paper or software project.

Note: CSCI 1450 may be used either as a math-oriented core course or as an advanced course. CSCI 1450 was formerly known as CSCI 450: they are the same course and hence only one may be taken for credit. Applied Math 1650 or Applied Math 1655 may be used in place of CSCI 1450. However, concentration credit will be given for only one of Applied Math 1650, 1655 and CSCI 1450.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

- Helvetica was used instead of Arial.
- The editor may contact Leepfrog for a draft with the correct fonts in place.