

INTRODUCTORY COURSES

Students wishing to devote one course to the study of computer science may choose Computer Science 1, 2, 3, or 4, depending on their background and interests. Students wishing to devote two or more courses to the study of computer science should begin with Computer Science 1 and 10. Students wishing to take courses in Digital Arts should start by taking Computer Science 1, 2, or 4. Students wishing to take courses in Computational Methods are advised to start by taking Computer Science 3, but may instead take Computer Science 1. Engineering Sciences 20 may substitute for Computer Science 1 in any program of study.

UNDERGRADUATE COURSES

Computer Science undergraduate courses are numbered as follows:

- 1–19: Introductory and non-major courses.
- 20–29: Courses in digital arts.
- 30–49: Courses in theory and algorithms.
- 50–69: Courses in systems and hardware.
- 70–89: Courses in applied computer science.
- 90–99: Reading course and culminating experience courses.

Wherever Computer Science 1 is listed as a prerequisite, it may be replaced by Computer Science 5, which is no longer offered; by Engineering Sciences 20; or by credit and placement from either the Computer Science Advanced Placement examination or a local placement examination. Wherever Computer Science 10 is listed as a prerequisite, it may be replaced by Computer Science 8, which is no longer offered.

ELECTIVE COURSES

Many of the majors and minors involving computer science allow for one or more elective courses. In all cases, an elective course is any Computer Science course numbered from 30 to 89 that is not used to fulfill another requirement. With the approval of the Department's Undergraduate Advisor, a Mathematics course or Computer Science 95 may substitute for one elective course; at most one such substitution is allowed. With the approval of the Departmental Undergraduate Advisor, any graduate course in Computer Science (courses numbered above 100) may substitute for an elective course, as long as the graduate course is not cross-listed as an undergraduate course that is used to fulfill another requirement.

MAJOR IN COMPUTER SCIENCE

The major in computer science is intended for those students who plan careers in computer science or in fields that make use of computing, for those who plan graduate study in computer science, and also for those who simply find computer science interesting. Undergraduates majoring in computer science will have opportunities to participate with faculty in activities outside formal coursework. These activities include assisting in courses, writing a thesis or doing a project under the guidance of a faculty member, and assisting a faculty member in research or in a programming project.

To fulfill the major in computer science, a student must complete the courses prerequisite to the major and satisfy the requirements of the major. For additional requirements for the Honors Program see the section 'The Honors Program in Computer Science' below.

REQUIREMENTS FOR THE COMPUTER SCIENCE MAJOR

Prerequisite courses: Computer Science 1 or Engineering Sciences 20; Computer Science 10.

Requirements: A student who wishes to major in Computer Science must obtain approval of her or his program of study from the Departmental Undergraduate Advisor. To complete the major, it is necessary to pass at least ten courses in addition to taking the two prerequisite courses. Among these ten courses must be the following:

1. Two Computer Science courses numbered 30 to 49;
2. Two Computer Science courses numbered 50 to 69;
3. Two Computer Science courses numbered 70 to 89;
4. Three elective courses (see 'Elective Courses' above);
5. Computer Science culminating experience: either two terms of Computer Science 98, or one or two terms of Computer Science 99 (Honors Thesis Research).

MINORS IN COMPUTER SCIENCE

The Computer Science, Computational Methods, and Operations Research minors are available to all students who are not majoring in Computer Science and who do not have a modified major with Computer Science. The Digital Arts minor is available to all students, including those majoring in Computer Science. Students may modify any major, including Computer Science, with Digital Arts. For each minor, the prerequisites and required courses are listed below. Approval of a minor can be obtained through the Departmental Undergraduate Advisor.

I. Computer Science

Prerequisites: Computer Science 1 or Engineering Sciences 20; Computer Science 10.

Courses: Any five elective courses (see 'Elective Courses' above) as approved by the Departmental Undergraduate Advisor and drawn from at least two of the following three sets of courses: Computer Science 30 to 49; Computer Science 50 to 69; Computer Science 70 to 89.

II. Digital Arts

Prerequisites: Computer Science 1, 2, or 4, or Engineering Sciences 20.

Courses: Computer Science 22, 24, 27; one of Film Studies 31, Film Studies 35, Film Studies 38, Studio Art 16, Studio Art 29, Theater 30; and one other course from the following list: Film Studies 31, Film Studies 35, Film Studies 38, Studio Art 16, Studio Art 29, Theater 30, Computer Science 20, Computer Science 77, Psychology 21.

III. Computational Methods

Prerequisites: One of Computer Science 1, Computer Science 3, Engineering Sciences 20, or equivalent; one of Mathematics 22 or 24.

Courses: Computer Science 70 and 84; one of Computer Science 31, 71, or 74; and two courses from one of the following groups:

1. Biology 39, 47, 75; Computer Science 75;
2. Earth Sciences 64, 66, 67, 76;
3. Engineering Sciences 22, 23, 26, 27, 41, 52, 67, 68, 91 (if Computer Science 71 is not used as one of the courses above), 104, 105, 106, 110, 145, 150;
4. Linguistics 22, 25, 26;
5. Mathematics 75 and one of Mathematics 25, 31, 71, 81;
6. Mathematics 23, 46, 53, 76;
7. Mathematics 36, 76, 86, 96;
8. Physics 68, 73, 74, 75; Astronomy 74, 75;
9. Psychology 28, 40, 60;
10. Two other courses, as approved for inclusion in the minor by the offering department(s) and the Computer Science department.

IV. Operations Research

Prerequisites: Mathematics 3, 8, 13; Computer Science 1 or Engineering Sciences 20; Computer Science 10.

Courses: Computer Science 30 or Mathematics 19; Computer Science 31; Computer Science 84; Mathematics 20, 22; and one of Mathematics 38 or 88 or Computer Science 49 with approval of the Undergraduate Advisor.

THE HONORS PROGRAM IN COMPUTER SCIENCE

No change.

PREGRADUATE STUDY IN COMPUTER SCIENCE

Some graduate departments of computer science require applicants to take the Graduate Record Examination in Computer Science. This examination primarily covers material in Computer Science 1, 10, 30, 31, 39, 50, 51, 57, 58, 59, 60, and 61, plus material in Engineering Sciences 31. Those considering graduate school should take many of these courses. Less emphasis is placed on material in other elective courses and the various advanced topics covered in Computer Science 49, 69, and 89 (although advanced topics are very good preparation for graduate study). Material from mathematics courses related to computer science may appear on the examination, though it is hard to recommend any particular mathematics course over the others. This examination is only one part of an application for graduate school. Letters of recommendation, particularly from professors who know you well through an advanced class or work on a project, usually are given more weight.

MODIFIED MAJORS

Many students have created modified majors with Computer Science being either the primary or the secondary part. Particularly common modified majors are with engineering, mathematics, or economics, but modified majors with philosophy, music, film studies, psychology, physics, geography, studio art, and many other subjects have been approved.

MODIFIED MAJOR WITH COMPUTER SCIENCE AS THE PRIMARY PART

A modified major with Computer Science as the primary part must satisfy the following requirements, and it must be approved by the Departmental Undergraduate Advisor to ensure a coherent major.

Prerequisites: Computer Science 1 or Engineering Sciences 20; Computer Science 10.

Requirements: Along with at least four modifying courses, as approved, the requirements are as follows:

1. One Computer Science course numbered 30 to 49;
2. One Computer Science course numbered 50 to 69;
3. One Computer Science course numbered 70 to 89;
4. Three elective courses (see 'Elective Courses' above);
5. Computer Science culminating experience: either two terms of Computer Science 98, or one or two terms of Computer Science 99 (Honors Thesis Research).

MODIFIED MAJOR WITH COMPUTER SCIENCE AS THE SECONDARY PART

Prerequisites: Computer Science 1 or Engineering Sciences 20; Computer Science 10.

Requirements: Four electives (see 'Elective Courses' above) that complement the primary part of the modified major, subject to the approval of the Departmental Undergraduate Advisor.

THE COMPUTER SCIENCE MAJOR MODIFIED WITH ENGINEERING

The Computer Science major modified with engineering requires satisfying most of the requirements of the computer science major, along with four engineering courses related to computer science. The prerequisites are Computer Science 1 or Engineering Sciences 20; Computer Science 10; Mathematics 3, 8, 13; and Physics 13, 14. The requirements are as follows:

1. One Computer Science course numbered 30 to 49;
2. One Computer Science course numbered 50 to 69, but not Computer Science 56, which is identical to Engineering Sciences 31;
3. One Computer Science course numbered 70 to 89;
4. Three elective courses (see 'Elective Courses' above), not including Computer Science 56;
5. Engineering Sciences 22;
6. Engineering Sciences 31;

7. Engineering Sciences 62 or 63;
8. Engineering Sciences 26, 32, 61, 62, 63 or 91. (The same course cannot satisfy both requirements 5 and 6);
9. Computer Science culminating experience: either two terms of Computer Science 98, or one or two terms of Computer Science 99 (Honors Thesis Research).

THE COMPUTER SCIENCE MAJOR MODIFIED WITH DIGITAL ARTS

The Computer Science major modified with Digital Arts requires satisfying some of the requirements of the computer science major, along with four courses from the Digital Arts minor. The prerequisites are Computer Science 1 or Engineering Sciences 20; and Computer Science 10. The requirements are as follows:

1. Two Computer Science courses, either both numbered 30 to 49 or both numbered 50 to 69;
2. Computer Science 22;
3. Computer Science 24;
4. Computer Science 27;
5. Computer Science 77;
6. One Computer Science course numbered 70 to 89, but not 77;
7. One elective course (see 'Elective Courses' above);
8. Two of the following courses: Film and Television Studies 31, 35, 38; Studio Art 16, 29; Theater 30; Computer Science 20; Psychology 21;
9. Computer Science culminating experience: either two terms of Computer Science 98, or one or two terms of Computer Science 99 (Honors Thesis Research).