COMPUTER SCIENCE, BS

Program Director

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Description

The mission of the computer and information science programs is to assist students to be ready for work and ready for change. This means preparing students to make professional contributions to computer and information science immediately upon graduation and throughout their professional careers, and to adapt to technological and societal changes.

This program is accredited by the Computing Accreditation Commission of ABET, http://www.abet.org.

The programs in computer science prepare professionals who will adapt to constant changes in technology and who will be leaders in developing the new technologies of the Information Age. The multidisciplinary nature of the curricula offers students a high degree of flexibility to design a program of study tailored to their interests and professional aspirations.

Computer science focuses on programming, algorithms, large-scale software development, and the principles of computing that underlie these areas. Syracuse's program weaves together an emphasis on fundamental principles with new developments in computing, producing graduates prepared either to begin careers or to pursue advanced studies in the field.

With this program you will have opportunities to learn about:

- Computer and internet security
- Artificial intelligence and machine learning to develop machines that can work among humans.
- Operating system design to develop the next innovation to change Windows, Mac OS X and Unix or to invent a completely new operating system.
- Innovative thinking so you can design programs that control rockets, future search engines, and cars that drive themselves.
- Mathematics to reveal the limits of today's computers and explore the possibility of a new kind of computer that has yet to be imagined.
- Problem solving, independent thinking and team collaboration in developing a large-scale software systems with other computer scientists and software engineers.

Student Learning Outcomes

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline
3. Communicate effectively in a variety of professional contexts
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline
6. Apply computer science theory and software development fundamentals to produce computing-based solutions

Distribution and Core Requirements

The BS degree in Computer Science requires a minimum of 120 credits. The requirements are divided into a general education section, a mathematics section, and a major section.

General Education Section

Completion of the general education section requires at least 47 credits of coursework, as follows. Each student is required to complete 6 credits of writing (WRT 105 Studio 1: Practices of Academic Writing, WRT 205 Studio 2: Critical Research and Writing) and 3 credits in presentational skills by taking at least one course out of the following:

Code	Title	Credits
CRS 225	Public Advocacy	3
CRS 325	Presentational Speaking	3
IST 344	Information Reporting and Presentation	3

Natural Sciences

The student is further required to complete 8 credits of natural sciences, as follows.

Code	Title	Credits
PHY 211	General Physics I	3
PHY 221	General Physics Laboratory I	1

In addition, students must complete one of the following options: PHY 212 General Physics II and PHY 222 General Physics Laboratory II; CHE 106 General Chemistry Lecture I and CHE 107 General Chemistry Laboratory I; or BIO 121 General Biology I and BIO 122 General Biology I Laboratory.

Social Science and Humanities

The student is required to complete 21 credits in social science and humanities (A/SS/H), including the following two courses:

Code	Title	Credits
PHI 251	Logic	3
ECS 392	Ethical Aspects of Engineering and Computer Science	3

The remaining 15 credits may be chosen from courses offered by the College of Arts and Sciences or by the College of Visual and Performing Arts.

(See exclusions in the Undergraduate Student Handbook)

Free Electives

Finally, each student has 8 credits of free electives. This requirement can be satisfied by any courses except for CPS courses and certain remedial courses. A list of such courses can be obtained from the CIS program office.

Mathematics Section

The mathematics section requires at least 15 credits of math. The student must complete the following courses:

Code	Title	Credits
MAT 295	Calculus I	4
MAT 296	Calculus II	2-4
MAT 397	Calculus III	4
or MAT 331	First Course in Linear Algebra	
CIS 321	Introduction to Probability and Statistics	4

Major Section

The major section consists of ECS 101 Introduction to Engineering and Computer Science, CIS 151 Fundamentals of Computing and Programming, the 34-credit computer science core (listed below), and 18-credits of upper-division technical electives.

Computer Science Core

Code	Title	Credits
CIS 252	Elements of Computer Science	4
CIS 341	Computer Organization & Programming Systems	3
CIS 351	Data Structures	3
CIS 352	Programming Language: Theory & Practice	3
CSE 384	Systems and Network Programming	3
CIS 375	Introduction to Discrete Mathematics	3
CIS 453	Software Specification and Design	3
CIS 454	Software Implementation	3
CIS 473	Automata and Computability	3
CIS 477	Introduction to Analysis of Algorithms	3
CSE 486	Design of Operating Systems	3

Academic Standards

Students are required to meet academic standards as follows: no grade below C- will satisfy the requirements for the 6 credits of writing, for the mathematics section, for the computer science core, and the 18 credits of upper-division technical electives. The computer science core must be completed with a B- (2.667) average.

Upper Division Technical Electives

Students must complete 18 credits of upper division electives chosen from the following options. At least 9 credits of the upper division technical electives must be in computer science or computer engineering (CIS/CSE).

Arts and Sciences

Students may choose any mathematics courses numbered about 400, unless specifically excluded (e.g., MAT 521 Introduction to Probability and MAT 485 Differential Equations and Matrix Algebra for Engineers). Students may also choose from the following philosophy courses:

Code	Title	Credits
PHI 378	Minds and Machines	3
PHI 451	Logic and Language	3
PHI 551	Mathematical Logic	3
PHI 552	Modal Logic	3

Computer and Information Science

Students may select any CIS or CSE courses numbered above 300, unless specifically excluded.

Undergraduate University Requirements

The following requirements and experiences apply to all Syracuse University Undergraduate matriculated degree programs.

- IDEA Course Requirement (https://coursecatalog.syracuse.edu/undergraduate/idea-course-requirement/)
- First Year Seminar (https://coursecatalog.syracuse.edu/undergraduate/courses/fys/)

Representative Program of Study

Year 1		
Fall		**Credits**
ECS 101	Introduction to Engineering and Computer Science	3
CIS 151	Fundamentals of Computing and Programming	3
MAT 295	Calculus I	4
WRT 105	Studio 1: Practices of Academic Writing	3
FYS 101	First Year Seminar	1
A/SS/H elective		3
	Credits	**17**
Spring		
CIS 252	Elements of Computer Science	4
MAT 296	Calculus II	2-4
PHI 251	Logic	3
PHY 211	General Physics I	3
PHY 221	General Physics Laboratory I	1
	Credits	**13-15**
Year 2		
Fall		
CIS 375	Introduction to Discrete Mathematics	3
CIS 351	Data Structures	3
MAT 397 or MAT 331	Calculus III or First Course in Linear Algebra	3-4
Science Elective		4
	Credits	**13-14**
Spring		
CIS 321	Introduction to Probability and Statistics	4
CIS 341	Computer Organization & Programming Systems	3
CIS 352	Programming Language: Theory & Practice	3
CSE 384	Systems and Network Programming	3
WRT 205	Studio 2: Critical Research and Writing	3
	Credits	**16**
Year 3		
Fall		
CIS 453	Software Specification and Design	3
CIS 477	Introduction to Analysis of Algorithms	3
CSE 486	Design of Operating Systems	3
Presentation Skills Elective		3
A/SS/H elective		3
	Credits	**15**
Spring		
CIS 473	Automata and Computability	3
CIS 454	Software Implementation	3
Upper-division elective		3
A/SS/H Elective		3
Free elective		3
	Credits	**15**
Year 4		
Fall		
Upper-division elective		3
Upper-division elective		3
Upper-division elective		3

ECS 392	Ethical Aspects of Engineering and Computer Science	3
A/SS/H elective		3
	Credits	**15**
Spring		
Upper-division elective		3
Upper-division elective		3
Free elective		3
Free elective		2
A/SS/H elective		3
	Credits	**14**
	Total Credits	**118-121**

Intra-University Transfer

Students who wish to transfer into any program within the College of Engineering and Computer Science from another school or college within the University should have a strong record of achievement and demonstrated success in key technical courses. Specifically, it is critical for the applicant to have proven their ability to excel in college-level calculus (by completing at least one of MAT 295 Calculus I, MAT 296 Calculus II, or MAT 397 Calculus III with a grade of B- or better) and science (by completing at least one set of PHY 211 General Physics I/PHY 221 General Physics Laboratory I or CHE 106 General Chemistry Lecture I/CHE 107 General Chemistry Laboratory I with a grade of B- or better). Students who wish to major in computer science must also complete CIS 252 Elements of Computer Science with a grade of at least a B.