Program Overview: Bachelor of Science, Computer Science

About This Major . . .

As one of the most exciting, in-demand careers, Computer Science is the study of all aspects of software development and the hardware upon which the software is implemented. Your studies as a major will include the standard theoretical courses in Computer Science, such as networks, operating systems, computer security, mathematics, and computer architecture. In your years of study, you will develop many programs and applications in many computer languages, both individually and with teams of fellow Computer Science majors. You will also have the opportunities to study cutting edge technologies such as web development, robotics, and mobile applications.

In your final semesters of study in Computer Science, you will join a team of other students in creating a software solution to a real life problem using Software Engineering principles. Your project will be presented at the CMU Student Showcase and/or other scholarly venues.

Upon graduation, graduates can choose to continue their studies at graduate schools in Computer Science, or they can enter the job market assured that they have the skills necessary to obtain employment in a wide range of companies, as virtually all need the skills of a Computer Science graduate.

All CMU baccalaureate graduates are expected to demonstrate proficiency in critical thinking, communication fluency, quantitative fluency, and specialized knowledge/applied learning.

After completing a BS in Computer Science, you will be able to:

1. write programs in multiple programming languages and be able to translate concepts between languages.
2. develop, design, and test a software solution for a given problem.
3. compare and contrast competing hardware and software components and defend a choice for a given problem.
4. independently learn and use new technologies.
5. work in teams to solve large scale problems.

Program Highlights:

Clubs
Join the Student Chapter of the Association of Computing Machinery (ACM). The club brings in speakers, organizes social and academic events, sends students to the ACM Regional programming contest, and explores new technologies.

Current Students Employment
Local businesses often request students to do smaller jobs or internships, giving valuable experience for students.

Recent Graduates
Recent graduates are employed by Amazon.com, Visa, Rocky Mountain Health, Lockheed Martin, and other high-tech companies.

Graduate School
Recent graduates are studying for MS and PhD in Computer Science at University of Colorado, Colorado School of Mines, New Mexico Tech, and University of Texas at Austin.

Program Requirements

A student must follow CMU graduation requirements by completing 120 semester credit hours, including 40 credits of coursework at the 300+ level. See the "Undergraduate Graduation Requirements" in the catalog for additional graduation information. Students should work closely with a faculty advisor when selecting and scheduling courses prior to registration. In general, CMU's programs of study are based on two curriculum groups:

1. Essential Learning

CMU's Essential Learning program provides the foundation of skills and information that cuts across all fields of study and the support for advanced concepts that students will later encounter in their majors. Before moving into work at the 300+ level, students complete the Maverick Milestone and its co-requirement, Essential Speech. This pair of courses is a capstone experience where students integrate what they have learned from their foundation courses by making connections among diverse areas of knowledge. The capstone is also an opportunity for students to work with disparate ideas, a critical skill expected of all CMU graduates that will aid them in solving the complex and unscripted problems they will encounter in their personal, professional, and civic lives.

2. What You Will Study in This Major. . .

Foundational Courses

The following courses provide basic knowledge necessary for the successful study of Computer Science:

- CS1: Foundations of Computer Science
- CS2: Data Structures
- Calculus I /Engineering Calculus I
- Calculus II/Engineering Calculus II
- Probability & Statistics

Core Courses

These courses are the main coursework upon which all standard Computer Science programs are based:

- CS3: Introduction to Algorithms
- Computer Architecture & Assembly Language
- Programming Languages
- Computer Networks
- Operating Systems Design
- Software Engineering
- Advanced Programming (at least two languages required)

Five courses from the following – Student choose five courses from the following list, according to their own interests and research goals:

- Web Page Design III
- Embedded Systems
- Unix Operating System
- Video Game Design
- Computer Graphics
- Numerical Analysis
- Artificial Intelligence
- Database Design
- Theory of Algorithms
- Compiler Structure
- Object Oriented Programming
- Computer Security
- User Interface Design
- Operations Research

Electives

Many new courses are added to our program as topics courses or as electives. New technologies often fall in this group. There are also courses where students learn skills not specifically addressed in any other class. Among those classes are:

<u>Lower Division Electives</u>
Computers in Our Society
Web Page Design I
Web Page Design II
Beginning Programming
Robotics

<u>Upper Division Electives</u>
Cybersecurity
Mobile Applications
Computer Hardware
Advanced Programming*

*Students must take 4 credit hours of languages but can enroll in more. Many new and exciting languages are explored here!