Computer Science B.S. Degree 2024-2025 Curriculum Chart

Math Courses

MATH 19A or MATH 20A
Calculus I
Prerequisites: Math Placement score of 400 or more or Math 3

MATH 19B or MATH 20B
Calculus II
Prerequisites: Math 19A

CSE 16
Applied Discrete Mathematics
Prerequisites: Math 19A or Math 19B

AM 10
Engr Math Methods I
Prerequisites: Math Placement score of 400 or higher or Math 3
or
MATH 21
Linear Algebra
Prerequisites: Math 19A

AM 30
Multivariate Calculus for Engineers
Prerequisites: AM 10 or Math 21; Math 19B
or
MATH 23A
Vector Calculus
Prerequisites: Math 19B or 20B

CSE 40
Machine Learning Basics
Prerequisites: Math 19B or 20B and CSE 30

ECE 30
Engineering Principles of Electronics
Prerequisites: Math 19B

Lower Division Programming Courses

CSE 20
Beginning Programming Python

CSE 12
Computer Systems & Assembly Language
Prerequisites: CSE 20 or CSE 30

CSE 30
Programming Abstractions: Python
Prerequisites: CSE 20; and Math 19A or Math placement score of 400 ot more

CSE 13S
Computer Systems and C Programming
Prerequisites: CSE 12

CSE 101
Intro to Data Structures & Algorithms
Prerequisites: CSE 12, CSE 16, CSE 13S, and CSE 30; Math 19B or 20B

Elective Courses

Upper Division **ELECTIVE
_____

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_____

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Upper Division **ELECTIVE
_____

Ψ CSE 195 can satisfy the DC requirement OR an Upper Division Elective, but NOT both.

**Upper Division Electives: 5 credit (or more than 5 credit) upper-division computer science or computer engineering (CSE) courses with a course number between 100-189, or CSE 195, or courses from the Computational Media electives on the back of this chart. Up to *two* of these electives may be replaced by upper division mathematics electives listed on the back.

CSE 115A, CSE 185S, or CSE 185E cannot be used to satisfy one of the four upper-division elective requirements.

The capstone course can count toward 1 of the 4 required upper division electives.

Upper Division CSE Courses

CSE 120
Computer Architecture
Prerequisites: CSE 12 and CSE 13S

CSE 114A
Foundations of Programming Languages
Prerequisites: CSE 101

CSE 130
Principles of Computer Systems Design
Prerequisites: CSE 12 and CSE 101

CSE 101M
Mathematical Thinking for Computer Science
Prerequisites: CSE 101

CSE 102
Analysis of Algorithms
Prerequisites: CSE 101
or
CSE 103
Computational Models
Prerequisites: CSE 101

CSE 107
Probability and Statistics
Prerequisites: CSE 16 and Math 23A or AM 30
or
STAT 131
Intro to Probability Theory
Prerequisites: Math 19B or Math 20B

Many upper division Computer Science courses are restricted to enrollment by declared Computer Science majors during first-pass or priority enrollment.

DC Requirement
(See List Below)
_____

Disciplinary Communication Requirement (DC)

Students of every major must satisfy that major's upper-division Disciplinary Communication (DC) Requirement. The DC Requirement for the Computer Science B.S. is satisfied by completing one of the following courses:

CSE 115A Introduction to Software Engineering
CSE 185E/185S Technical Writing for Computer Science and Engineering
Ψ CSE 195 Senior Thesis

DC courses cannot be used to satisfy any of the 4 Upper Division Electives with the exception of CSE 195.

Capstone Courses

Many Capstone course options require additional prerequisites not already required in major requirements. Advance planning is crucial.

CSE 110B Fundamentals of Compiler Design II
CSE 115C Software Design Project II
CSE 115D Software Design Project - Accelerated
CSE 121 Embedded System Design
CSE 134 Embedded Operating Systems
CSE 138 Distributed Systems
CSE 140 Artificial Intelligence
CSE 143 Introduction to Natural Language Processing
CSE 144 Applied Machine Learning
CSE 145 Introduction to Data Mining
CSE 156/L Network Programming / Lab
CSE 157 Internet of Things
CSE 160 Introduction to Computer Graphics / Lab
CSE 161/L Introduction to Data Visualization / Lab
CSE 162/L Advanced Computer Graphics and Animation / Lab
CSE 163 Data Programming for Visualization
CSE 168 Introduction to Augmented Reality and Virtual Reality
CSE 181 Database Systems II
CSE 183 Web Applications
CSE 184 Data Wrangling and Web Scraping
CSE 187 Full Stack Web Development II
CMPM 172 Game Production Studio

These courses can be used to satisfy Upper Division Electives.

Comprehensive Requirement - Students have two options to fulfill the Computer Science exit requirement:
1. Pass one of the Capstone Courses_____
2. Successfully complete a Senior Thesis.

Disciplinary Communication Requirement - Students have two options to fulfill the DC requirement:
1. Pass one of the Disciplinary Communication Courses _____
2. Successfully complete a Senior Thesis.

Computer Science B.S. Degree
2024-2025 Curriculum Chart

Fall _____	Winter _____	Spring _____	Summer _____

Fall _____	Winter _____	Spring _____	Summer _____

Fall _____	Winter _____	Spring _____	Summer _____

Fall _____	Winter _____	Spring _____	Summer _____

Mathematics Electives List

AM 114 Introduction to Dynamical Systems
AM 147 Computational Methods and Applications
MATH 110 Introduction to Number Theory
MATH 115 Graph Theory
MATH 116 Combinatorics
MATH 117 Advanced Linear Algebra
MATH 118 Advanced Number Theory
MATH 134 Cryptography
MATH 145/L Introductory Chaos Theory / Lab
MATH 148 Numerical Analysis
MATH 160 Mathematical Logic I
MATH 161 Mathematical Logic II
STAT 132 Classical and Bayesian Inference

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One of the following combinations: [**PHYS 5A** and **PHYS 5B**] OR [**PHYS 5A** and **PHYS 5C**] OR [**PHYS 6A** and **PHYS 6B**] OR [**PHYS 6A** and **PHYS 6C**]***

Computational Media Electives List

CMPM 120 Game Development Experience
CMPM 131 User Experience for Interactive Media
CMPM 146 Game AI
CMPM 163 Game Graphics and Real Time Rendering
CMPM 164/L Game Engines / Lab
CMPM 171 Game Design Studio
CMPM 172 Game Production Studio

- **All courses being applied to requirements for the Computer Science major must be taken for a letter grade. Grades of P will not count toward major requirements.**
- Courses in which you receive a grade of C-, D+, D, or D- earn credit toward graduation, but cannot be used to satisfy a major requirement or a general education requirement, and cannot satisfy a prerequisite for another course.
- Shaded boxes represent major qualification courses. The full major qualification requirements for this major can be found at: **https://undergrad.soe.ucsc.edu/major-qualification-requirements**
- Many graduate courses can also be used to satisfy electives; however, students will need instructor and department approval.
- The Baskin Engineering major declaration process requires an earlier start than the deadline on the UCSC Academic/Administrative calendar. Our deadlines and process can be found on: **http://undergrad.soe.ucsc.edu/current-students/declare-your-major**

*** Physics courses have co-requisite labs required for enrollment. These associated labs are not part of the Computer Science B.S. major requirements.