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

**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
  - Optional: CSE 195 Senior Thesis

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

* Course has additional prerequisites. Please consult UCSC General Catalog course descriptions.

∞ CSE 13S is recommended for students pursuing a Computer Science major

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 below 170, or between 180-189, 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.

**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 III
- 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 150L Network Programming / Lab
- CSE 157 Internet of Things
- CSE 160L 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
- CMPM 172 Game Design Studio III
- ECE 118/L Introduction to Mechatronics / Lab

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
## 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

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

- STAT 132 Classical and Bayesian Inference

## 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 II
- CMPM 172 Game Design Studio III

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- 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](https://undergrad.soe.ucsc.edu/major-qualification)
- Many graduate courses can also be used to satisfy electives; however, students will need instructor and department approval.
- The School of Engineering has different major declaration deadlines than the UCSC Academic/Administrative calendar. Our deadlines and process can be found on: [http://undergrad.soe.ucsc.edu/declare-your-major](http://undergrad.soe.ucsc.edu/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.

### Student Name:

### Staff Advisor Signature:

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