**COMPUTER SCIENCE, BS**

**Introduction**

Please click here [link] to see computer science department information.

Undergraduate computer science students at CU Denver are able to tailor their degree to their interests and goals. Students are exposed to the breadth of the field including machine learning & data science, computer graphics & game design, programming, software engineering, systems, scientific computing, secure computing, theory and cyber-physical systems.

The computer science bachelor of science program is accredited by the Computing Accreditation Commission of ABET, [http://www.abet.org](http://www.abet.org).

The educational objectives of the computer science undergraduate program are to produce graduates who:

- Advance professionally as productive, practicing professionals in computer science and related careers through the continued development of their expertise and skills.
- Further develop their knowledge, skill set, and career opportunities through graduate education and/or professional studies.
- Function effectively as part of a team to succeed in their professional careers.

**Program Delivery**

- This is an on-campus program.

**Declaring This Major**

- Click here [link] to go to information about declaring a major.

**General Requirements**

To earn a degree, students must satisfy all requirements in each of the areas below, in addition to their individual major requirements.

- CU Denver General Graduation Requirements [link]
- CU Denver Core Curriculum [link]
- College of Engineering, Design and Computing Graduation Requirements [link]
- Click here [link] for information about Academic Policies

**Program Requirements**

1. Students must maintain a minimum 2.0 GPA in all courses applying to major requirements.

2. Students must maintain a minimum 2.0 GPA in all CSCI courses attempted.

3. Undergraduate students in the CSE department are required to have a personal laptop before starting 3000-level classes that satisfies the requirements listed on the CSE Laptop Requirement Website [link].

The BS computer science degree requires 128 credits including:
- 24 credits of CU Denver Core Curriculum
- 12 credits of mathematics
- 10 credits of physical science
- 3 credits of engineering design
- 79 credits of computer science

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CSCI 1400</td>
<td>Fundamentals of Computing</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 1411</td>
<td>Fundamentals of Computing Laboratory</td>
<td>1</td>
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<td>CSCI 2312</td>
<td>Object Oriented Programming</td>
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<td>CSCI 2421</td>
<td>Data Structures and Program Design</td>
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<td>CSCI 2511</td>
<td>Discrete Structures</td>
<td>3</td>
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<td>CSCI 3287</td>
<td>Database System Concepts</td>
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<td>CSCI 3412</td>
<td>Algorithms</td>
<td>3</td>
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<tr>
<td>CSCI 3508</td>
<td>Introduction to Software Engineering</td>
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<tr>
<td>CSCI 4034</td>
<td>Theoretical Foundations of Computer Science</td>
<td>3</td>
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<tr>
<td>CSCI 4110</td>
<td>Assembly Language and Computer Organization</td>
<td>3</td>
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<tr>
<td>CSCI 4111</td>
<td>Principles of Programming Languages</td>
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<tr>
<td>CSCI 4353</td>
<td>Operating System Concepts</td>
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<tr>
<td>CSCI 4361</td>
<td>Introduction to Computer Networks</td>
<td>3</td>
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<tr>
<td>CSCI 4551</td>
<td>Parallel &amp; Distributed Computing</td>
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<td>CSCI 4591</td>
<td>Computer Architecture</td>
<td>3</td>
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<td>CSCI 4738</td>
<td>Senior Design I</td>
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<tr>
<td>CSCI 4739</td>
<td>Senior Design II</td>
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<tr>
<td>CSCI 4455</td>
<td>Data Mining</td>
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<td>CSCI 4580</td>
<td>Data Science</td>
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<td>CSCI 4930</td>
<td>Machine Learning</td>
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<td>CSCI 4931</td>
<td>Deep Learning</td>
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<td>CSCI 4951</td>
<td>Big Data Systems</td>
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<td>CSCI 3560</td>
<td>Probability and Computing</td>
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<tr>
<td>CSCI 4650</td>
<td>Numerical Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 4110</td>
<td>Applied Number Theory</td>
<td>3</td>
</tr>
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**Principles of Cybersecurity**

- Select one of the following:
  - CSCI 4739
  - CSCI 4741

**Scientific Computing**

- Select one of the following:
  - CSCI 3560
  - CSCI 4650
  - CSCI 4110

**Secure Computing**

- Select one of the following:
  - CSCI 4741
### Computer Science, BS

- **CSCI 4742** Cybersecurity Programming and Analysis
- **CSCI 4743** Cyber and Infrastructure Defense

**System Software**
- Select two of the following: 6
  - **CSCI 3511** Hardware-Software Interface
  - **CSCI 4287** Embedded Systems Programming
  - **CSCI 4565** Introduction to Computer Graphics

**CS Technical Electives**
Select four courses of any 3000-level or above Computer Science (CSCI) course that is not applied to the above 67 credits. 12

**Mathematics**
- **MATH 1401** Calculus I 4
- **MATH 2411** Calculus II 4
- **MATH 3195** Linear Algebra and Differential Equations 4

**Science**
Select a two-course sequence with lab of the following: 10

**Choice 1**
- **BIOL 2010** & **BIOL 2011** Organisms to Ecosystems (Gen Bio) and Organisms to Ecosystems Lab (Gen Bio)
- **BIOL 2020** & **BIOL 2021** Molecules to Cells (Gen Bio) and Molecules to Cells Lab (Gen Bio)

**Choice 2**
- **CHEM 2031** & **CHEM 2038** General Chemistry I and General Chemistry Laboratory I
- **CHEM 2061** & **CHEM 2068** General Chemistry II and General Chemistry Laboratory II

**Choice 3**
- **PHYS 2311** & **PHYS 2321** General Physics I: Calculus-Based and Intro Experimental Phys Lab I
- **PHYS 2331** & **PHYS 2341** General Physics II: Calculus-Based and Intro Experimental Phys Lab II

**Total Hours** 128

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1. Students can substitute both MATH 3191 Applied Linear Algebra and MATH 3200 Elementary Differential Equations for MATH 3195 Linear Algebra and Differential Equations.
2. Additional credits needed to reach 10 may come from an advanced science course beyond CHEM 2061 General Chemistry II or beyond BIOL 2020 Molecules to Cells (Gen Bio), an additional CS elective, math beyond CALC II, or one of the engineering disciplines (not GEN-ED. courses).
3. Students may apply up to 3 credits of approved CSCI internship to the CS Technical Electives requirement.

### Measurable Outcomes

The bachelor of science in computer science program must enable its students to attain, by the time of graduation:

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- Communicate effectively in a variety of professional contexts.

To review the Degree Map for this program, please visit our website (https://www.ucdenver.edu/student/advising/undergraduate/degree-maps/cedc/).