COMPUTER SCIENCE, BS

Introduction
Please click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-engineering-design-computing/computer-science-engineering/) 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.

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 (http://catalog.ucdenver.edu/cu-denver/undergraduate/records-registration/registration/declare-change-major-minor/) 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 (http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation/general-graduation-requirements/)
- CU Denver Core Curriculum (http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation-undergraduate-core-requirements/)
- College of Engineering, Design and Computing Graduation Requirements (http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-engineering-design-computing/#graduationrequirementstext)
- Click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/academic-policies-procedures/) 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, with the following specifications, before starting 3000-level classes:

<table>
<thead>
<tr>
<th>Specifications Minimum for:</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Windows 10 1809+</td>
</tr>
<tr>
<td>CPU</td>
<td>Intel Core i5 dual-core 1.6 GHz or Intel Core i5 quad core 1.4 GHz</td>
</tr>
<tr>
<td>RAM</td>
<td>8GB (upgradable to 16GB)</td>
</tr>
<tr>
<td>Disk Space</td>
<td>256GB Hard Disk Drive (HDD) with 100GB free Upgradeable to 512GB SSD</td>
</tr>
<tr>
<td>Hard Disk Speed</td>
<td>12 to 16GB</td>
</tr>
<tr>
<td>Graphic Card</td>
<td>Install Windows and Applications on a SSD</td>
</tr>
<tr>
<td>Display</td>
<td>1280x720 Resolution, 1920x1024 Resolution</td>
</tr>
<tr>
<td>Network Connectivity</td>
<td>Ethernet + Wifi</td>
</tr>
</tbody>
</table>

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, and 79 credits of computer science.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CU Denver Core Curriculum</td>
<td>Select 24 credits</td>
<td>24</td>
</tr>
<tr>
<td>ENGR 1200</td>
<td>Fundamentals of Engineering Design Innovation</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 1410</td>
<td>Fundamentals of Computing</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 1411</td>
<td>Fundamentals of Computing Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CSCI 2312</td>
<td>Object Oriented Programming</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 2421</td>
<td>Data Structures and Program Design</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 2511</td>
<td>Discrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 3287</td>
<td>Database System Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 3412</td>
<td>Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 3508</td>
<td>Introduction to Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 4034</td>
<td>Theoretical Foundations of Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 1510</td>
<td>Logic Design</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 2525</td>
<td>Assembly Language and Computer Organization</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 3415</td>
<td>Principles of Programming Languages</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 3453</td>
<td>Operating System Concepts</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 3761</td>
<td>Introduction to Computer Networks</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 4551</td>
<td>Parallel &amp; Distributed Computing</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 4591</td>
<td>Computer Architecture</td>
<td>3</td>
</tr>
</tbody>
</table>

Capstone Courses
- CSCI 4738 Senior Design I 3
- CSCI 4739 Senior Design II 3

Data Science
Select one of the following:  
CSCI 4455  Data Mining  
CSCI 4580  Data Science  
CSCI 4930  Machine Learning  
CSCI 4931  Deep Learning  
CSCI 4951  Big Data Systems

Computer Science
Select one of the following:  
CSCI 3560  Probability and Computing  
CSCI 4650  Numerical Analysis I  
CSCI 4110  Applied Number Theory

Secure Computing
Select one of the following:  
CSCI 4741  Principles of Cybersecurity  
CSCI 4742  Cybersecurity Programming and Analysis  
CSCI 4743  Cyber and Infrastructure Defense

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

3000-Level or Above Computer Science Course
Select four courses of any 3000-level or above Computer Science (CSCI) course that is not applied to the above 67 credits.

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:  
Choice 1  
BIOL 2010  & BIOL 2011  Organisms to Ecosystems (Gen Bio)  
& Organisms to Ecosystems Lab (Gen Bio)  
BIOL 2020  & BIOL 2021  Molecules to Cells (Gen Bio)  
& Molecules to Cells Lab (Gen Bio)  
Choice 2  
CHEM 2031  & CHEM 2038  General Chemistry I  
& General Chemistry Laboratory I  
CHEM 2061  & CHEM 2068  General Chemistry II  
& General Chemistry Laboratory II  
Choice 3  
PHYS 2311  & PHYS 2321  General Physics I: Calculus-Based  
& Intro Experimental Phys Lab I  
PHYS 2331  & PHYS 2341  General Physics II: Calculus-Based  
& Intro Experimental Phys Lab II

Total Hours  128

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 2010 Organisms to Ecosystems (Gen Bio), an additional CS elective, math beyond CALC II, or one of the engineering disciplines (not GEN-ED. courses).

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.
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- Apply computer science theory and software development fundamentals to produce computing-based solutions.

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