# CYBERSECURITY, BS

## Introduction

Please click here (https://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-engineering-design-computing/computer-science-engineering/) to see the computer science department information.

The Bachelor of Science in Cybersecurity degree will allow undergraduate students to combine their passion for computer science with skills to defend computers, servers, mobile devices, electronic systems, networks, users and data from malicious attacks. Skills and experiences will render them immediately useful in today's workforce where cybersecurity—cyber offense and defense—is a growing concern and necessity in both the public and private sector.

Graduates will be able to apply the attained computing and security skills and knowledge to create solutions to real-world problems, and analyze, evaluate, and maintain operational systems in the presence of cyber risks and threats. Graduates will be able to:

- Analyze a complex computing and security problem and apply algorithmic reasoning to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing and security requirements.
- Communicate and function effectively in professional contexts and teams.
- Make informed judgments in computing and security practices based on legal and ethical principles.
- Apply security principles and practices to maintain operations in the presence of threats.

## Program Delivery

- This is an on-campus program.

## Declaring This Major

- Click here (https://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 and CSCY courses attempted.

Undergraduate students in the Department of Computer Science and Engineering are required to have a personal laptop, with the specifications on the CEDC Student Laptop website (https://engineering.ucdenver.edu/laptops/#ac-computer-science-bachelor-of-arts-cs-2).

The BS in cybersecurity requires 120 credits including:

- 24 credits CU Denver core curriculum
- 7 credits mathematics
- 8 credits natural and physical science
- 3 credits engineering design
- 31 credits computer science
- 47 credits cybersecurity

### Code | Title
--- | ---
1. **CU Denver Core Curriculum**
   - CSCI 1410 Fundamentals of Computing 3
   - CSCI 1411 Fundamentals of Computing Laboratory 1
   - CSCI 1510 Logic Design 3
   - CSCI 2312 Object Oriented Programming 3
   - CSCI 2421 Data Structures and Program Design 3
   - CSCI 2511 Discrete Structures 3
   - CSCI 2525 Assembly Language and Computer Organization 3
   - CSCI 3287 Database System Concepts 3
   - CSCI 3412 Algorithms 3
   - CSCI 3453 Operating System Concepts 3
   - CSCI 3761 Introduction to Computer Networks 3

### Code | Title
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2. **Cybersecurity Core**
   - CSCY 2930 Practical System Administration 2
   - CSCY 3740 Computer Security 3
   - CSCY 3765 Secure Network and Systems Programming 3
   - CSCY 4407 Security and Cryptography 3
   - CSCY 4738 Senior Design I 3
   - CSCY 4739 Senior Design II 3
   - CSCY 4741 Principles of Cybersecurity 3
   - CSCY 4742 Cybersecurity Programming and Analysis 3
   - CSCY 4743 Cyber and Infrastructure Defense 3
   - CSCY 4772 Mobile and IoT Security 3
   - CSCY 4950 Cybersecurity Risk Analysis and Management 3

Select five of any 3000-level or above Cybersecurity (CSCY) courses not applied to the above 32 credits. Students may apply up to two of the following courses in place of two CSCY courses: MATH 3195, CSCY 3415, CSCY 4034, CSCY 4591 & CSCY 4773

### Mathematics

- MATH 1401 Calculus I 4
- MATH 2830 Introductory Statistics 3

### Science

- 8
Students must complete a minimum of 8 credits (two courses with associated labs) of natural and physical sciences with labs for science majors. Students may choose to complete ENGR 1300 Chemistry for Engineers as one choice.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>BIOL 2010</td>
<td>Organisms to Ecosystems (Gen Bio)</td>
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<tr>
<td>&amp; BIOL 2011</td>
<td>and Organisms to Ecosystems Lab (Gen Bio)</td>
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<tr>
<td>BIOL 2020</td>
<td>Molecules to Cells (Gen Bio)</td>
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<tr>
<td>&amp; BIOL 2021</td>
<td>and Molecules to Cells Lab (Gen Bio)</td>
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<tr>
<td>CHEM 2031</td>
<td>General Chemistry I</td>
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<td>&amp; CHEM 2038</td>
<td>and General Chemistry Laboratory I</td>
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<tr>
<td>CHEM 2061</td>
<td>General Chemistry II</td>
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<tr>
<td>&amp; CHEM 2068</td>
<td>and General Chemistry Laboratory II</td>
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<tr>
<td>PHYS 2010</td>
<td>College Physics I</td>
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<tr>
<td>&amp; PHYS 2321</td>
<td>and Intro Experimental Phys Lab I</td>
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<tr>
<td>PHYS 2020</td>
<td>College Physics II</td>
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<tr>
<td>&amp; PHYS 2341</td>
<td>and Intro Experimental Phys Lab II</td>
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<tr>
<td>PHYS 2311</td>
<td>General Physics I: Calculus-Based</td>
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<tr>
<td>&amp; PHYS 2321</td>
<td>and Intro Experimental Phys Lab I</td>
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<tr>
<td>or PHYS 2351</td>
<td>Applied Physics Lab I</td>
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<tr>
<td>PHYS 2331</td>
<td>General Physics II: Calculus-Based</td>
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<tr>
<td>&amp; PHYS 2341</td>
<td>and Intro Experimental Phys Lab II</td>
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<tr>
<td>or PHYS 2361</td>
<td>Applied Physics Lab II</td>
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<tr>
<td>ENGR 1130</td>
<td>Chemistry for Engineers</td>
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**Engineering Design**

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<tbody>
<tr>
<td>ENGR 1200</td>
<td>Fundamentals of Engineering Design Innovation</td>
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**Total Hours** 120

**Measurable Outcomes**

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

- Analyze a complex computing and security problem and apply algorithmic reasoning to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing and security requirements.
- Communicate and function effectively in professional contexts and teams.
- Make informed judgments in computing and security practices based on legal and ethical principles.
- Apply security principles and practices to maintain operations in the presence of threats.

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