**University of Colorado Denver**

# Department of Computer Science and Engineering

# Cybersecurity Bachelor of Science Handbook
**Rules of the program leading to a Bachelor of Science in Cybersecurity**

*These degree requirements are in effect starting from 2023-2024 Admission.*

The CSE department offers a Bachelor of Science in Computer Science, a Bachelor of Science in Cyber Security, a Bachelor of Arts in Computer Science, a Minor in Computer Science, an undergraduate certificate in Cybersecurity and Secure Computing, and a Masters in Computer Science as well as two doctorate degrees and graduate certificates in "Software Engineering" and "Cybersecurity and Defense". The department also offers a CS Scholars dual BS/MS program for students in the BSCS program. Curriculum for CSE undergraduate programs can be found in this handbook beginning on page 4.

## Applying to the Department of Computer Science and Engineering:

If students are new and interested in our bachelor's degree program, students must apply directly through the CU Denver Office of Admissions, http://www.ucdenver.edu/admissions .

**CSCY**
Students currently admitted to the College of Engineering, Design and Computing as pre-engineers must complete an IUT form and submit it to the CSE department. All GPA and math admissions requirements must be met before applying for the CSE Department. You can find the admission requirements for all CSE majors at this link. The Change of major must be completed prior to registering for 3000-level courses.

Students currently admitted to the College of Engineering, Design and Computing in a bachelor of science major and would like to change majors to the bachelor of science in computer science will need to complete a CEDC Change of Major Form. The Change of major form must be completed prior to registering for 3000-level courses and after completion of Calculus I.

Students who would like to change majors within the Dept. of Computer Science and Engineering will need to meet with a faculty advisor to ensure their new degree will align with their chosen career. Students changing to a BA degree will need to submit a CSE Change of Major form prior to meeting with a faculty advisor. If faculty support their request, the student will then need to complete an IUT form. The change of major request must be completed prior to registering for 3000-level courses and after completion of Calculus I.

Students who would like to transfer from another school or college at CU Denver will need to

complete [an IUT form](). All GPA and math admissions requirements must be met before applying for the CSE Department. You can find the admission requirements for all CSE majors at this [link](). The IUT form should be submitted to the Computer Science and Engineering (CSE) Department in the Lawrence Street Center, Ste 800. The IUT form must be completed prior to registering for 3000-level courses.

**Minor**

Students declaring a Minor in Computer Science must complete a [Minor Declaration Form.]() The minor declaration form must be completed prior to registering for 3000-level courses.

Students completing a major within the CSE Department are not eligible to complete a Minor in Computer Science

**Undergraduate Certificate**

Students currently enrolled in CSCY are not eligible pursue the Cybersecurity and Secure Computing certificate.

## Advisor

Students are responsible for completing all requirements towards graduation. Regular visits with a CSE advisor are mandatory and will help to verify satisfactory progress towards a degree in computer science. Students must meet with their advisor every semester or attend an advising workshop in order to register for the upcoming semester. It is recommended that students get to know CSE faculty well enough that they can serve as references in the future for employment or when applying for an internship or graduate school.

Students should schedule an appointment with their advisor by contacting the CSE department at 303-315-1408.

## 30-Hour Senior Checkout

After completing approximately 100 semester hours toward the BACS degree, students must request a 30-hour senior checkout. Students should have no more than 3 semesters before graduating when requesting the 30-hour senior checkout. Students should complete the 30 hour checkout form prior to the appointment and plan out their remaining semesters to fulfill graduation requirements.

Students need to apply for graduation on their portal before census date the semester they will be graduating.

## Graduation Plan

Prior to the last semester before graduation students must meet with their advisor and complete a graduation plan. This identifies the courses that need to be satisfactorily completed during the final semester of your program.

Students need to apply for graduation on their portal before census date the semester they will be graduating.

## Transfer credit evaluations

Students may request transfer evaluations for courses completed prior to their acceptance at CU Denver. Transfer evaluations are only completed for academic coursework. Transfer evaluations will not be completed until a transcript has been received by CU Denver and the final grade has been posted for the course.

- All non CS transfer credits for science general education and math will be evaluated by the Admissions office. If a course is not accepted for equivalency, students may request an evaluation from CLAS.
- Students requesting transfer evaluation for computer science coursework must complete a Transfer request form. A syllabus is required for all computer science transfer requests. If the course is from an international university, it will also need credit evaluation through International Admissions.
- The CSE department will not review courses, or approve transfer credit, for coursework students have not completed.
- All Transfer evaluation decisions are final.

## CU Denver students taking courses elsewhere

Students must take all your courses at CU Denver once you're admitted to the College of Engineering, Design and Computing. Students must obtain prior departmental approval via an approved petition for any exception regarding courses outside CU Denver. If approved, the credit hours earned will be included in your program.

## Petitions

All CSCY program requirements are enforced. Any deviations from the published curriculum must be approved via an approved CS department petition. Students should meet with their academic advisor to discuss the petition process and if there is reasonable justification for an exceptional condition for the request. Petitions must be submitted to the CSE department office. Please note that it takes about two weeks to process any petition and may take longer at the beginning or end of the semester.

## Incomplete Grade

An Incomplete grade may be requested when there is a small amount of work left in a course at the end of the semester due to a situation/event beyond the student's control. Students should contact their instructor to request an Incomplete. If the instructor agrees, the student and instructor will work together to draft an Incomplete Agreement.

The Incomplete Agreement should include justification for the Incomplete, current grade in the course, what work is left to complete and expectations for completion, and timeframe for completion. The Incomplete Agreement will then be reviewed by the department. If approved, the agreement is final and the work must be completed according to the agreement expectations and timeframe.

## CSCY Technical Electives

Students must take five courses (15 semester hours) chosen from any CSCY 3000 or 4000-level courses that are not part of the required bachelor of science in cybersecurity (CSCY) curriculum. Students may also take MATH 3195, CSCI 3415, 4034, 4591, or 4773 to fulfill the technical elective credits.

## Required cumulative GPA

To remain in good standing with the College of Engineering, Design and Computing you must maintain at least 2.0 cumulative GPA for all courses and a minimum 2.0 GPA for all courses that are counted as part of the study program.

## Laptop Requirement

Undergraduate students in the CSE Department are required before starting 3000 level classes. Laptop requirements can be found here.

## University and college requirements

These rules of the undergraduate program of the CSE department are complementary to the policies, regulations and requirements of the University of Colorado Denver and the College of Engineering, Design and Computing. The relevant information about these rules and policies is published annually in the University of Colorado Denver catalog, which is available on the CU Denver website www.ucdenver.edu.

## Curriculum

All newly admitted students must follow the curriculum that is in place at the time they are admitted into the computer science program. Under some conditions, it is possible to switch to the requirements of a new curriculum if the revision(s) occurred after your admittance.

Prerequisite requirements are strictly enforced for all computer science (CSCI) and cybersecurity (CSCY) courses.

### Curriculum for B.S. Cybersecurity (CSCY)

The required minimum number of hours is 120. The student must satisfactorily complete all the course work in the curriculum shown below, satisfy all the graduation requirements, and maintain at least a 2.0 grade-point average in all courses. The courses below are listed together with their prerequisites. Prerequisite courses must be completed with a letter grade of C- or better.

**REQUIRED COMPUTER SCIENCE CORE COURSES FOR CYBERSECURITY (25 SEMESTER HOURS)**

**COMPUTER SCIENCE COURSES**

| | |
|---|---|
| CSCI 1410-3 Fundamentals of Computing | Pre: Freshman status, Co: CSCI 1411 |
| CSCI 1411-1 Fundamentals of Computing Lab | Pre: Freshman status, Co: CSCI 1410 |
| CSCI 1510-3 Logic Design | |
| CSCI 2312-3 Object Oriented Programming | Pre: CSCI 1410 & 1411 |
| CSCI 2421-3 Data Structures & Program Design | Pre: CSCI 2312 |
| CSCI 2525-3 Assembly Language | Pre : CSCI 1510 |
| CSCI 2511-3 Discrete Structures | Pre: MATH 1401 |
| CSCI 3287-3 Database Systems | Pre: ENGL 1020, CSCI 2421 |
| CSCI 3412-3 Algorithms | Pre: CSCI 2421 & 2511 |
| CSCI 3453-3 Operating Systems Concepts | Pre: CSCI 2525 & 3412 |
| CSCI 3761-3 Intro to Networks | Pre: CSCI 2421 |

**ENGINEERING DESIGN (3 HOURS)**

ENRG 1200-3 Fundamentals of Engineering Design Innovation

**CYBERSECURITY CORE (36 HOURS)**

**Cybersecurity Core**

| | |
|---|---|
| CSCY 2930-3 Practical System Administration | Pre: CSCI 1410 & 1411 |
| CSCY 3740-3 Computer Security | Pre: CSCI 2421 |
| CSCY 4407-3 Security and Cryptography | Pre: CSCI 3412 |
| CSCY 3765-3 Secure Network and Systems Programing | Pre: CSCI 3761 |
| CSCY 4741-3 Principles of Cybersecurity | Pre: CSCI 3287 & 3761 |
| CSCY 4742-3 Cybersecurity Programing and Analysis | Pre: CSCY 3740 & CSCI 3765 |
| CSCY 4743-3 Cyber and Infrastructure Defense | Pre: CSCI 3761 |
| CSCY 4772-3 Mobile and IoT Security | Pre: CSCI 3761 & 3453 |
| CSCY 4950-3 Cyber Risk Management | Pre: CSCI 3761 & CSCY 3740 |
| CSCY 4738-3 Senior Design I for Cybersecurity Majors | Pre: CSCI 3453 & CSCY 4741,2&3 |
| CSCY 4739-3 Senior Design II for Cybersecurity Majors | Pre: CSCY 4738 |

**CYBERSECURITY ELECTVES (15 HOURS)**

Students must take five courses (15 semester hours) chosen from any CSCY 3000 or 4000-level courses that are not part of the required bachelor of science in cybersecurity (CSCY) curriculum. Students may also take MATH 3195, CSCI 3415, 4034, 4591, or 4773 to fulfill the technical elective credits.

**MATHEMATICS (7 SEMESTER HOURS)**

| | |
|---|---|
| MATH 1401-4 Calculus I | Pre: (MATH 1120 or 1130) and placement exam |
| MATH 2830-3 Intro to Statistics | |

**SCIENCE (8 SEMESTER HOURS)**

Students must complete two Natural & Physical Science Course with lab **intended for science majors** with ENGR 1300 Chemistry for Engineers as a choice.

**UNDERGRADUATE CORE CURRICULUM IN ENGINEERING: SOCIAL SCIENCES, HUMANITIES, ARTS, ETC. (24 SEMESTER HOURS)**

The undergraduate core curriculum for engineering includes: social sciences 3 hrs, humanities 3 hrs, arts 3 hrs, international perspectives 3 hrs, cultural diversity 3 hrs, behavioral sciences 3 hrs, and intellectual competencies (English 1020 and English 2030), for a total of 24 hours. Refer to the current CU Denver catalog for available courses and their prerequisite requirements.

# Sample Academic Plan consistent with the prerequisite requirements

| Year One | Semester 1 | CRS |
|---|---|---|
| | CSCI 1410 FUNDAMENTALS OF COMPUTING | 3 |
| | CSCI 1411 FUNDAMENTALS OF COMPUTING LAB | 1 |
| | MATH 1401 CALCULUS I | 4 |
| | ENGL 1020 CORE COMPOSITION I | 3 |
| | ENGR 1200 FUND OF ENGINEERING DESIGN INNOVATION | 3 |

| Year One | Semester 2 | CRS |
|---|---|---|
| | CSCI 2312 OBJECT ORIENTED PROGRAMMING | 3 |
| | CSCI 2511 DISCRETE STRUCTURES | 3 |
| | CSCY 2930 PRACTICAL SYSTEMS ADMINISTRATION | 2 |
| | ENGL 2030 CORE COMPOSITION II | 3 |
| | CSCI 1510 LOGIC DESIGN | 3 |

| Year Two | Semester 3 | CRS |
|---|---|---|
| | CSCI 2421 DATA STRUCTURES & PROGRAM DESIGN | 3 |
| | CSCI 2525 Assembly Language | 3 |
| | MATH 2830 INTRODUCTORY STATISTICS | 3 |
| | CORE CURRICULUM CHOICE | 3 |
| | SCIENCE CHOICE | 3-4 |
| | SCIENCE CHOICE LAB | 1 |

| Year Two | Semester 4 | CRS |
|---|---|---|
| | CSCI 3287 DATABASE SYSTEMS | 3 |
| | CSCI 3412 ALGORITHMS | 3 |
| | CSCY 3740 COMPUTER SECURITY | 3 |
| | CORE CURRICULUM CHOICE | 3 |
| | SCIENCE CHOICE | 3-4 |
| | SCIENCE CHOICE LAB | 1 |

| Year Three | Semester 5 | CRS |
|---|---|---|
| | CSCI 3761 INTRODUCTION TO COMPUTER NETWORKS | 3 |
| | CSCY 4743 CYBER & INFRASTRUCTURE DEFENSE | 3 |
| | CYBERSECURITY TECHNICAL ELECTIVE | 3 |
| | CYBERSECURITY TECHNICAL ELECTIVE | 3 |
| | ENGR 3400 CORE CURR. CULTURAL DIVERSITY | 3 |

| Year Three | Semester 6 | CRS |
|---|---|---|
| | CSCI 3453 OPERATING SYSTEMS | 3 |
| | CSCY 4741 PRINCIPLES OF CYBERSECURITY | 3 |
| | CSCY 4742 CYBERSECURITY PROG. & ANALYSIS | 3 |
| | CYBERSECURITY TECHNICAL ELECTIVE | 3 |
| | ENGER 3600 CORE CURR. INT'L PERSPECTIVES | 3 |

| Year Four | Semester 7 | CRS |
|---|---|---|
| | **CSCY 3765 SECURE NETWORK & SYSTEMS PROGRAMMING** | 3 |
| | **CSCY 4738 SENIOR DESIGN I (Security focused projects)** | 3 |
| | CSCY 4772 MOBILE & IOT SECURITY | 3 |
| | CYBERSECURITY TECHNICAL ELECTIVE | 3 |
| | CORE CURRICULUM CHOICE | 3 |

| Year Four | Semester 8 | CRS |
|---|---|---|
| | **CSCY 4739 SENIOR DESIGN II** | 3 |
| | **CSCY 4950 CYBER RISK MANAGEMENT** | 3 |
| | CSCY 4407 SECURITY & CRYPTOGRAPHY | 3 |
| | CORE CURRICULUM CHOICE | 3 |
| | CYBERSECURITY TECHNICAL ELECTIVE | 3 |