Graduate Student Handbook

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Revision 1

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Technology, Cybersecurity and Policy Program

UNIVERSITY OF COLORADO **BOULDER**

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Foreword

As part of the Department of Computer Science at the University of Colorado Boulder, the Technology, Cybersecurity and Policy (TCP) program accepts students from a broad range of backgrounds and offers curriculum and coursework that creates bridges across disciplinary boundaries. The program teaches cybersecurity from an interdisciplinary perspective which includes aspects of technology, engineering, leadership, policy, and applications to emerging technology areas. Among the goals of TCP are to accelerate both research and learning in areas of technology, cybersecurity, and policy; to provide relevant content with experiential learning; and to prepare students to be future leaders in these critical areas.

Honor Code Pledge

The University of Colorado Boulder is dedicated to maintaining the highest standards of intellectual honesty. Commitment to these standards is the responsibility of every student, faculty and staff member. Here is a link to the Honor Code which was designed to uphold CU Boulder's standards of academic integrity and intellectual honesty. All students of the University of Colorado Boulder are subject to the Honor Code for academic matters. The Honor Code reads:

"On my honor, as a University of Colorado Boulder student, I have neither given nor received unauthorized assistance."

Colorado Creed

The Colorado Creed is a social responsibility code developed by past generations of CU students. It is a way of life and a reminder to act with honor, integrity, and respect.

"As a member of the Boulder community and the University of Colorado Boulder, I agree to:
- ❖ *Act with honor, integrity, and accountability in my interactions with students, faculty, staff, and neighbors.*
- ❖ *Respect the rights of others and accept our differences.*
- ❖ *Contribute to the greater good of this community.*

I will strive to uphold these principles in all aspects of my collegiate experience and beyond."

MS in TCP Curriculum Overview

Degree Requirements	Credit Hours
3 Core Courses - 1 course in each TCP Core area:	
• **Core Course in *Technology, Thought Leadership, and Policy***	3
• **Core Course in *Networking and Secure Communications***	3
• **Core Course in *Cybersecurity***	3
5 Depth Area Courses - 5 Elective courses within a depth area: Cybersecurity Engineering, Secure Communications, or Custom	15
Interdisciplinary Capstone, Thesis, or Portfolio - Two semesters of substantial graduate project work solving problems for industry, defense, government, etc. or two additional courses for a coursework-only degree.	6
Total Required Credits	**30**

TCP Core Courses

The TCP program has three Core areas: (i) Technology, Thought Leadership and Policy, (ii) Networking and Secure Communications, and (iii) Cybersecurity. These three areas form the cornerstones of the TCP degree, and students are required to complete the three courses listed below to explore each area. These areas cover the skills needed to become a leader in Technology, Cybersecurity and Policy and ensures graduates have the technical, policy, and strategy skills to work in industry and advance to senior leadership levels. The three Core courses contribute 9 credit hours to the overall degree program.

1. CYBR 5000: Seminar in Technology, Cybersecurity and Policy

   Introduces students to emerging areas in technology, cybersecurity, and policy; developing critiques and narratives of these areas; and enhancing communication skills.

2. CYBR 5010: Fundamentals of Data Communication

   Introduces students to the underlying technologies involved in networked systems and secure data communications between computers and other hosts.

3. CYBR 5300: Cybersecurity

   Introduces students to the key concepts in the design and use of cybersecurity techniques to protect individuals, corporations, and nations.

TCP Depth Areas

TCP's advanced courses allow students to gain deeper knowledge and focus in the area of their choosing. Students must select a depth area and complete the 15 credit (5 course) requirement associated with that depth area. Three depth areas are currently available.

- Cybersecurity Engineering

  Students pursuing this depth area must fulfill the following course requirements:
  - **3 Required Courses**
    - CYBR 5320: Cybersecurity Network Analytics
    - CYBR 5330: Digital Forensics
    - CYBR 5350: Security Auditing and Penetration Testing
  - **2 Advanced Elective Options**
    - CYBR 5240: Introduction to Blockchain
    - CYBR 5310: Immersive Cyber Defense
    - CSCI 5413: Computer Security and Ethical Hacking
    - CYBR 5830: Special Topics: Software Reverse Engineering

- Secure Communications

  Students pursuing this depth area must fulfill the following course requirements:
  - **4 Required Courses**
    - CYBR 5200: Introduction to Wireless Systems
    - CYBR 5220: Wireless Local Area Networks
    - CYBR 5620: Advanced Wireless Lab
    - CYBR 5630: Wireless and Cellular Systems
  - **1 Advanced Elective Option**
    - CYBR 5230: Wireless Systems Lab
    - CYBR 5240: Introduction to Blockchain
    - CYBR 5420: Spectrum Management and Policy

- Custom

  Students electing to take the Custom Depth Area option must first obtain approval from the TCP Program. Under the Custom Option, students must identify a sequence of 5 graduate courses that form a coherent whole that aligns with a student's academic goals and their current, and possibly longer-term, career objectives. Approval of the Custom option is not automatic and requires the student to submit a two-page proposal showing how the selected courses function as a depth area for the student.

The two-page write-up must be submitted and approved at least two semesters prior to graduation. Specifically, full-time students would submit Custom option proposals before the end of their second semester, which would be reviewed and either approved or denied prior to their third semester.

Students should not take courses in their proposed Custom option until their petition has been approved by the graduate committee. An approved custom depth area is not subject to the rule described below in the section entitled "Taking Courses Outside of TCP". That is, a student taking courses in an approved custom depth area may take more than six credits of courses outside of TCP.

The TCP Program is developing some recommended pathways for students who want to use the Custom depth area to specialize in combining knowledge in cybersecurity with other areas such as policy, leadership, or management. Some of these pathways will become official depth areas in future years. Students are encouraged to contact the TCP Graduate Program Advisor for information about these pathways if interested.

Interdisciplinary Capstone, Thesis, or Portfolio

Students in the MS in TCP program have three options for completing their degree: capstone, thesis, or portfolio.

With the interdisciplinary capstone option, students work in teams across two semesters to complete an advanced project that builds on their Core and Depth Area courses. Projects are often done in conjunction with industry partners. Topics are selected based on the combined interests of the students, the faculty, and external partners such as industry and government. All students are required to take the first course of the sequence below. Most students will then move on to take the second course in the sequence but if a student is enrolled in the Designing for Defense class, they can choose to substitute it for the second capstone course (no petition needed). Thus, the three courses that can be used to meet the Interdisciplinary Capstone requirement are:

- CYBR 5700: Graduate Projects I

- CYBR 6700: Graduate Projects II

- CYBR 5550: Designing for Defense

Research Thesis

With faculty approval, students may elect to take 6 credits of thesis work (CYBR 6950) in place of the Interdisciplinary Capstone requirement. To complete a thesis, the student must get approval from a faculty member who will serve as their thesis advisor and find two additional faculty members who are able to serve on their thesis committee. Students will work with a faculty advisor to complete a thesis on a topic of mutual interest that includes aspects of the three Core areas. The three-member committee must be approved by the TCP Program and by the Graduate School. The student works primarily with the thesis advisor and provides both a written document and arranges a presentation (thesis defense/thesis exam) before the thesis examining committee. Examination Report Forms must be filed with the TCP Program at least two weeks prior to the date of your defense (exam). Students must be registered during the semester in which they defend their thesis. Additional information, rules, dates and deadlines, and thesis submission requirements can be found on the [Graduate School](#) website.

Portfolio

A third capstone option is the portfolio option in which a student may petition the graduate committee to identify two courses that will help them customize their TCP degree in a way that will help them meet their academic and career goals. Students increase the chances of their portfolio petition being approved if the courses they select involve interdisciplinary and/or project-based work as defined by the syllabi from those courses. If a student's portfolio petition is not approved, they must then select either the capstone or thesis option. As a result, students must be submitting their petition for the portfolio option early in their second semester to have time to switch to one of the other two options if denied.

For full-time students, the decision whether to pursue the Interdisciplinary Capstone, Thesis, or Portfolio options must be made prior to the start of the second year. In their third semester, a student will be enrolled in one of these three options. Since all of these options involve two course sequences, being allowed to switch from one option to another is rare and may require one or two additional semesters to complete the degree.

For part-time students, this decision needs to be made in the semester preceding their last two semesters in the program. Part-time students should work with the TCP Graduate Program Advisor to develop a plan to graduation that makes it possible to identify their "third from last"

semester in the program and then finalize the decision about capstone, thesis, or portfolio in that semester. Be advised: if a part-time student decides on the capstone option, they must be ready to take the first class in the capstone sequence in the Fall semester of a given academic year.

Taking Courses Outside of TCP

Students may take up to six credits of courses from areas outside of TCP to substitute courses within their depth area (both required courses or advanced elective courses). Students must gain approval for these two substitutions prior to completing them by submitting a petition to their graduate program advisor for review/approval by the CS graduate committee. Note: In line with standard practice for the CS graduate committee, courses from the following departments are automatically approved: Linguistics, Business, Geography, Physics, Mathematics, Applied Mathematics/STATS, and Information Science.

MS in TCP Timeline

All students must complete the degree requirements within four years from the date of commencing coursework. The option to petition for an additional fifth year is available. TCP offers Fall, Spring, and Summer courses online or in person on varying days and meeting times to allow flexibility for full- or part-time students.

Full-time students typically complete the degree in two years. To graduate in two years:
- Students are encouraged to complete the Core Courses in the first Fall and Spring semesters and must complete the Core Courses by the end of the third semester (excluding Summer sessions).
- Full-time students take their capstone, thesis, or portfolio courses in their third and fourth semesters.

Part-time students can pursue the degree at their own pace. Students with graduation paths longer than 2 years are encouraged to complete the Core Courses before enrolling in Depth Area courses.

Academic Standards

Minimum Grades and GPA Requirements

Students must complete a total of 30 credit hours of approved graduate level course work with a grade of C or better and a cumulative GPA of at least 3.00.

Any student, who fails to maintain a 3.00 grade point average or to make adequate progress toward completing a degree, as assessed by the student's academic/research advisor, will be subject to suspension or dismissal from the Graduate School upon consultation with the major department. The final decision on suspension or dismissal will be made by the Dean of the Graduate School. See the [Graduate School Rules](#) for additional information.

Incomplete (I) Grades

An incomplete (I) grade is given only when students, for documented reasons beyond their control, have been unable to complete course requirements in the semester enrolled. A substantial amount of work must have been satisfactorily completed before approval of such a grade is given. The final grade (earned by completing the course requirements or by retaking the course) does not result in deletion of the (I) from the transcript. A second entry is posted on the transcript to show the final grade for the course. At the end of one year, (I) grades for courses that are not completed or repeated are regarded as (F) and are shown as such on the student's transcript. Courses with grades of (I) are not included in computation of grade point averages until a final letter grade has been awarded in that course.

Graduation Checklist

The following [Graduate School forms](#) must be submitted to the TCP Program for approval. IMPORTANT: Check the [Graduate School deadlines](#) prior to the start of the semester.

MS Interdisciplinary Capstone or Portfolio Option

- **Apply to Graduate**. Students must apply through [myCUinfo.colorado.edu](#) to graduate. This notifies the Graduate School and your department that you intend to graduate. If you do not complete the requirements for graduation, you must log back in and re-apply to graduate for the new graduation date. *You must apply to graduate online whether or not you plan to attend the ceremony.*
- **Candidacy Application for Advanced Degree**

MS Thesis Option

- **Apply to Graduate**. Students must apply through [myCUinfo.colorado.edu](#) to graduate. This notifies the Graduate School and your department that you intend to graduate. If you do not complete the requirements for graduation, you must log back in and re-apply to graduate for the new graduation date. *You must apply to graduate online whether or not you plan to attend the ceremony.*
- **Candidacy Application for Advanced Degree**
- **Master's Examination Report**
- **Final Grade Card**
- **Signature Page –** original page with original signatures
- **Final Copy of [Thesis](#)** must be submitted online

Contact Persons

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TCP Program	Department of Computer Science
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TCP | TECHNOLOGY, CYBERSECURITY AND POLICY PROGRAM

Appendix A – MS in TCP Degree Planning Form

Name:

CU Email:

Student ID #:

Required Course Areas	Credits
3 Core Courses	9
5 Depth Area Courses	15
Master's Project, Thesis, or Portfolio	6
Total Required Credit Hours	30

Courses satisfying Core Requirements:

Semester/Yr.	Course #	Course Title	Credit

Courses satisfying Depth Area Requirements:

Semester/Yr.	Course #	Course Title	Credit

Courses satisfying MS Project, Thesis, or Portfolio Requirement:

Semester/Yr.	Course #	Course Title	Credit

Notes:

Faculty/Academic Advisor Signature: Date: