Graduate Student Handbook

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Revision 1

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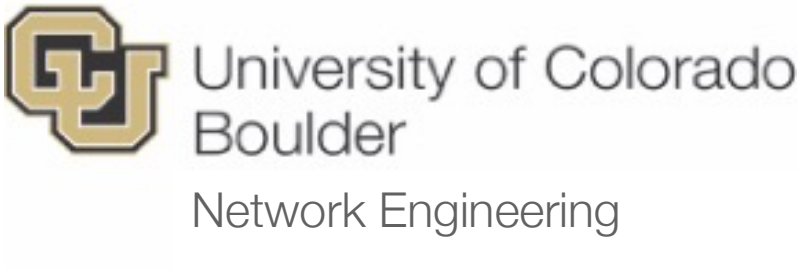

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Foreword

As part of the Department of Computer Science at the University of Colorado Boulder, the Professional Master's in Network Engineering (MSNE) program accepts students from a broad range of backgrounds and offers curriculum and coursework that creates bridges across disciplinary boundaries. The program prepares students to design, construct, and operate data communication systems by teaching network engineering from an interdisciplinary, hands-on perspective. Among the goals of the MSNE are to accelerate both critical thinking and learning in areas of networking, programming, and system administration; 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."

MSNE Curriculum Overview

The MSNE is a coursework-only professional master's program. Students will take at least 30 credits in the following categories.

Category	Credits
Fundamentals	6
Core	6
Advanced Electives	9
Electives	9
Total	30

Fundamentals Courses

The courses in the Fundamentals category are designed to provide students with the background they need to succeed in this degree. Courses in this category cover the fundamental concepts of how the Internet operates; how to develop network systems; and how to administer the machines (both physical and virtual) that deploy them.

- CSCI 5010: Fundamentals of Data Communication
- CSCI 5020: Fundamentals of Network Programming
- CSCI 5030: Fundamentals of System Administration and Virtualization

Students are required to take two courses (6 credits) from the Fundamentals category unless they can demonstrate that they have acquired the necessary skills and knowledge via their undergraduate degree or prior work experience. Such students can petition to take two extra elective or advanced elective courses instead.

Core Courses

The courses in the Core category begin to lay the foundation for exploring network engineering topics in depth. All aspects of network engineering from the management of network systems to the policies that govern traffic on the Internet to the wireless systems that deliver information to devices on the edge are all covered.

- CSCI 5113: Linux System Administration
- CSCI 5160: Introduction to Enterprise Networks
- CSCI 5170: IP Routing Protocols and Policies
- CSCI 5180: Network Management and Automation
- CSCI 5200: Introduction to Wireless Systems
- CSCI 5220: Wireless Local Area Networks
- CSCI 5230: Wireless Systems Lab

Students are required to take two courses (6 credits) from the Core category to help set the stage for taking courses in the Advanced Electives category. Students can be guided in their choice of Core courses by using the suggested focus areas at the end of this document to craft a set of coursework that best meets their academic goals (Appendix A). If a student feels that they need to take more courses from the Core category, they can certainly do so by choosing to take additional Core classes and applying those credits towards meeting the credits associated with the Electives category.

Advanced Electives

The courses in the Advanced Electives category go in depth on a variety of network engineering topics. Students are required to take three courses (9 credits) of advanced electives to graduate.

- CSCI 5190: Voice Over IP: Voice Network Design and Implementation
- CSCI 5210: Secure Linux Platform Engineering
- CSCI 5260: Datacenter Networks
- CSCI 5270: IP Network Design
- CSCI 5280: Software-Defined Networking
- CSCI 5360: Internet Service Provider Networks
- CSCI 5380: Network Virtualization and Orchestration
- CSCI 5620: Advanced Wireless Lab
- CSCI 5630: Wireless and Cellular Systems

Electives

The three courses (9 credits) associated with the Electives category allow students to customize the MSNE degree to meet their academic goals. These credits can include any of the following options:

- Any of the remaining Core courses
- Any of the remaining Advanced Electives Courses
- Any CS 5000-level course approved by petition
- At most three graduate-level courses from outside CS approved by petition

For the last two options, students are encouraged to submit petitions to the CS graduate committee BEFORE taking the courses they want to apply to the Electives category.

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. MSNE 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 Fundamentals and 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).

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

International Students should consult with International Student and Scholar Services to ensure that they are meeting the requirements for studying at CU Boulder: http://www.colorado.edu/isss.

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 MSNE Program for approval. IMPORTANT: Check the Graduate School deadlines prior to the start of the semester.

- **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.*
- You must also complete the **Candidacy Application for Advanced Degree, which you will submit to the Graduate Program Advisor.**

Contact Persons

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Appendix A – Suggested Focus Area Combinations

The following sets of courses represent common focus areas that students can take to target a particular area of network engineering in depth.

Network Design and Configuration

- CSCI 5160: Introduction to Enterprise Networks
- CSCI 5260: Datacenter Networks
- CSCI 5360: Internet Service Provider Networks

Network Programmability and Automation

- CSCI 5180: Network Management and Automation
- CSCI 5280: Software-Defined Networking
- CSCI 5380: Network Virtualization and Orchestration

Linux System Administration

- CSCI 5030: Fundamentals of System Administration and Virtualization
- CSCI 5113: Linux System Administration
- CSCI 5210: Secure Linux Platform Engineering

Wireless Networking

- CSCI 5200: Introduction to Wireless Networks
- CSCI 5220: Wireless Local Area Networks
- CSCI 5620: Advanced Wireless Lab
- CSCI 5630: Wireless and Cellular Systems (LTE 5G)

Comprehensive Networking Solutions

- CSCI 5160: Introduction to Enterprise Networks
- CSCI 5170: IP Routing Protocols and Policies
- CSCI 5190: Voice Over IP: Voice Network Design and Implementation
- CSCI 5200: Introduction to Wireless Networks
- CSCI 5270: IP Network Design

Appendix B – Example Plan of Study - Course Sequences

The outline below shows an example course sequence for students enrolled in the MSNE degree. There are a wide variety of course sequences that are possible, and many students elect to take additional credits above the 30-credit degree minimum. To accommodate this, the program is designed to be flexible and aims to meet the needs of students.

Example Plan of Study for students without a Computer Science background wanting to focus on the areas of **Network Design and Configuration** and **Network Programmability and Automation:**

Semester 1 (9 credits)

CSCI 5010	Fundamentals of Data Communication
CSCI 5020	Fundamentals of Network Programming
CSCI 5030	Fundamentals of System Administration and Virtualization

Semester 2 (9 credits)

CSCI 5180	Network Management and Automation
CSCI 5160	Introduction to Enterprise Networks
CSCI 5170	IP Routing Protocols and Policies

Semester 3 (6 credits)

CSCI 5260	Datacenter Networks
CSCI 5280	Software-Defined Networking

Semester 4 (9 credits)

CSCI 5380	Network Virtualization and Orchestration
CSCI 5360	Internet Service Provider Networks
CSCI 5270	IP Network Design

Network Engineering
Course Based Master's Degree (PMP)
PLAN OF STUDY

Department of Computer Science

Student Name:_____ Student ID:_____

Fundamentals—6 credit hours (two courses)				
The courses in the Fundamentals category are designed to provide students with the background they need to succeed in this degree. Courses in this category cover the fundamental concepts of how the Internet operates; how to develop network systems; and how to administer the machines (both physical and virtual) that deploy them.				
Course Number	Course Title	Semester To Be Taken	Semester Actually Taken	Grade

Core—6 credit hours (two courses)				
The courses in the Core category lay the foundation for exploring network engineering topics in depth. Cores courses cover all aspects of network engineering from the management of network systems to the policies that govern traffic on the internet to the wireless systems that deliver information.				
Course Number	Course Title	Semester To Be Taken	Semester Actually Taken	Grade

Advanced Electives—9 credit hours (three courses)				
The three courses in the Advanced Electives category go in depth on a variety of network engineering topics. Students are required to take three courses of advanced electives to graduate.				
Course Number	Course Title	Semester To Be Taken	Semester Actually Taken	Grade

Electives—9 credit hours (three courses)				
The three courses associated with the Electives category allow students to customize the MS in Network Engineering degree to meet their academic goals.				
Course Number	Course Title	Semester To Be Taken	Semester Actually Taken	Grade

Student Signature:_____ Date:_____

Graduate Advisor Signature:_____ Date:_____

Sample Plans of Study:

Potential course sequence for students with a Computer Science background:

- Semester 1 (6 credits)
  - CSCI 5113: Linux System Administration
  - CSCI 5180: Network Management and Automation
- Semester 2 (6 credits)
  - CSCI 5160: Introduction to Enterprise Networks
  - CSCI 5210: Secure Linux Platform Engineering
  - CSCI 5170: IP Routing Protocols and Policies
- Semester 3 (6 credits)
  - CSCI 5260: Datacenter Networks
  - CSCI 5280: Software-Defined Networking
- Semester 4 (9 credits)
  - CSCI 5380: Network Virtualization and Orchestration
  - CSCI 5360: Internet Service Provider Networks
  - CSCI 5270: IP Network Design

Potential course sequence for students without a Computer Science background:

- Semester 1 (9 credits)
  - CSCI 5010: Fundamentals of Data Communication
  - CSCI 5020: Fundamentals of Network Programming
  - CSCI 5030: Fundamentals of System Administration and Virtualization
- Semester 2 (9 credits)
  - CSCI 5180: Network Management and Automation
  - CSCI 5160: Introduction to Enterprise Networks
  - CSCI 5170: IP Routing Protocols and Policies
- Semester 3 (6 credits)
  - CSCI 5260: Datacenter Networks
  - CSCI 5280: Software-Defined Networking
- Semester 4 (6 credits)
  - CSCI 5380: Network Virtualization and Orchestration
  - CSCI 5360: Internet Service Provider Networks
  - CSCI 5270: IP Network Design