

# TELECOMMUNICATIONS - MASTER OF SCIENCE (MS)

The Interdisciplinary Telecom Program (ITP) offers students the opportunity to learn skills that allow them to master among the latest technologies associated with the Internet's Technology, Cybersecurity and Policy (TCP) landscape. Additional foci include the business skills and policy knowledge essential to achieving success in the companies driving today's rapidly changing high-tech world. ITP offers hands-on experience in the Program's world-class labs equipped with state-of-the-art technologies in some of the most sought-after areas in the broadband arena.

Admitted students may select from among the following specializations:

- network engineering
- network security
- policy and strategy
- wireless networking
- cybersecurity
- open option

For more information, visit the program's Master of Science in Telecom (<http://www.colorado.edu/itp/masters-degree>) webpage.

## Distance Education Option

Students can take individual courses toward a master's degree or graduate certificate through distance education (online). For more information, connect with the individual graduate program directly.

## Bachelor's–Accelerated Master's Degree Program

Students may earn this degree as part of the Bachelor's–Accelerated Master's (BAM) degree program, which allows currently enrolled CU Boulder undergraduate students the opportunity to earn a bachelor's and master's degree in a shorter period of time.

For more information, see the Accelerated Master's tab for the associated bachelor's degree(s):

- Applied Mathematics - Bachelor of Science (BS) ([catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/applied-mathematics/applied-mathematics-bachelor-science-bsam/#acceleratedmasterstext](http://catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/applied-mathematics/applied-mathematics-bachelor-science-bsam/#acceleratedmasterstext))
- Computer Science - Bachelor of Science (BS) ([catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/computer-science/computer-science-bachelor-science-bs/#acceleratedmasterstext](http://catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/computer-science/computer-science-bachelor-science-bs/#acceleratedmasterstext))
- Electrical and Computer Engineering - Bachelor of Science (BS) ([catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/electrical-computer-energy-engineering/electrical-computer-engineering-bachelor-science-bs](http://catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/electrical-computer-energy-engineering/electrical-computer-engineering-bachelor-science-bs))

## Requirements

The following course requirements are subject to change; for the most current information, visit the program's Master of Science in Telecom (<http://www.colorado.edu/itp/masters-degree>) webpage.

## General Requirements

The Master of Science in telecommunications requires, at minimum, 36 credit hours completed at the 5000 level or above, including 33 credits from telecommunications core courses (eight courses) and specific education track requirements.

Students must maintain a cumulative GPA of at least 3.00, and may elect to pursue a capstone or thesis for their culminating project.

## Time Limit

All degree requirements must be completed within four years of the date of commencing course work. Most full-time students complete the MS within 24 months.

## Sample Two-Year Plans of Study Network Engineering Track

| Course                 | Title                               | Credit Hours |
|------------------------|-------------------------------------|--------------|
| <b>Year One</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5010              |                                     |              |
| TLEN 5330              |                                     | 3            |
| TLEN 5830              | Fundamentals of Network Programming | 1            |
| TLEN 5842              | Linux Systems Administration        | 3            |
| Credit Hours           |                                     | 7            |
| <b>Spring Semester</b> |                                     |              |
| TLEN 5130              |                                     | 3            |
| TLEN 5410              |                                     | 3            |
| TLEN 5460              |                                     | 3            |
| Credit Hours           |                                     | 9            |
| <b>Year Two</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5210              |                                     |              |
| One of the following:  |                                     | 3            |
| TLEN 5462              |                                     |              |
| TLEN 5840              |                                     |              |
| TLEN 5830              | Next Generation Networks            |              |
| TLEN 5830              | Service Provider Networks           |              |
| TLEN 5700              | Research Methods                    | 2            |
| Credit Hours           |                                     | 5            |
| <b>Spring Semester</b> |                                     |              |
| TLEN 5370              |                                     |              |
| Other elective         |                                     | 3            |
| One of the following:  |                                     | 3-6          |
| TLEN 5710              | Capstone                            |              |
| TLEN 6950              |                                     |              |
| Credit Hours           |                                     | 6-9          |
| Total Credit Hours     |                                     | 27-30        |

**Network Security Track**

| Course                 | Title                               | Credit Hours |
|------------------------|-------------------------------------|--------------|
| <b>Year One</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5010              |                                     |              |
| TLEN 5330              |                                     | 3            |
| TLEN 5530              | Applied Network Security            | 3            |
| TLEN 5830              | Fundamentals of Network Programming | 1            |
| Credit Hours           |                                     | 7            |
| <b>Spring Semester</b> |                                     |              |
| TLEN 5130              |                                     | 3            |
| TLEN 5540              | Network Security Laboratory         | 3            |
| TLEN 5841              | Secure Web Application Development  | 3            |
| Credit Hours           |                                     | 9            |
| <b>Year Two</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5210              |                                     | 3            |
| TLEN 5700              | Research Methods                    | 2            |
| TLEN 5830              | Large Scale Network Analysis        | 3            |
| Credit Hours           |                                     | 8            |
| <b>Spring Semester</b> |                                     |              |
| TLEN 5830              | Secure Embedded Programming         | 3            |
| One of the following:  |                                     | 3            |
| TLEN 5842              | Linux Systems Administration        |              |
| Other elective         |                                     |              |
| One of the following:  |                                     | 3-6          |
| TLEN 5710              | Capstone                            |              |
| TLEN 6950              |                                     |              |
| Credit Hours           |                                     | 9-12         |
| Total Credit Hours     |                                     | 33-36        |

**Telecom Policy and Strategy Track**

| Course                 | Title                               | Credit Hours |
|------------------------|-------------------------------------|--------------|
| <b>Year One</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5010              |                                     |              |
| TLEN 5210              |                                     | 3            |
| TLEN 5438              | Internet Lab                        | 3            |
| TLEN 5830              | Fundamentals of Network Programming | 1            |
| Credit Hours           |                                     | 7            |
| <b>Spring Semester</b> |                                     |              |
| TLEN 5130              |                                     | 3            |
| TLEN 5310              |                                     |              |
| Other elective         |                                     | 3            |
| Credit Hours           |                                     | 6            |
| <b>Summer</b>          |                                     |              |
| TLEN 5230              | Maymester                           | 3            |
| Credit Hours           |                                     | 3            |

**Year Two**

|                        |  |       |
|------------------------|--|-------|
| <b>Fall Semester</b>   |  |       |
| TLEN 5330              |  | 3     |
| TLEN 5700              | Research Methods                               | 2     |
| One of the following:  |  | 3-4   |
| TLEN 5250              |  |       |
| TLEN 5XXX              | Intro to Telecom Lab II                        |       |
| Credit Hours           |  | 8-9   |
| <b>Spring Semester</b> |  |       |
| One of the following:  |  | 3     |
| TLEN 5106              | International Deployment of Broadband Networks |       |
| TLEN 5380              |  |       |
| One of the following:  |  | 3-6   |
| TLEN 5710              | Capstone                                       |       |
| TLEN 6950              |  |       |
| Credit Hours           |  | 6-9   |
| Total Credit Hours     |  | 30-34 |

**Wireless Networking Track**

| Course                 | Title                               | Credit Hours |
|------------------------|-------------------------------------|--------------|
| <b>Year One</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5010              |                                     |              |
| TLEN 5330              |                                     | 3            |
| TLEN 5830              | Wireless Systems                    | 3            |
| TLEN 5830              | Fundamentals of Network Programming | 1            |
| Credit Hours           |                                     | 7            |
| <b>Spring Semester</b> |                                     |              |
| TLEN 5130              |                                     | 3            |
| TLEN 5520              |                                     | 3            |
| TLEN 5560              |                                     | 3            |
| Credit Hours           |                                     | 9            |
| <b>Summer</b>          |                                     |              |
| TLEN 5230              | Maymester                           | 3            |
| Credit Hours           |                                     | 3            |
| <b>Year Two</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5210              |                                     | 3            |
| TLEN 5510              |                                     | 3            |
| TLEN 5700              | Research Methods                    | 2            |
| Credit Hours           |                                     | 8            |
| <b>Spring Semester</b> |                                     |              |
| TLEN 5830              | Advanced Wireless Lab               | 3            |
| One of the following:  |                                     | 3-6          |
| TLEN 5710              | Capstone                            |              |
| TLEN 6950              |                                     |              |
| Credit Hours           |                                     | 6-9          |
| Total Credit Hours     |                                     | 33-36        |

**Open Option Track**

| Course                 | Title                               | Credit Hours |
|------------------------|-------------------------------------|--------------|
| <b>Year One</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5010              | Required Business Course            |              |
| TLEN 5310              | Required Technical Course           |              |
| TLEN 5330              | Required Technical Course           | 3            |
| TLEN 5830              | Fundamentals of Network Programming | 1            |
| Credit Hours           |                                     | 4            |
| <b>Spring Semester</b> |                                     |              |
| TLEN 5130              | Required Business Course            | 3            |
| Choice of electives    |                                     | 6            |
| Credit Hours           |                                     | 9            |
| <b>Year Two</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5210              | Required Policy Course              | 3            |
| TLEN 5700              | Research Methods                    | 2            |
| Choice of elective     |                                     | 3            |
| Credit Hours           |                                     | 8            |
| <b>Spring Semester</b> |                                     |              |
| Choice of electives    |                                     | 6            |
| One of the following:  |                                     | 3-6          |
| TLEN 5710              | Capstone                            |              |
| TLEN 6950              |                                     |              |
| Credit Hours           |                                     | 9-12         |
| Total Credit Hours     |                                     | 30-33        |

| Course                 | Title                               | Credit Hours |
|------------------------|-------------------------------------|--------------|
| <b>Year One</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5010              |                                     |              |
| TLEN 5330              |                                     | 3            |
| TLEN 5830              | Fundamentals of Network Programming | 1            |
| TLEN 5842              | Linux Systems Administration        | 3            |
| Credit Hours           |                                     | 7            |
| <b>Spring Semester</b> |                                     |              |
| TLEN 5130              |                                     | 3            |
| TLEN 5410              |                                     | 3            |
| TLEN 5460              |                                     | 3            |
| Credit Hours           |                                     | 9            |
| <b>Year Two</b>        |                                     |              |
| <b>Fall Semester</b>   |                                     |              |
| TLEN 5210              |                                     |              |
| One of the following:  |                                     | 3            |
| TLEN 5462              |                                     |              |
| TLEN 5840              |                                     |              |
| TLEN 5830              | Next Generation Networks            |              |
| TLEN 5830              | Service Provider Networks           |              |
| TLEN 5700              | Research Methods                    | 2            |
| Credit Hours           |                                     | 5            |

**Spring Semester**

|                       |          |       |
|-----------------------|----------|-------|
| TLEN 5370             |          |       |
| Other elective        |          | 3     |
| One of the following: |          | 3-6   |
| TLEN 5710             | Capstone |       |
| TLEN 6950             |          |       |
| Credit Hours          |          | 6-9   |
| Total Credit Hours    |          | 27-30 |

**Dual Degree Programs**

Students pursuing a telecommunications dual degree must be admitted to both schools/programs under their respective admissions procedures and standards.

- MBA (catalog.colorado.edu/graduate/colleges-schools/business/programs-study/business-administration/business-administration-master-business-administration-mba) & MS in telecom
- ME in engineering management (catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/engineering-management/engineering-management-master-engineering-me) & MS in telecom
- JD & MS in telecom (catalog.colorado.edu/law/programs-study/law-juris-doctor-laws-jd)

For more information, visit the program's Concurrent & Dual Degrees (<http://www.colorado.edu/itp/dual-degree>) webpage.