

# Telecommunication Networks, MS

Website (<http://www.coe.neu.edu/degrees/ms-tsm>)

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The Master of Science in Telecommunication Networks is designed for professionals currently in the telecommunications or networking field who either wish to enhance their technical skills and credentials or who wish to make a transition to the business side of telecommunications or networking. We also welcome applications from prospective students with limited industry experience. This program, which may be pursued on a full- or part-time basis, is one of only a very few master's programs in telecommunications and networking in the United States that is truly multidisciplinary, giving students the flexibility to tailor the curriculum to their specific interests, backgrounds, and career goals.

## Degree Requirements

The program requires that a mix of core required courses and elective courses be taken—16 semester hours of core course work and a minimum of 16 semester hours of elective course work. Although there are some dependencies among the core courses, the program may be started in either the fall or spring semester.

There are four required core courses and a wide range of technical and business electives available. The core courses each carry 4 semester hours of credit. A maximum of two of the core courses may be waived only if a student has taken similar course material at another university with a satisfactory grade. If a technical core course is waived, it must be replaced with a technical elective. Similarly, if the business core course is waived, it must be replaced with a business elective.

At least one of the electives must be a business elective and at least one must be a technical elective. The technical electives include courses on network and communications technology and on the development of software systems and applications. The business electives are focused on engineering management and entrepreneurship. Electives come from approved lists of courses supplied by the colleges of engineering, business, and computer and information science. All students must take at least one technical elective and one business elective. These electives must be courses of at least 3 semester hours. Students may take elective course work outside these lists only with the prior approval of the program director.

It is expected that students beginning this program will have an adequate background in the following areas: C, C++, or Java programming languages; probability and statistics; and differential and integral calculus.

Special topics courses, as well as other courses from outside the program, may be used as electives with prior approval of the program director.

Independent Study (TELE 5978), usually 1 or 2 semester hours, or Master's Project (TELE 6945) is sometimes available for students and must be carried out under the supervision of a professor and must have prior approval of the program director. Proposals for Independent Study

or a Master's Project need to be submitted at least one month before the start of the semester.

Directed Study (TELE 5976), also for 1 or 2 semester hours, is sometimes available for students. For directed study projects, a student follows a prescribed curriculum, usually with some form of an exam at the end of the semester.

## Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (<http://catalog.northeastern.edu/graduate/engineering/graduate-certificate-programs>).

### GORDON INSTITUTE OF ENGINEERING LEADERSHIP Master's Degree in Telecommunication Networks with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Telecommunications Networks in addition to earning a Graduate Certificate in Engineering Leadership. Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors. The integrated 32-semester-hour degree and certificate require 12 hours of technical core courses from the telecommunication networks program and 4 hours from the technical course list provided for this program.

Engineering Leadership (<http://catalog.northeastern.edu/graduate/engineering/leadership/engineering-leadership-graduate-certificate/#text>)

## Program Requirements

Complete all courses and requirements listed below unless otherwise indicated. Students may not register for more than 10 semester hours in the fall and spring terms and 4 semester hours in each of the three summer terms. Any exceptions must be approved by the program director.

## Core Requirements

Code	Title	Hours
TELE 5330 and TELE 5331	Data Networking and Lab for TELE 5330	4
TELE 5340	Telecommunications Public Policy and Business Management	4
TELE 5350	Telecom and Network Infrastructure	4
TELE 5360	Internet Protocols and Architecture	4

## Electives

A grade of C or higher is required in each elective. At least one course must be taken from the business course list and at least one course from the technical course list.

Code	Title	Hours
	Complete a minimum of 16 semester hours from the course lists below (p. 2)	16

**BUSINESS COURSE LIST**

Minimum 3.000 GPA required

Code	Title	Hours
EMGT 5220	Engineering Project Management	
EMGT 6225	Economic Decision Making	
EMGT 6305	Financial Management for Engineers	
ENTR 6200	Enterprise Growth and Innovation	
ENTR 6212	Business Planning for New Ventures	
ENTR 6218	Business Model Design and Innovation	
ENTR 6219	Financing Ventures from Early Stage to Exit	
HRMG 6200	Managing People and Organizations	
INFO 6245	Planning and Managing Information Systems Development	
MGMT 6214	Negotiations	
MGSC 6206	Management of Service and Manufacturing Operations	
MKTG 6200	Creating and Sustaining Customer Markets	
TECE 6222	Emerging and Disruptive Technologies	
TECE 6230	Entrepreneurial Marketing and Selling	
TECE 6250	Lean Design and Development	
TECE 6300	Managing a Technology-Based Business	

**TECHNICAL COURSE LIST**

Code	Title	Hours
CS 5520	Mobile Application Development	
CS 6710	Wireless Network	
CS 6740	Network Security	
CSYE 6200	Concepts of Object-Oriented Design	
CSYE 6225	Network Structures and Cloud Computing	
CSYE 6510	Fundamentals of the Internet of Things	
EECE 5155	Wireless Sensor Networks and the Internet of Things	
EECE 5576	Wireless Communication Systems	
EECE 7364	Mobile and Wireless Networking	
IA 5150 and IA 5151	Network Security Practices and Lab for IA 5150	
INFO 6101	Data Science Engineering with Python	
INFO 6210	Data Management and Database Design	
INFO 6350	Smartphones-Based Web Development	
TELE 5600	Linux/UNIX Systems Management for Network Engineers	
TELE 6100	Mobile Wireless Communications and Networking	
TELE 6200	Advanced Data Networking	
TELE 6350	IP Telephony	
TELE 6360	Operation Support Systems in Telecommunications	
TELE 6400	Software-Defined Networking	
TELE 6603	Special Topics—Networking	

**Program Credit/GPA Requirements**

Minimum of 32 total semester hours required