

Electrical and Computer Engineering with Concentration in Communications, Control, and Signal Processing, MSECE (Boston)

For program contact information, please visit this website (<https://ece.northeastern.edu/academics/graduate-studies/ms-elee/>).

The master's degree program in electrical and computer engineering offers in-depth coursework within the concentration-choice-related areas. The curriculum is integrated and intensive and is built on state-of-the-art research, taught by faculty who are experts in their areas.

Excluded Courses for All MSECE Concentrations

Students cannot take excluded courses as part of the MSECE program and may not petition to take these courses, as any petition to take these courses will be automatically rejected. Courses from the following subject areas may not count toward any concentration within the MSECE program: CSYE, DAMG, INFO, TELE. Select CS courses are also excluded from all MSECE concentrations. Please see the program requirements tab and your college administrator for more information.

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 (<https://catalog.northeastern.edu/graduate/engineering/graduate-certificate-programs/>).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Electrical and Computer Engineering with a Concentration in Communications, Control, and Signal Processing with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Electrical and Computer Engineering with a Concentration in Communications, Control, and Signal Processing in addition to earning a Graduate Certificate in Engineering Leadership (<https://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-leadership-graduate-certificate/>). 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 40-semester-hour degree and certificate will require 24 semester hours of advisor-approved communications, control, and signal processing technical courses. For students who concurrently enroll in the Graduate Certificate in Engineering Leadership, 8 SH of the certificate project may be applied to this program's thesis requirements.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Fundamental Courses

Code	Title	Hours
Complete at least 8 semester hours from the following:		8
EECE 5576	Wireless Communication Systems	
EECE 5666	Digital Signal Processing	
EECE 7200	Linear Systems Analysis	
EECE 7204	Applied Probability and Stochastic Processes	

Options

Complete one of the following options:

COURSEWORK OPTION

Code	Title	Hours
Concentration Courses		
Complete 16 semester hours from the concentration course list below. Any fundamental course not used to meet the fundamental course requirement can be used toward the concentration course requirement.		16
Electives		
Complete 8 semester hours from either concentration courses or from other concentrations.		8

THESIS OPTION

Code	Title	Hours
Thesis		
EECE 7945	Master's Project	4
EECE 7990	Thesis	4

In addition to completing the thesis course, students must successfully complete the thesis submission process, including securing Committee and Graduate School of Engineering signatures and submission of an electronic copy of their MS Thesis to ProQuest.

Concentration Courses

Complete 8 semester hours from the concentration course list below. Any fundamental course not used to meet the fundamental course requirement can be used toward the concentration course requirement. 8

Electives

Complete 8 semester hours from either concentration courses or from other concentrations. 8

In the coursework option a maximum of two courses may be taken outside of electrical and computer engineering. Thesis track students can take up to three courses outside of electrical and computer engineering.

Optional Co-op Experience

Code	Title	Hours
Complete the following. Students must complete ENCP 6100 to qualify for co-op experience:		
ENCP 6100	Introduction to Cooperative Education	1
ENCP 6964	Co-op Work Experience	
or ENCP 6954	Co-op Work Experience - Half-Time	
or ENCP 6955	Co-op Work Experience Abroad - Half-Time	
or ENCP 6965	Co-op Work Experience Abroad	

CONCENTRATION COURSES

Code	Title	Hours
EECE 5115	Dynamical Systems in Biological Engineering	
EECE 5550	Mobile Robotics	
EECE 5552	Assistive Robotics	
EECE 5576	Wireless Communication Systems	
EECE 5580	Classical Control Systems	
EECE 5582	Making Systems Reliable—An Introduction to Coding Theory	
EECE 5610	Digital Control Systems	
EECE 5612	Statistical Inference: An Introduction for Engineers and Data Analysts	
EECE 5626	Image Processing and Pattern Recognition	
EECE 5665	Signal Processing for Global Navigation Satellite Systems	
EECE 5666	Digital Signal Processing	
EECE 5698	Special Topics in Electrical and Computer Engineering (Feedback Control Systems: Applications to Unmanned Aerial Vehicles)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Formal Methods for Dynamical Systems)	
EECE 5698	Special Topics in Electrical and Computer Engineering (GNSS Signal Processing)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Introduction to Molecular Systems Biology Dynamic Modeling)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Spectrum Policy Issues for Wireless Communications Innovators)	
EECE 5698	Special Topics in Electrical and Computer Engineering (Terahertz Communications for 6G)	
EECE 6400	Special Problems in Electrical and Computer Engineering (*For MSECE and PhD-BS students only)	
EECE 7200	Linear Systems Analysis	
EECE 7204	Applied Probability and Stochastic Processes	
EECE 7211	Nonlinear Control	
EECE 7213	System Identification and Adaptive Control	
EECE 7214	Optimal and Robust Control	
EECE 7215	Introduction to Distributed Intelligence	
EECE 7223	Riemannian Optimization	
EECE 7310	Modern Signal Processing	
EECE 7311	Two Dimensional Signal and Image Processing	

EECE 7315	Digital Image Processing
EECE 7323	Numerical Optimization Methods
EECE 7336	Digital Communications
EECE 7337	Information Theory
EECE 7345	Big Data and Sparsity in Control, Machine Learning, and Optimization
EECE 7346	Probabilistic System Modeling and Analysis
EECE 7398	Advanced Special Topics in Electrical and Computer Engineering (Advances in Communication Electronics)
EECE 7398	Advanced Special Topics in Electrical and Computer Engineering (Advances in Wireless Communications)
EECE 7398	Advanced Special Topics in Electrical and Computer Engineering (An Experimental Approach to Wireless Communications)
EECE 7398	Advanced Special Topics in Electrical and Computer Engineering (Current Research in Nonlinear Systems)
EECE 7398	Advanced Special Topics in Electrical and Computer Engineering (Distributed Intelligence)
EECE 7398	Advanced Special Topics in Electrical and Computer Engineering (Legged Robots)
EECE 7398	Advanced Special Topics in Electrical and Computer Engineering (Systems Modeling and Analysis)
EECE 7400	Advanced Special Problems in Electrical and Computer Engineering (*For PhD-AE students only)
ME 7247	Advanced Control Engineering

EXCLUDED COURSES FOR ALL MSECE CONCENTRATIONS

Please see your college administrator for more information.

Code	Title	Hours
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Courses from the following subject areas may not count toward any concentration within the MSECE program:

CSYE, DAMG, INFO, TELE

The following CS courses may not count toward any concentration within the MSECE program:

CS 5010	Programming Design Paradigm
CS 5330	Pattern Recognition and Computer Vision
CS 5340	Computer/Human Interaction
CS 5520	Mobile Application Development
CS 5610	Web Development
CS 5700	Fundamentals of Computer Networking
CS 5800	Algorithms
CS 6140	Machine Learning
CS 6350	Empirical Research Methods

Program Credit/GPA Requirements

32 total semester hours required (33 with optional co-op)

Minimum 3.000 GPA required