Robotics, MS

For program contact information, please visit this website (https://coe.northeastern.edu/academic-programs/ms-robo/).

The multidisciplinary Master of Science program in robotics is offered by the College of Engineering and the Khoury College of Computer Sciences. The program is designed to provide students comprehensive training in algorithms, sensors, control systems, and mechanisms used in robotics.

In this degree program, students will be admitted (as of Spring 2025) to the college associated with their concentration, and their degree is awarded by that college. The concentrations are associated with the colleges as follows:

- Computer Science—Khoury College of Computer Sciences
- Electrical and Computer Engineering—College of Engineering
- Mechanical Engineering—College of Engineering

Students will follow all policies associated with their home college.

Gordon Institute of Engineering Leadership

Master's Degree in Robotics with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Robotics 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 robotics technical courses.

Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

Core Requirements

Code	Title	Hours
Mechanical Engineering		
Complete one of the following:		4
ME 5250	Robot Mechanics and Control	
ME 5659	Control Systems Engineering	
Electrical and Computer Engineering		
Complete one of the following:		4
EECE 5550	Mobile Robotics	
EECE 5552	Assistive Robotics	
EECE 5554	Robotics Sensing and Navigation	
Computer Science		
Complete one of the following:		4
CS 5180	Reinforcement Learning and Sequential Decision Making	
CS 5335	Robotic Science and Systems	

Concentrations

Complete one of the following concentrations:

- Computer Science (p. 2)—Khoury College of Computer Sciences
- Electrical and Computer Engineering (p. 2)—College of Engineering
- Mechanical Engineering (p. 2)—College of Engineering

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

COMPUTER SCIENCE

Code	Title	Hours
Students in the computer science concentration follow the Khoury College of Computer Sciences co-op policies.		
Required Course		
Complete one additional CS course not used to fulfill the core requirements:		4
CS 5180	Reinforcement Learning and Sequential Decision Making	
CS 5335	Robotic Science and Systems	
Complete one of the following options:		
Coursework Option		
Complete 16 semester hours of courses from the elective course list. (p. 3)		16
Project Option		
CS 8674	Master's Project	4
Complete 12 semester hours of courses from the elective course list. (p. 3)		12
Thesis Option		
CS 8674	Master's Project	4
CS 7990	Thesis	4
Complete 8 semester hours of courses from the elective course list. (p. 3)		8

ELECTRICAL AND COMPUTER ENGINEERING

Code	Title	Hours
Students in the electrical and computer engineering concentration follow the College of Engineering co-op policies.		
Required Course		
Complete one additional EECE course not used to fulfill the core requirements:		4
EECE 5550	Mobile Robotics	
EECE 5552	Assistive Robotics	
EECE 5554	Robotics Sensing and Navigation	
Complete one of the following options:		
Coursework Option		
Complete 16 semester hours of courses from the elective course list. (p. 3)		16
Project Option		
EECE 7945	Master's Project	4
Complete 12 semester hours of courses from the elective course list. (p. 3)		12
Thesis Option		
EECE 7945	Master's Project	4
EECE 7990	Thesis	4
Complete 8 semester hours of courses from the elective course list. (p. 3)		8

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.

MECHANICAL ENGINEERING

Code	Title	Hours
Students in the mechanical engineering concentration follow the College of Engineering co-op policies.		
Required Course		
Complete one additional ME course not used to fulfill the core requirements:		4
ME 5250	Robot Mechanics and Control	
ME 5659	Control Systems Engineering	
Complete one of the following options:		
Coursework Option		
Complete 16 semester hours of courses from the elective course list. (p. 3)		16
Project Option		
ME 7945	Master's Project	4
Complete 12 semester hours of courses from the elective course list. (p. 3)		12
Thesis Option		
ME 7945	Master's Project	4

ME 7990	Thesis	4
Complete 8 semester hours of courses from the elective course list. (p. 3)		8
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.		

Elective Course List

Any course in the following list will serve as an elective course, provided the student satisfies prerequisites.

Code	Title	Hours
CS 5097	Mixed Reality	
CS 5100	Foundations of Artificial Intelligence	
CS 5170	Artificial Intelligence for Human-Computer Interaction	
CS 5330	Pattern Recognition and Computer Vision	
CS 5340	Computer/Human Interaction	
CS 5800	Algorithms	
CS 6120	Natural Language Processing	
CS 6140	Machine Learning	
CS 6350	Empirical Research Methods	
CS 7140	Advanced Machine Learning	
CS 7150	Deep Learning	
CS 7180	Special Topics in Artificial Intelligence	
EECE 5550	Mobile Robotics	
EECE 5552	Assistive Robotics	
EECE 5554	Robotics Sensing and Navigation	
EECE 5580	Classical Control Systems	
EECE 5639	Computer Vision	
EECE 5642	Data Visualization	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	
EECE 7150	Autonomous Field Robotics	
EECE 7323	Numerical Optimization Methods	
EECE 7337	Information Theory	
EECE 7370	Advanced Computer Vision	
EECE 7397	Advanced Machine Learning	
EECE 7398	Advanced Special Topics in Electrical and Computer Engineering (Legged Robots)	
IE 6500	Human Performance	
IE 7280	Statistical Methods in Engineering	
IE 7315	Human Factors Engineering	
IE 7615	Neural Networks and Deep Learning	
ME 5240	Computer Aided Design and Manufacturing	
ME 5245	Mechatronic Systems	
ME 5250	Robot Mechanics and Control	
ME 5654	Elasticity and Plasticity	
ME 5655	Dynamics and Mechanical Vibration	
ME 5659	Control Systems Engineering	
ME 5665	Musculoskeletal Biomechanics	
ME 6200	Mathematical Methods for Mechanical Engineers 1	
ME 6260	Introduction to Microelectromechanical Systems (MEMS)	
ME 6250	Wearable Robotics	
ME 7247	Advanced Control Engineering	
PT 5170	Motor Control	
PT 5321	Applications of Biomechanics in Human Function and Movement	
PT 7005	Experimental Design and Applied Statistics	
PT 7020	Technologies in Movement and Rehabilitation Science	