

# Artificial Intelligence, MS

The Master of Science in Artificial Intelligence program is designed to give students a comprehensive framework for AI with specialization in one of five areas: vision, intelligent interaction, robotics and agent-based systems, machine learning, and knowledge management and reasoning. Students may choose from three options: specialization, thesis, or coursework only. Students will engage in an extensive core intended to develop depth in all core concepts that build a foundation for AI theory and practice. Students will also be given the opportunity to build on the core knowledge of AI by taking a variety of elective courses, selected from colleges throughout campus, to explore key contextual areas or more complex technical applications. Program graduates will be well positioned to attain research and development positions in a rapidly growing field or to progress into doctoral-degree-related fields.

The Master of Science in Artificial Intelligence is comprised of eight courses: five core courses, two electives to be chosen from one of five specialization areas or coursework option, and one elective. The core courses are designed and developed by Khoury College faculty. Elective courses consist of graduate courses offered in Khoury and other partner colleges, including College of Arts, Media and Design; College of Engineering; College of Science; and College of Social Sciences and Humanities.

## Prerequisites

The Master of Science in Artificial Intelligence curriculum is tailored toward technically or mathematically trained students. To ensure that all students have the foundation necessary to be successful in this program, each incoming student must either complete two introductory courses at Northeastern University or complete two placement exams administered one week prior to the beginning of the semester. The two exams cover fundamentals of computer science and programming skills and basic statistics, probability, and linear algebra. This admission requirement can also be fulfilled by successful completion of Introduction to Programming for Data Science (DS 5010) and Introduction to Linear Algebra and Probability for Data Science (DS 5020). The introductory courses that are completed before the student's admission to the program are not counted as credit toward the degree but are included in the student's cumulative grade-point average. Students may have the option of taking the courses before they begin the program or during the first semester of study. Students are required to get a passing grade in each section of the placement exams in order to be admitted to the program. If the student does not get a passing grade in a part of the placement exam, then the student must take the corresponding introductory course. Students that do not achieve a B or better in the introductory courses will be required to retake the courses.

## Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

## Core Requirements

A cumulative GPA of 3.000 or higher is required in the following core courses:

Code	Title	Hours
<b>Intelligence</b>		
CS 5100	Foundations of Artificial Intelligence	4
<b>Programming and Algorithms</b>		
CS 5010	Programming Design Paradigm	4
CS 5800	Algorithms	4
<b>Machine Learning</b>		
CS 6140	Machine Learning	4
<b>Interaction</b>		
Complete four semester hours from the following: <sup>1</sup>		4
CS 5170	Artificial Intelligence for Human-Computer Interaction	
CS 5340	Computer/Human Interaction	

## Options

Complete one of the following options:

### SPECIALIZATION OPTION

Code	Title	Hours
Complete two courses from one of the following specializations:		
<b>Vision</b>		
CS 5330	Pattern Recognition and Computer Vision	
CS 7180	Special Topics in Artificial Intelligence	
EECE 5639	Computer Vision	
EECE 7370	Advanced Computer Vision	
<b>Intelligent Interaction</b>		

CS 5150	Game Artificial Intelligence
CS 5340	Computer/Human Interaction
CS 7340	Theory and Methods in Human Computer Interaction
PSYC 5010	Human Cognitive Processes

**Robotics and Agent-Based Systems**

CS 5180	Reinforcement Learning and Sequential Decision Making
CS 5335	Robotic Science and Systems
EECE 5550	Mobile Robotics
EECE 5554	Robotics Sensing and Navigation

**Machine Learning**

CS 5180	Reinforcement Learning and Sequential Decision Making
CS 6220	Data Mining Techniques
CS 7140 or EECE 7397	Advanced Machine Learning
CS 7150	Deep Learning
DS 5230	Unsupervised Machine Learning and Data Mining
EECE 5612	Statistical Inference: An Introduction for Engineers and Data Analysts
EECE 5644	Introduction to Machine Learning and Pattern Recognition
MATH 7340	Statistics for Bioinformatics

**Knowledge Management and Reasoning**

CS 6120	Natural Language Processing
CS 6200	Information Retrieval
CS 6220	Data Mining Techniques
CS 7290	Special Topics in Data Science

Complete one course from the electives list below or an additional course chosen from the specialization area above, outside of the student's selected specialization area. 4

**COURSEWORK OPTION**

Code	Title	Hours
Complete 12 semester hours from the electives or specialization course lists. Students can take up to one course from any Khoury College 5000–6000-level course.		12

**THESIS OPTION**

Code	Title	Hours
CS 8674	Master's Project	4
CS 7990	Thesis	4
Complete 4 semester hours from the electives or specialization course lists.		4

**Electives List**

Code	Title	Hours
CS 7180	Special Topics in Artificial Intelligence	
CS 8674	Master's Project	
EECE 7337	Information Theory	
GSND 5110	Game Design and Analysis	
PHIL 5010	AI Ethics	

1

If students take both interaction core courses, one may count as an elective.

**Program Credit/GPA Requirements**

32 total semester hours required

Minimum 3.000 GPA required