Artificial Intelligence, MS (Boston)

The Master of Science in Artificial Intelligence provides a comprehensive framework encompassing foundational algorithms, theory, and practical applications in the rapidly evolving field of AI. This program offers students the essential knowledge and skills to design, develop, and implement AI systems across various high-demand sectors. The core curriculum is designed to provide in-depth understanding of fundamental AI concepts, forming a solid foundation for both theoretical and practical aspects of artificial intelligence.

Building on this strong foundation, students can delve into advanced AI applications through interdisciplinary concentrations tailored to industry needs. These concentrations include computer vision, continuous process engineering, machine learning, and robotics and agent-based systems.

The master's in artificial intelligence is an interdisciplinary degree offered by Khoury College of Computer Sciences and the College of Engineering. Descriptions of the concentrations offered in this degree are as follows:

- Computer Vision—College of Engineering
  - The computer vision concentration offers students the knowledge and skills to drive innovation at the intersection of new and emerging vision systems and AI, through utilizing AI and machine learning solutions for a wide range of applications including image enhancement/restoration, object recognition, navigation, graphics rendering, and pattern classification.
- Continuous Process Engineering—College of Engineering
  - The continuous process engineering concentration offers students the knowledge and skills to revolutionize how industrial processes are designed, monitored, and optimized. The program aims to prepare students to utilize AI and machine learning solutions to enhance process efficiency, predictive maintenance, and real-time decision making in industries such as chemicals, pharmaceuticals, and energy. Graduates will be prepared to integrate AI-driven solutions into continuous manufacturing environments to improve safety, sustainability, and productivity.
- Energy Systems—College of Engineering
  - The energy systems concentration offers students the knowledge and skills to drive innovation in sustainable and intelligent energy systems. Students examine how to utilize AI and machine learning solutions to support smart energy grid operations, integrate renewable energy sources, and create responsive and resilient systems.
- Machine Learning—Khoury College of Computer Sciences
  - The goal of the machine learning concentration is to provide students with practical, hands-on experience in designing, implementing, and optimizing machine learning models for real-world applications. The curriculum positions graduates to pursue roles that leverage AI to drive innovation and efficiency in a wide variety of industries and domains.
- Robotics and Agent-Based Systems—Khoury College of Computer Sciences
  - The goal of the robotics and agent-based systems concentration is to provide students with expertise in designing and developing intelligent robotic systems and autonomous agents capable of performing complex tasks in dynamic environments. The curriculum positions graduates to pursue roles that contribute to innovations in automation, human-robot interaction, and intelligent systems design.

Students are admitted to the college associated with their concentration, and their degree is awarded by that college. Students will follow all policies associated with their college of admission.

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:

Code	Title	Hours
CS 5100	Foundations of Artificial Intelligence	4
CS 5130	Applied Programming and Data Processing for AI	4
DADS 5200	Mathematics for Machine Learning	4
or DS 5020	Introduction to Linear Algebra and Probability for Data Science	
EECE 5644	Introduction to Machine Learning and Pattern Recognition	4
or DADS 7275	Machine Learning and Data Analytics	

Concentrations

Complete one of the following concentrations:

- Computer Vision (p. 2)—College of Engineering
- Continuous Process Engineering (p. 2)—College of Engineering
- Energy Systems (p. 3)—College of Engineering
- Machine Learning (p. 3)—Khoury College of Computer Sciences
- Robotics and Agent-Based Systems (p. 3)—Khoury College of Computer Sciences

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

COMPUTER VISION CONCENTRATION—COLLEGE OF ENGINEERING

Code	Title	Hours
Complete 8 semester hours from the following:		8
EECE 5550	Mobile Robotics	
EECE 5554	Robotics Sensing and Navigation	
or ME 5554	Robotics Sensing and Navigation	
EECE 5614	Reinforcement Learning and Decision Making Under Uncertainty	
EECE 5639	Computer Vision	
EECE 5642	Data Visualization	
Complete 4 semester hours from the following:		4
EECE 5645	Parallel Processing for Data Analytics	
EECE 7370	Advanced Computer Vision	
EECE 7397	Advanced Machine Learning	
EECE 7398	Advanced Special Topics in Electrical and Computer Engineering	
Capstone		
EECE 7945	Master's Project	4

CONTINUOUS PROCESS ENGINEERING CONCENTRATION—COLLEGE OF ENGINEERING

Code	Title	Hours
Students without a chemical engineering degree are advised to choose the 510X courses, which serve as a bridge from other degrees.		
Complete 8 semester hours from the following:		8
CHME 5101 and CHME 5102	Fundamentals of Chemical Engineering: Fluid, Heat, and Mass Transfer and Fundamentals of Chemical Engineering: Thermodynamics and Kinetics	
CHME 5510 and CHME 5515	Fundamentals in Process Safety Engineering and Process Safety Engineering for Biotechnology and Pharmaceutical Industries	
CHME 7600 and CHME 7601	Pharmaceutical Engineering I and Pharmaceutical Engineering II	
Complete 4 semester hours from the following:		4
CHEM 5641 and CHME 7901	Computational Chemistry and Journal Club in Chemical Engineering	
CHME 5137	Computational Modeling in Chemical Engineering	
CHME 5520	Designing for Process Safety	
CHME 5649	Numerical Strategies and Data Analytics for Chemical Sciences	
IE 7270	Intelligent Manufacturing	
PHIL 5010	AI Ethics	
PHSC 5900	AI in Drug Discovery and Development	
Capstone		
CHME 6580	Artificial Intelligence for Process Engineering Capstone	4

ENERGY SYSTEMS CONCENTRATION—COLLEGE OF ENGINEERING

Code	Title	Hours
Complete 12 semester hours from the following:		12
CHME 5621	Electrochemical Engineering	
CHME 5692	Carbon Capture, Utilization, and Storage	
ENSY 5000	Fundamentals of Energy System Integration	
ENSY 5700	Renewable Energy Development	
ENSY 5800	Applications of Artificial Intelligence in Energy Systems	
MATL 6270	Principles, Devices, and Materials for Energy Storage and Energy Harvesting	
ME 5374	Special Topics in Mechanical Engineering	
ME 6200	Mathematical Methods for Mechanical Engineers 1	
PHIL 5010	AI Ethics	
Capstone		
ME 7945	Master's Project	4

MACHINE LEARNING CONCENTRATION—KHOURY COLLEGE OF COMPUTER SCIENCES

Code	Title	Hours
CS 5800	Algorithms	4
Complete 8 semester hours from the following:		8
CS 5180	Reinforcement Learning and Sequential Decision Making	
CS 5330	Pattern Recognition and Computer Vision	
CS 6120	Natural Language Processing	
CS 6200	Information Retrieval	
CS 6220	Data Mining Techniques	
CS 7140	Advanced Machine Learning	
CS 7150	Deep Learning	
CS 7180	Special Topics in Artificial Intelligence	
Capstone		
Complete 4 semester hours from the following:		4
CS 6170	AI Capstone	
CS 8674	Master's Project	

ROBOTICS AND AGENT-BASED SYSTEMS CONCENTRATION—KHOURY COLLEGE OF COMPUTER SCIENCES

Code	Title	Hours
CS 5800	Algorithms	4
Complete 8 semester hours from the following:		8
CS 5180	Reinforcement Learning and Sequential Decision Making	
CS 5335	Robotic Science and Systems	
EECE 5550	Mobile Robotics	
EECE 5554	Robotics Sensing and Navigation	
Capstone		
Complete 4 semester hours from the following:		4
CS 6170	AI Capstone	
CS 8674	Master's Project	