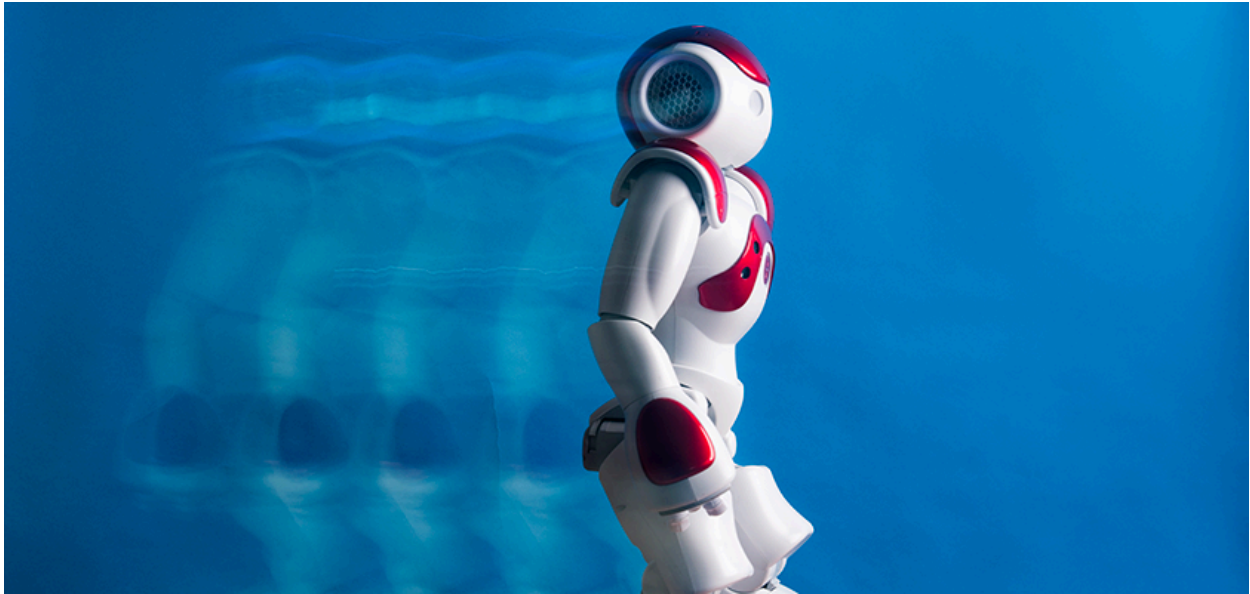


School of Engineering

Department of Computer Science

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MS in Artificial Intelligence



The Department of Computer Science and the Department of Electrical and Computer Engineering offer a Master's of Science in Artificial Intelligence degree, which can be completed on a full-time or part-time schedule.

Designed for students with a background in computer science, mathematics, or a related technical field, the curriculum covers AI concepts and techniques — including machine learning, deep learning, natural language processing, computer vision, and knowledge representation.

The program offers a core curriculum and department-specific tracks to help students understand, implement, and deploy a wide range of AI technologies. The degree requires a minimum of 30 credits and the fulfillment of at least 10 courses; all courses must be at the 100 level or above.

The core curriculum covers in-depth concepts in artificial intelligence, machine learning, ethics, and mathematics. All MS in Artificial Intelligence students must complete the following four courses:

Artificial Intelligence

- CS 131 Artificial Intelligence

Machine Learning

- CS 135 Introduction to Machine Learning and Data Mining, or
- EE 143/CS 144 Iterative Methods in Machine Learning

Ethics

- CS 239 Ethics for AI, Robotics, and Human-Robot Interaction

Probability, Statistics, and Mathematics

- EE 104 Probabilistic Systems Analysis, or
- Math 165 Probability, or
- Math 166 Statistics, or
- EE 140 Stochastic Processes, Detection, and Estimation

The MSAI – Computer Science track focuses on the principles and applications of machine learning and artificial intelligence from a computational perspective, with a strong emphasis on the broader social context in which AI technologies are developed and deployed.

This track requires one track-specific course, four AI breadth electives, and one general elective. As there are many possible paths through the program, the choice of electives is broad, and students will select appropriate electives with the advice of their advisor. The electives may include an additional ethics/social context course, if both the student and advisor feel that is appropriate.

Required Course

- AI Foundations and Knowledge Representations

Breadth Electives (Pick four)

- CS 119 Big Data
- CS 132 Computer Vision
- CS 133 Human-Robot Interaction
- CS 136 Statistical Pattern Recognition
- CS 137 Deep Neural Networks
- CS 138 Reinforcement Learning
- CS 141 Probabilistic Robotics for HRI
- CS 142 Network Science
- CS 143/EE 130 Distributed ML and Control
- CS 157 Special Topics in AI
- CS 166 Computational Systems Biology
- CS 167/BME 167 Computational Biology
- CS 168/EE 109 Convex Optimization or CS 268/EE 159 Advanced Optimization
- CS 169 Statistical Bioinformatics
- CS 236 Computational Learning Theory
- Math 123 Mathematical Aspects of Data Analysis
- Up to one additional course on ethics and social impact, such as:
 - CS 155 Special Topics in Social Context of Computing
 - CS 182/DHP P236 Cyber in the Civilian Sector: Threats and Upheavals
 - CS 183/DHP P237 Privacy in the Digital Age
 - CS 184/ILO 184 Cyberlaw and Cyberpolicy
 - CS 185 Computing for Developing Regions
 - EE 185 Societal Aspects of Design
 - DS 143/ME 173 Data Science for Sustainability

General Elective (Pick one)

- Any CS, DS, EE, or Math course numbered 100 or above, or as approved by an advisor.

The MSAI – Electrical and Computer Engineering track integrates principles of machine learning and artificial general intelligence with specialized

engineering domain knowledge, covering both fundamental and systems concepts in AI and how to apply these methods to diverse domains.

This track requires one track-specific course, four courses from theory/systems electives and two courses from domain-specific electives. The theory/systems track focuses on foundational and theoretical aspects that include basic concepts, techniques, algorithms and methods, and systems engineering concepts that aim to develop specialized hardware to efficiently run modern AI algorithms. The goal of the domain-specific elective track is to expose students to AI challenges across multiple disciplines.

Required Course

- EE 141 Trusted and Responsible AI

Theory/Systems Electives (Pick four)

- CS 136 Statistical Pattern Recognition
- CS 137 Deep Neural Networks
- CS 236 Computational Learning Theory
- EE 109/CS 168 Convex Optimization or EE 159/CS 268 Advanced Optimization
- EE 127 Information Theory
- EE 130/CS 143 Distributed ML and Control
- EE 140 Stochastic Processes
- EE 152 Real-time Embedded Systems
- EE 153 Networked Embedded Systems
- EE 155 Parallel Computing
- EE 157 Emerging Memory Systems
- EE 193 High-dimensional Probability
- EE 193 Hardware and Systems for Machine Learning
- Math 123 Mathematical Aspects of Data Analysis
- Probabilistic Machine Learning
- Causal Inference
- Dynamic Programming
- Graph Neural Networks and Graph Signal Processing

Domain-specific Electives (Pick two)

- CS 119 Big Data

- CS 132 Computer Vision
- CS 133 Human-Robot Interaction
- CS 138 Reinforcement Learning
- CS 141 Probabilistic Robotics for HRI
- CS 142 Network Science
- CS 166 Computational Systems Biology
- CS 167/BME 167 Computational Biology
- CS 169 Statistical Bioinformatics
- EE 107 Communication Systems
- EE 108 Wireless Communications
- EE 114 Physics of Solar Cells
- EE 127/CS 149 Information Theory
- EE 129 Computer Communication Networks
- EE 193 Digestible Electronics

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