

# ARTIFICIAL INTELLIGENCE (MS)

The MS in Artificial Intelligence degree provides students with the foundational knowledge and technical skills to design and implement artificial intelligence machines and autonomous systems. Students will gain a deep understanding of advanced concepts and techniques in AI, and will learn core relevant areas including machine learning, vision computing, natural language processing, robotics and cognitive science. The degree prepares students for professional careers as AI/ML engineers or research scientists, managing intelligent systems development and design.

Program Requirements	Quarter Hours
Introductory Courses	0-24
Degree Requirements	52
<b>Total hours required</b>	<b>52-76</b>

## Learning Outcomes

Students will be able to:

- Analyze and design architectures for intelligent agents to solve a specific real-world problem.
- Explain core concepts of advanced machine learning techniques and AI algorithms including, for instance, heuristic search, logical reasoning, supervised and unsupervised learning, deep learning, classification methods, Bayesian networks, natural language processing and image analysis.
- Identify and combine AI techniques and approaches to solve a specific problem and to develop a modern intelligent application.
- Use programming skills to implement an AI enabled system in a specific domain.
- Explain and define categories of ethical dilemmas posed by the coming revolution in intelligent and autonomous computing systems.
- Work independently or in a small team to design and develop an intelligent computer system.
- Read and present research papers.
- Communicate effectively the core concepts of an intelligent computer system to a non-technical audience.

## Degree Requirements

### Course Requirements

No Introductory Course may be substituted for any other course at any level.

#### Introductory Courses

Introductory courses may be waived for any of the following conditions:

- The student has the appropriate course work to satisfy an Introductory Course.
- The student has appropriate and verified professional experience to satisfy an Introductory Course.
- If an exam is available, the student passes a Graduate Assessment Examination (GAE) in the Introductory Course area.

Course	Title	Quarter Hours
CSC 400	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	4
CSC 401	INTRODUCTION TO PROGRAMMING	4
CSC 402	DATA STRUCTURES I	4
CSC 403	DATA STRUCTURES II	4
CSC 412	TOOLS AND TECHNIQUES FOR COMPUTATIONAL ANALYSIS	4
IT 403	STATISTICS AND DATA ANALYSIS	4

### Required Courses

Course	Title	Quarter Hours
CSC 421	APPLIED ALGORITHMS AND STRUCTURES	4
CSC 480	ARTIFICIAL INTELLIGENCE I	4
CSC 481	INTRODUCTION TO IMAGE PROCESSING	4
CSC 484	ETHICS IN ARTIFICIAL INTELLIGENCE	4
CSC 578	NEURAL NETWORKS AND DEEP LEARNING	4
CSC 580	DESIGN OF OBJECT-ORIENTED LANGUAGES,ARTIFICIAL INTELLIGENCE II	4
CSC 583	NATURAL LANGUAGE PROCESSING	4
CSC 587	COGNITIVE SCIENCE	4
DSC 540	ADVANCED MACHINE LEARNING	4

### Major Electives

Course	Title	Quarter Hours
Choose two (2) from the following list:		8
CMNS 549	SPECIAL TOPICS IN ORGANIZATIONAL COMMUNICATION	
CSC 458	SYMBOLIC PROGRAMMING	
CSC 475	INTRODUCTION TO ROBOTICS	
CSC 482	APPLIED IMAGE ANALYSIS	
CSC 528	COMPUTER VISION	
CSC 555	MINING BIG DATA	
CSC 575	INTELLIGENT INFORMATION RETRIEVAL	
CSC 577	RECOMMENDER SYSTEMS	
CSC 594	TOPICS IN ARTIFICIAL INTELLIGENCE	
CSEC 440	INFORMATION SECURITY MANAGEMENT (FORMERLY CNS 440)	
DSC 450	DATABASE PROCESSING FOR LARGE-SCALE ANALYTICS	
DSC 480	SOCIAL NETWORK ANALYSIS	
DSC 478	PROGRAMMING MACHINE LEARNING APPLICATIONS	

### Open Elective

Course	Title	Quarter Hours
Student must complete one (1) advisor-approved graduate course from the School of Computing in the range of 421-699.		4

**Capstone Requirement**

<b>Course</b>	<b>Title</b>	<b>Quarter Hours</b>
CSC 675 or CSC 695	CAPSTONE IN ARTIFICIAL INTELLIGENCE MASTER'S RESEARCH	4