

M.S. in Artificial Intelligence

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The M.S. program in Artificial Intelligence (<https://ds.njit.edu/ms-artificial-intelligence/>) acclimates students to the ongoing AI revolution that has already produced computer programs with problem-solving and content-generating abilities that complement and enhance human abilities. The program offers theoretical and practical knowledge in various areas of AI, including Natural Language Understanding and Generation, Image Understanding, Reasoning, and Planning. It empowers students to apply AI techniques in a wide range of application domains.

Prerequisites

Applicants should have a bachelor's degree in the general area of Computing, from an accredited University. Applicants with a bachelor's degree in STEM or related professional experience can start with the graduate certificate (<https://cs.njit.edu/graduate-certificates/>) and then apply to the M.S. program. Further information can be found in the program's webpage (<https://ds.njit.edu/ms-artificial-intelligence/>).

Degree Requirements

The program requires the completion of 30 credits. These are satisfied by taking 10 courses, as indicated in the following table.

Code	Title	Credits
Core Courses		
Select at least four of the following:		
DS 644	Introduction to Big Data	
DS 669	Reinforcement Learning	
CS 670	Artificial Intelligence	
DS 675	Machine Learning	
DS 677	Deep Learning	
DS 680	Natural Language Processing	
DS 789	Trustworthy Artificial Intelligence	
After the 4 core courses are completed, any of the remaining core courses listed can count towards the elective requirements.		
Elective Courses		
CS 634	Data Mining	
CS 659	Image Processing and Analysis	
CS 681	Computer Vision	
CS 732	Advanced Machine Learning	
CS 735	High Performance Data Analytics	
CS 782	Pattern Recognition and Applications	
DS 637	Python and Mathematics for Machine Learning *	
DS 786	Selected Topics in Data Science	
ECE 776	Information Theory	
MATH 662	Probability Distributions	
MATH 663	Introduction to Biostatistics	
MATH 665	Statistical Inference	
MATH 678	Statistical Methods in Data Science	
ME 625	Introduction to Robotics	
MGMT 735	Deep Learning in Business	
Project and Thesis Courses		
DS 700B	Master's Project	
DS 701B	Master's Thesis	

* DS 637 is recommended as an introductory course, offering a review of mathematics for machine learning to students with a limited background in mathematics or programming.

Students in the Master of Science in Artificial Intelligence (MSAI) program must successfully complete 30 credits based on any of the following options:

Courses (30 credits)

Courses (27 credits) + MS Project (3 credits)

Courses (24 credits) + MS Thesis (6 credits)

Independent of the chosen option, 4 out of 7 core courses are required (detailed below).

If a student chooses the MS thesis option, the thesis must be related to Artificial Intelligence and requires approval from the Program Director.

Students may choose an elective outside the list after approval of their respective advisor.

M.S. in Artificial Intelligence

Core Course Requirements

Students are required to take four (4) core courses from the following list.

Code	Title	Credits
DS 675	Machine Learning	3
DS 680	Natural Language Processing	3
DS 669	Reinforcement Learning	3
DS 789	Trustworthy Artificial Intelligence	3
DS 677	Deep Learning	3
CS 670	Artificial Intelligence	3
CS 634	Data Mining	3

Electives

Sample course sequence M.S. in Artificial Intelligence

Year 1 Fall:

- CS 675 Machine Learning
- CS 634 Data Mining
- CS 670 Artificial Intelligence

Year 1 Spring:

- DS 677 Deep Learning
- DS 680 Natural Language Processing
- DS 669 Reinforcement Learning

Year 2 Fall:

- DS 789: Trustworthy AI
- Free elective or Master project course
- Free elective

Year 2 Spring:

- Free elective or Master thesis course
- Free elective or Master project course
- Free elective

The requirements for the MS in Artificial Intelligence program are as follows:

- 30 credits are required, which can be satisfied by any one of the following approaches:
 - o Courses only (30 credits)
 - o Courses (27 credits) + MS Project (3 credits)
 - o Courses (24 credits) + MS Thesis (6 credits)

- Four out of seven core courses are required

If a student chooses to work on an MS project or an MS thesis, the project or thesis must be related to Artificial Intelligence.

Admission Requirements

To be eligible for admission, a student must have a Bachelor of Science degree with a minimum GPA of 3.0 on a 4.0 scale and have completed the following undergraduate coursework:

- Calculus I and II (equivalent to the NJIT courses Math 111 and Math 112)
 - o Derivatives, integrals, applications
 - o Business calculus may suffice and will be considered on a case by case basis
- Introduction to Programming (equivalent to the NJIT CS 113 course)
 - o Basic programming constructs, writing and debugging programs, iteration, recursion, arrays, lists
- Data Structures and Algorithms (equivalent to the NJIT CS 114 course)
 - o Basic data structures (lists, arrays, hash tables), search and sort, algorithm analysis
- Probability and Statistics (equivalent to the NJIT Math 333 course)
 - o Random variables, probability distributions, sample mean and variance
 - o Basic probability or statistics course separately will also suffice
- Linear Algebra (equivalent to the NJIT Math 337 course)
 - o Vector spaces, dot products, Euclidean norm, matrices

International students will have to take TOEFL and GRE exams and meet the minimum requirements for admission to graduate programs at NJIT as per the NJIT policy.

Students who do not meet all of the above requirements but hold a BS or BA a degree in a technical scientific subject will be evaluated on a case-by-case basis and may be admitted to the program after they successfully complete a relevant graduate certificate.

Core Course Requirements

Students are required to take four (4) core courses from the following list.

Code	Title	Credits
DS 675	Machine Learning	3
DS 680	Natural Language Processing	3
DS 669	Reinforcement Learning	3
DS 789	Trustworthy Artificial Intelligence	3
DS 677	Deep Learning	3
CS 670	Artificial Intelligence	3
CS 634	Data Mining	3

Electives

Students will have a wide array of Artificial Intelligence-related electives to choose from. Students would have to take required pre-requisites or seek approval of instructor for the elective courses.