

# ARTIFICIAL INTELLIGENCE, MASTER OF SCIENCE

## Admission Requirements

Applicants (degree-seeking and special students) must meet the general requirements for admission (<https://e-catalogue.jhu.edu/engineering/engineering-professionals/admission-requirements/>) to graduate study. In addition, applicants for the Master of Science in Artificial Intelligence will likely have prior educational experience that includes an undergraduate or graduate degree in engineering or computer science. The applicant's prior education must include the following prerequisites:

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1. Three semesters or five quarters of calculus, which includes multivariate calculus;
2. One semester/term of linear algebra;
3. One semester/term of probability and statistics;
4. One semester/term in a programming language such as Python;
5. One semester/term of advanced programming such as Data Structures.

Applicants whose prior education does not include the prerequisites listed above may still enroll under provisional status, followed by full admission status once they have completed the missing prerequisites. Missing prerequisites may be completed with Johns Hopkins Engineering (all prerequisites are available) or at another regionally accredited institution. These prerequisite courses do not count toward the degree or certificate requirements. Transcripts from all college studies must be submitted. When reviewing an application, the candidate's academic and professional background will be considered.

If you are an international applicant (<https://e-catalogue.jhu.edu/engineering/engineering-professionals/admission-requirements/>), you may have additional admission requirements.

## Program Requirements

In order to earn a Master of Science in Artificial Intelligence, the student must complete ten graduate-level courses (30 credits) within five years. The curriculum consists of four core courses (12 credits) and six elective courses (18 credits) from the course lists below. Three courses (9 credits) must be taken at the 700-level. Only one C-range grade (C+ C, C-) can count toward the master's degree. All course selections outside of the Artificial Intelligence program requirements are subject to advisor approval.

Non-degree students in Artificial Intelligence should consult with their advisor to determine which courses must be successfully completed before 600- or 700-level courses may be taken.

## Prerequisite Courses

Code	Title	Credits
<b>Prerequisite Courses (or approved equivalent) <sup>1</sup></b>		
EN.625.108	Calculus I	0
EN.625.109	Calculus II	0
EN.605.206	Introduction to Programming Using Python	3
EN.605.202	Data Structures <sup>2</sup>	3

EN.625.240	Introduction to Probability and Statistics	3
EN.625.250	Multivariable Calculus and Complex Analysis	3
EN.625.252	Linear Algebra and Its Applications	3

<sup>1</sup> Applicants whose prior education does not include the prerequisites listed under Admission Requirements may enroll under provisional status, followed by full admission once they have completed the missing prerequisites. All prerequisite courses are available at Johns Hopkins Engineering. These courses do not count toward the degree or certificate requirements.

<sup>2</sup> Any comparable second semester Python programming course can be substituted for Data Structures.

## Core Courses

Code	Title	Credits
<b>A total of 4 core courses are required <sup>1</sup></b>		
EN.705.621	Introduction to Algorithms	3
<b>OR</b>		
EN.685.621	Algorithms for Data Science	3
<b>Followed by these 3 courses</b>		
EN.705.601	Applied Machine Learning	3
EN.705.603	Creating AI-Enabled Systems	3
EN.605.645	Artificial Intelligence	3

<sup>1</sup> One or more core courses can be waived by the student's advisor if a student has received an A or B in equivalent graduate courses. In this case, the student may replace the waived core courses with the same number of other graduate Artificial Intelligence courses and may take these courses after all remaining core course requirements have been satisfied.

## Electives

Code	Title	Credits
<b>Take at least 6 of the following courses</b>		
EN.705.604	Optimizing and Deploying Scalable AI Systems	3
EN.705.612	Values and Ethics in Artificial Intelligence	3
EN.705.615	Artificial Intelligence for Leaders	3
EN.705.640	Cognitive and Behavioral Foundations for Artificial Intelligence	3
EN.705.643	Deep Learning Developments with PyTorch	3
EN.705.651	Large Language Models: Theory and Practice	3
EN.705.741	Reinforcement Learning	3
EN.705.742	Advanced Applied Machine Learning	3
EN.705.743	ChatGPT from Scratch: Building and Training Large Language Models	3
EN.605.613	Introduction to Robotics	3
EN.605.617	Introduction to GPU Programming	3
EN.605.624	Logic: Systems, Semantics, and Models	3
EN.605.633	Social Media Analytics	3
EN.605.634	Crowdsourcing and Human Computation	3
EN.605.635	Cloud Computing	3
EN.605.646	Natural Language Processing	3
EN.605.647	Neural Networks	3
EN.605.649	Principles and Methods in Machine Learning	3

EN.605.662	Data Visualization	3
EN.605.716	Modeling and Simulation of Complex Systems	3
EN.605.724	Applied Game Theory	3
EN.605.742	Deep Neural Networks	3
EN.605.743	Advanced Artificial Intelligence	3
EN.605.745	Reasoning Under Uncertainty	3
EN.605.746	Advanced Machine Learning	3
EN.605.747	Evolutionary and Swarm Intelligence	3
EN.695.637	Introduction to Assured AI and Autonomy	3
EN.645.651	Integrating Humans and Technology	3
EN.525.661	UAV Systems and Control	3
EN.525.670	Machine Learning for Signal Processing	3
EN.525.724	Introduction to Pattern Recognition	3
EN.525.733	Deep Learning for Computer Vision	3
EN.525.770	Intelligent Algorithms	3
EN.525.786	Human Robotics Interaction	3
<b>Independent Study</b>		<b>Credits</b>
EN.705.801	Independent Study in Artificial Intelligence I	3
EN.705.802	Independent Study in Artificial Intelligence II	3