

Artificial Intelligence

Artificial intelligence (AI) uses computers and technology to achieve the outcomes of human problem-solving and decision-making abilities. It comprises methods to solve easy problems for humans but hard for digital computers, such as Natural Language Understanding, Natural Language Generation, and Image Understanding.

This program is suitable for many people with a quantitative background or experience dealing with data and who would like to obtain some grounding in artificial intelligence. Examples include software engineers who want to complement their programming skills with Machine Learning and Deep Learning modeling skills, pharmaceutical data analysts who explore the transition from traditional statistical analytics to contemporary deep learning models, and many more.

List of the requirements for the AI certification program are as follows:

12 credits are required, which can be satisfied by:

- o 2 core courses (6 credits)
- o 2 elective courses (6 credits)

Admission Requirements

Applicants should have a bachelor's degree and have some experience with programming and data analytics. Some experience with programming, equivalent to CS 602 (Java), and some experience in data analytics, equivalent to CS 482 (Data Mining).

What are the Courses to be taken?

Students must take a total of four courses, with the following compulsory core courses and elective courses to choose from.

Core courses:

Code	Title	Credits
CS 670	Artificial Intelligence	3
DS 675	Machine Learning	3

Elective courses: Select one application track and choose two elective courses from that selected track.

Code	Title	Credits
1. Data Science		
DS 633	Advances in Representation Learning	3
DS 637	Python and Mathematics for Machine Learning *	3
DS 669	Reinforcement Learning	3
DS 677	Deep Learning	3
DS 680	Natural Language Processing	3
DS 681	Deep Learning for Computer Vision	3
DS 683	Graph Neural Networks	3
DS 685	Artificial Intelligence for Robotics	3
DS 688	Advanced Federated Machine Learning	3
DS 698	Special Emerging Topics	3
DS 732	Theoretical Foundation of Machine Learning	3
or CS 732	Advanced Machine Learning	
DS 786	Selected Topics in Data Science	3
DS 789	Trustworthy Artificial Intelligence	3
2. Computer Science		
CS 634	Data Mining	3
CS 659	Image Processing and Analysis	3
CS 681	Computer Vision	3
CS 782	Pattern Recognition and Applications	3
3. Statistics		
MATH 663	Introduction to Biostatistics	3

MATH 665	Statistical Inference	3
MATH 678	Statistical Methods in Data Science	3
4. Robotics		
ME 625	Introduction to Robotics	3
BME 673	Biorobotics	3
BME 676	Computational Biomechanics	3
BME 760	Modeling in Func Brain Imaging	3
5. Engineering		
ECE 744	Optimization for Data Engineering	3
ECE 776	Information Theory	3
BME 661	Neural Engineering	3
MTEN 633	Machine Learning for Chemical and Materials Engineers	3
CE 506	Remote Sensing of Environment	3
CE 739	Structural Optimization	3
6. Science		
BIOL 601	Computational Biology I	3
BIOL 635	Intro to Comp Neuroscience	3
BIOL 636	Advanced Comp Neuroscience	3
BIOL 638	Computational Ecology	3
BIOL 672	Computational Systems Biology	3
CHEM 716	Integrated Drug Dev & Discover	3
CHEM 737	Applications of Computational Chemistry and Molecular Modeling	3
7. Business and Management		
FIN 616	Data Driven Financial Modeling	3
ACCT 640	Big Data Analytics for Accounting	3
MGMT 630	Decision Analysis with Quantitative Modeling	3
MGMT 735	Deep Learning in Business	3

* 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.

Sample course sequence:

1. CS 634, CS 670, DS 675, DS 677
2. DS 675, CS 670, DS 669, DS 680
3. CS 670, DS 675, DS 677, CS 681