ARTIFICIAL INTELLIGENCE - GRADUATE CERTIFICATE (ONLINE)

The graduate certificate in Artificial Intelligence (AI) provides students a strong foundation in key AI topics. Students apply Machine Learning (ML) algorithms to real-world data sets; examine ethical issues in the design and implementation of current and future computing systems and technologies; create an appreciation for the tight interplay between mechanism, sensor and control in the design of robotic and intelligent systems; and study vital topics in generative AI reinforcement learning, natural language processing and autonomous systems.

Program Policies

This CU Boulder on Coursera program does not align with standard campus policies. Please refer to the Online Programs (https://catalog.colorado.edu/online/) section of the catalog for more information.

Requirements

The AI graduate certificate requires 12 credit hours of coursework. To earn the certificate, students must complete 4 full specializations from the following courses with a grade of C or higher in each course and a 3.0 cumulative GPA. Each course in a specialization is 1 credit.

Code	Title	Credit Hours
Specializations		
Choose four specializations from the list below:		12
Computing, Ethics and Society		
CSCA 5214	Computing, Ethics, and Society Foundations	
CSCA 5224	Ethical Issues in AI and Professional Ethics	
CSCA 5234	Ethical Issues in Computing Applications	
Natural Language Processing: Deep Learning Meets Linguistics		
CSCA 5832	Fundamentals of Natural Language Processing	
CSCA 5842	Deep Learning for Natural Language Processing	
CSCA 5852	Model and Error Analysis for Natural Language Processing	
Artificial Intelligence		
Reinforcement Learning		
Foundations of Autonomous Systems		
CSCA 5834	Modeling of Autonomous Systems	
CSCA 5844	Requirement Specifications for Autonomous Systems	
CSCA 5854	Verification and Synthesis of Autonomous Systems	
Introduction to Robotics with Webots		
CSCA 5312	Basic Robotic Behaviors and Odometry	
CSCA 5332	Robotic Mapping and Trajectory Generation	
CSCA 5342	Robotic Path Planning and Task Execution	
Generative AI		
CSCA 5112	Introduction to Generative AI	
CSCA 5122	Modern Applications of Generative AI	
CSCA 5132	Advances in Generative AI	
Machine Learning		
CSCA 5622	Introduction to Machine Learning - Supervised Learning	
CSCA 5632	Unsupervised Algorithms in Machine Learning	
CSCA 5642	Introduction to Deep Learning	
Total Credit Hours		**12**

Learning Outcomes

- Students will gain a deep knowledge of AI, machine learning theory and its numerous applications including (but not limited to) natural language processing, computer vision, robotics, healthcare and human-centered computing.
- Students will be able to design and implement comprehensive solutions for practical problems that incorporate the latest AI techniques.
- Students will be able to identify the ethical implications in the design and application of AI technology and contribute to the emerging discussion in these areas as ethical developers of new technologies.
- Students will understand CS foundations, probability/statistics, programming languages and computer systems. Specifically, their knowledge will extend to how ideas from these sub-disciplines of CS support AI systems and vice-versa.
- Students will keep up with the state-of-the-art methods and techniques in this rapidly changing discipline of AI. Students will read and comprehend research papers and consider how the ideas in them can be applied in their everyday practice.