



Course Syllabus

Introduction to Artificial Intelligence

This introductory course provides hands-on experience with Artificial Intelligence concepts, and real-world applications.

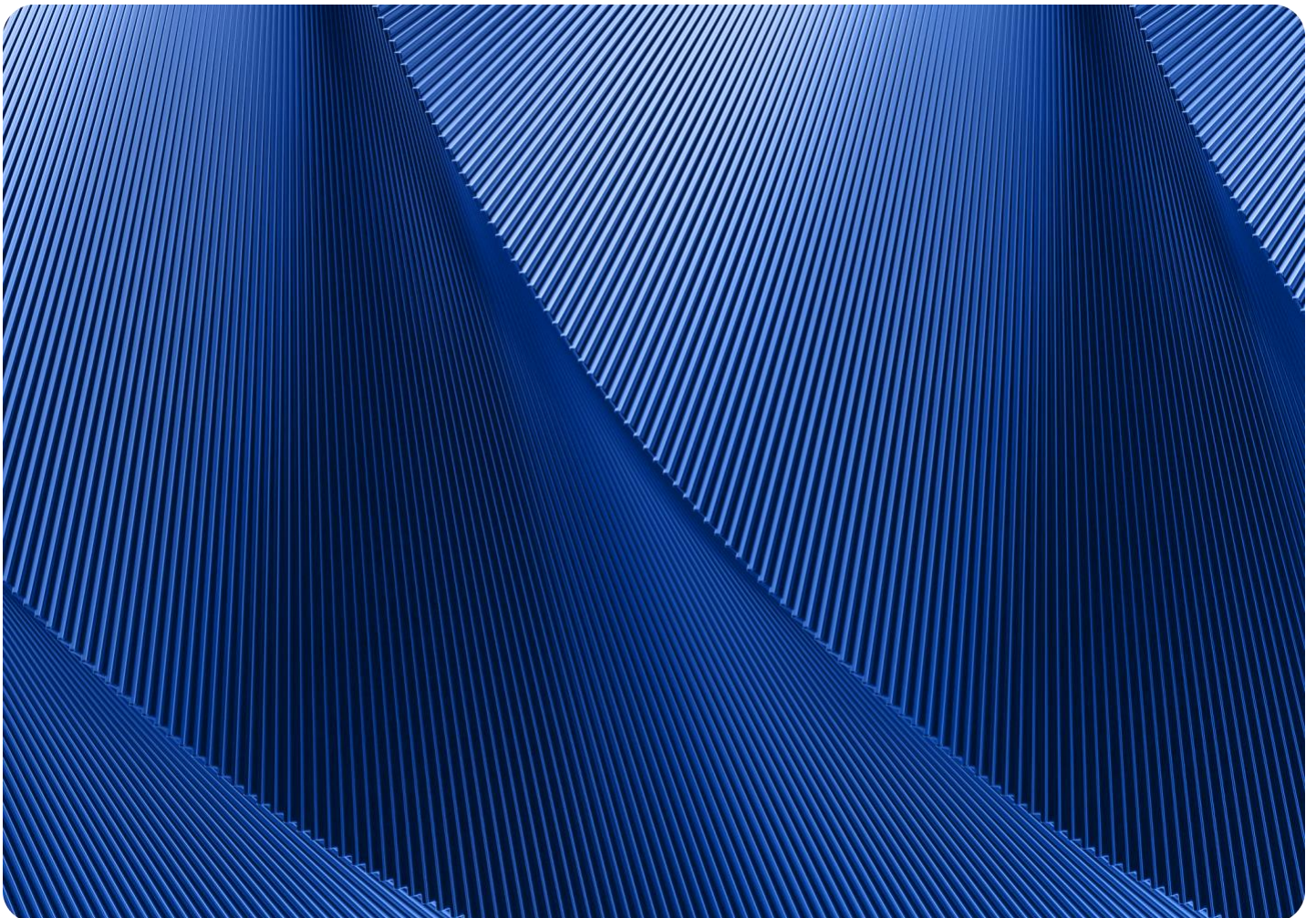




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Course Description

A survey of artificial intelligence (AI) where students explore different technologies utilizing concepts and skills widely accepted for AI and digital competency. Classification algorithms, supervised vs. unsupervised learning, data preparation, and training/using learning models for predictions are presented.

Prerequisites:

Familiarity with computers

High school mathematics

Basic understanding of statistics



Course Competencies

Competency 1
Student will examine the field of AI and machine learning by:
<ul style="list-style-type: none"> a) Describing Digital Literacy, Practical Functional Digital Skill, Digital Collaboration, Curating Information, and Data Sources – Internet of Things b) Describing the history of AI c) Describing and using the AI project cycle d) Identifying supervised vs. unsupervised learning, neural networks and discovering their application e) Researching enterprise applications of AI and implementation readiness such as computing scalability, technical tradeoffs, and data pipelines
Competency 2
The student will demonstrate an understanding of ethical and legal considerations in AI by:
<ul style="list-style-type: none"> a) Defining key vocabulary terms related to computing ethics such as algorithmic privacy and algorithmic fairness b) Identifying and explaining issues in computing ethics at the levels of system development, implementation, and administration
Competency 3
The student will explore data sets by:
<ul style="list-style-type: none"> a) Defining and describing data, data acquisition, data visualization, and data transformation b) Identifying data sources and their production c) Using and manipulating data sets to train learning models
Competency 4
The student will explore machine-learning algorithms for classification by:
<ul style="list-style-type: none"> a) Describing classification algorithms including linear classifiers, support vector machines, quadratic classifiers, kernel estimation (k-nearest neighbor), decision trees, and neural networks b) Reproducing linear classifiers, support vector machines, k-nearest neighbor, and neural net learning models using Python

Competency 5

The student will examine computer vision and facial recognition by:

- a) Explaining computer vision and facial recognition, image segmentation, object and motion detection and object classification

Competency 6

The student will examine Natural Language Processing by:

- a) Defining and explaining machine translation, sentiment analysis, application of deep learning to NLP, speech recognition, and synthesis
- b) Reproducing Chatbots using Python

Competency 7

The student will examine Robotic Sensing and Manipulation by:

- a) Defining and explaining robotics, sensing and manipulation, human-robot interaction, navigation and path planning, reinforcement learning, and autonomous vehicle technologies and impacts



Instructional Resources

No prescribed textbook is required due to the rapidly evolving nature of artificial intelligence tools, frameworks, and best practices. Instructors will curate up-to-date articles, tutorials, documentation, and other resources available to provide the latest advancements and diverse perspectives. This approach ensures flexibility to tailor content to class needs and incorporate emerging topics and industry practices.

Platforms and Tools:

Kaggle, Google Colab, Orange Data Mining

Recommended Reading:

- *Artificial Intelligence: A Modern Approach*, 4th US ed., Peter Norvig
- *Artificial Intelligence Basics: A Non-Technical Introduction*, Tom Taulli
- *Artificial Intelligence: A Guide for Thinking Humans*, Melanie Mitchell

Grading Schema

Assignment Type	Percentage of Grade
Assignments	20%
Discussions	10%
Projects	40%
Attendance	10%
Quizzes	20%

Course Outline

Week starting on / Module	Module Topic
Week 1	Demystifying AI and Syllabus Overview
Week 2	AI and Technology
Week 3	Domains of AI
Week 4	Elements of Machine Learning
Week 5	Data – Fuel for AI
Week 6	Natural Language Processing (NLP)
Week 7	Generative AI
Week 8	Computer Vision
Week 9	Python for AI
Week 10	AI Project I (Statistical Data Analysis)
Week 11	AI Project II (Natural Language Processing)
Week 12	AI Project III (Computer Vision)