

CSC-350: Artificial Intelligence Syllabus

General Information

Course Number	CSC-350
Credit Hours	2+1 (Theory Credit Hour = 2, Lab Credit Hours = 1)
Prerequisite	None
Course Coordinator	Not Specified

Course Objectives

This is an introductory course on Artificial Intelligence. The topics may include: AI methodology and fundamentals; intelligent agents; search algorithms; neural networks; knowledge-based systems; knowledge representation schemes; reasoning in AI; Inference techniques; natural language processing. Several assignments will be given to enable the student to gain practical experience in using these techniques.

Catalog Description

CSC-350

Course Content

Week	Topic	Classwork/Presentations Assignments	Readings
1-2	Introduction to Python Variables If, elif, else Loops Python Collections: list, tuple, set, dict Fundamentals of OOP in Python		R&N: Chapter 1 Luger: Chapter 1

	<p>Numpy</p> <ul style="list-style-type: none"> • Creating Arrays • Array Properties • Array Operations • Array Indexing and Slicing <p>Pandas</p> <ul style="list-style-type: none"> • Loading Data • Selecting Data • Modifying Data 		
3-4	<p>Introduction to Intelligence</p> <p>History of AI</p> <p>Introduction to AI</p> <p>What is Intelligence?</p> <p>Characteristics of Intelligence</p> <p>What do people in AI think about Intelligence?</p> <p>Characterizing AI Systems</p> <p>Distinctions Think vs. Act</p> <p> Cognitive Science</p> <p>Distinctions Rational vs. Human</p> <p>Common Misconceptions</p> <p>Assumptions behind AI research</p> <p>Goals of AI Research</p> <p> Engineering Goal</p> <p> Scientific Goal</p> <p>Is AI Possible?</p> <p>Turing Test</p>		Online Resources
5-6	<p>Introduction to Machine Learning</p> <p>What is Machine Learning</p> <p>Types of Machine Learning</p> <ul style="list-style-type: none"> • Supervised Learning • Unsupervised Learning • Reinforcement Learning <p>Applications of Machine Learning</p> <p>Classification Problems</p> <p> What is Classification Problem</p> <p> Types of Classification:</p> <ul style="list-style-type: none"> • Binary 	Assignment Class work	

	<ul style="list-style-type: none"> • Multi-Class • Multi-Label <p>Evaluation Metrics: Accuracy, F1 Score</p> <p>Problem of Learning</p>		
--	---	--	--

7-8	<p>Regression Problems</p> <p>What is Regression?</p> <p>Types of Regression:</p> <ul style="list-style-type: none"> • Simple Linear Regression • Multiple Linear Regression • Polynomial Linear Regression • Logistic Regression (for classification) <p>Evaluation Metrics:</p> <ul style="list-style-type: none"> • MSE, MAE, R2_Score 		<p>R&N: Chapter 2</p> <p>Luger: Chapter 2</p>
9-10	<p>Problem of Learning</p> <p>Learning Process:</p> <ul style="list-style-type: none"> • Training Data • Test Data <p>Underfitting vs Overfitting</p> <p>Gradient Descent Algorithm</p> <p>Introduction to Regularization</p>		<p>R&N: Chapter 3</p> <p>Luger: Chapter. 3</p>
11	<p>Introduction to Neural Networks</p> <p>Artificial Neural networks</p> <ul style="list-style-type: none"> • Perceptron • Weights & Biases • Input Layers, Hidden Layers, Output Layer 	<p>Assignment</p> <p>Class work</p>	<p>R&N: Chapter 4</p> <p>Luger: Chapter 4</p>
12	<p>Introduction to Convolutional Neural Networks</p> <p>CNN basics and classification</p> <p>ANN vs CNN</p> <p>CNN applications</p> <p>Using Pre-trained model in Google Colab</p>		<p>R&N: Chapter 7</p> <p>Luger: Chapter 7</p>

13	Agent What is Agents? Types of Agents Simple reflex agents Reflex agents with state/model Goal-based agents		
14	Utility-based agents Agents Environment Properties of Environment Architecture Rationality Autonomy Single and multi-agent		
15	Uninformed Search Introduction State Space search (Classical Search Problem) Example of shortest path Breadth First Search (Blind) Depth First Search (Blind) Informed Search Heuristic Search (A*) Best First Search	Assignment Class work	R&N: Chapter 9&10 Luger: Chapter 7&13
16	Project Submission	Assignment Class work	R&N: Chapter 10 Luger: Chapter 7

Text Book

1. S. Russell and P. Norvig, “Artificial Intelligence: A Modern Approach”, 3rd Ed. Prentice Hall, 2011

Reference Material

1. G. Luger, Addison, “Artificial Intelligence: Structures and Strategies for Complex Problem Solving”, 6th Edition Addison Wesley, 2009

Course Learning Outcomes

	Course Learning Outcomes (CLO)
1	Understand different types of AI agents as well as the fundamentals of knowledge representation, inference and resolution.
2	Design a real world problem for implementation and recognize the dynamic behavior of a system
3	Implement these techniques in applications that involve perception, reasoning, and learning

CLO-SO Map

	SO IDs											
CLO ID	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CLO 1	1	0	0	0	0	0	0	0	0	0	0	0
CLO 2	0	0	1	0	0	0	0	0	0	0	0	0
CLO 3	0	0	0	0	1	0	0	0	0	0	0	0

Approvals

Prepared By	
Approved By	Not Specified
Last Update	