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 Intelligence** History of AI Introduction to AI What is Intelligence? Characteristics of Intelligence What do people in AI think about Intelligence? Characterizing AI Systems Distinctions Think vs. Act		R&N: Chapter 1 Luger:.Chapter 1

	Cognitive Science Distinctions Rational vs. Human Common Misconceptions Assumptions behind AI research Goals of Al Research Engineering Goal Scientific Goal Is AI Possible? Turing Test		
3-4	**Introduction to Machine Learning** ML Basics Classification Problems Regression Problems Problem of Learning Gradient Descent Algorithm Classifiers KNN SVM Linear Regression Problem of overfitting Introduction to Regularization		Online Resources
5	**Introduction to Neural Networks** Artificial Neural networks Gradient Descent on ANNs Classification Problems with ANNs Feature Engineering and dataset issues related to ANNs	Assignment Class work	
6	**Introduction to Convolutional Neural Networks** CNN basics and classification ANN vs CNN CNN applications CNN development and deployment		
7-8	**Agent** What is Agents? Types of Agents Simple reflex agents Reflex agents with state/model Goal-based agents		R&N: Chapter 2 Luger: Chapter 2

	Utility-based agents Agents Environment Properties of Environment Architecture Rationality Autonomy Single and multi-agent		
9-10	**Uninformed Search** Introduction State Space search (Classical Search Problem) Example of shortest path find Romania Building Goal-Based Agents- What is the goal to be achieved? What are the actions? Representing states Breadth First Search (Blind) Depth First Search (Blind)		R&N: Chapter 3 Luger:Chapter. 3
11	**Informed Search** Heuristic Search (A*) Min Max Search Alpha Beta Pruning Best First Search	Assignment Class work	R&N: Chapter 4 Luger: Chapter 4
12	**Knowledge and Represntation** Propositional Logic Propositional Logic Propositional Logic: Syntax Examples of PL sentences Introduction to Predicate Logic (Wumpus world)		R&N: Chapter 7 Luger: Chapter 7
13	Predicate Logic (Wumpus world) Quantifiers Universal quantification (or for-all) Existential quantification A common mistake to avoid Properties of quantifiers Equality Quantifier Scope Connections between All and Exists		

14	Semantic Net Object Attribute Value (OAV) Frames Unification Pattern Matching Types of Knowledge Structural Procedural Declarative Heuristics		
15	**Reasoning and Inference techniques** Types of Reasoning Inference Engine Inference Rules Forward Chaining Backward Chaining Structure of reasoning and inference engine Role model of Reasoning in inference Working of Inference Engine comparative study with human mind Resolution Resolution Proof Conversion into Clausal Form	Assignment Class work	R&N: Chapter 9&10 Luger: Chapter 7&13
16	**Expert Systems** What is an Expert System? Types OF Expert System Rule Based Model Based Case Based Forward and Backward Chaining	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	