



ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : B.Sc. (Hons.) Computer Science						
Semester	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
VI	BHCS13	Artificial Intelligence Discipline Specific Core Course - (DSC)	4			4
Teacher/Instructor(s)		Dr. Parul Jain				
Session		2021-22				

Course Objective:

This course introduces the basic concepts and techniques of Artificial Intelligence (AI). The course aims to introduce intelligent agents and reasoning, heuristic search techniques, game playing, knowledge representation, reasoning with uncertain knowledge.

Course Learning Outcomes:

On successful completion of this course, students will be able to:

1. Identify problems that are amenable to solution by specific AI methods
2. Represent knowledge in Prolog and write code for drawing inferences
3. Identify appropriate AI technique for the problem at hand
4. Compare strengths and weaknesses of different artificial Intelligence techniques
5. Sensitive towards development of responsible Artificial Intelligence

Lesson Plan:

Week	Contents	Contact Hours
1	Introduction to artificial intelligence, background and applications, Turing test and rational agent approaches to AI, introduction to intelligent agents.	4
2	Structure, behavior and environment of intelligent agents, problem characteristics, production systems, control strategies.	4
3	Introduction to programming in logic (PROLOG)	4
4	Programming in logic (PROLOG), breadth first search, depth first	4

	search introduction of heuristic search techniques.	
5	Propositional logic, first order predicate logic.	4
6	Unification, clausal form, resolution principle.	4
7	Semantic nets, conceptual graphs, conceptual dependencies.	4
8	Frames, scripts, Uncertainty: non-monotonic reasoning, truth maintenance systems, default reasoning and closed world assumption.	4
9	Bayesian probabilistic inference, Bayesian networks, Dempster-Shafer theory, Introduction to fuzzy sets and fuzzy logic.	4
10	Basic reasoning using fuzzy concepts, production rules, Chomsky hierarchy of grammars, context-free grammars.	4
11	Hill climbing and its variations, best first search.	4
12	A* algorithm, constraint satisfaction problem, means-end analysis.	4
13	Introduction to game playing, min-max procedure, alpha-beta pruning.	4
14-15	Overview of linguistics, Chomsky hierarchy of grammars, parsing techniques..	8

Evaluation Scheme:

No.	Component	Duration	Marks
1.	Internal Assessment		25
	• Quiz		
	• Class Test		
	• Attendance		
	• Assignment		
2.	End Semester Examination	3 hr	75

Unit	Contents
I	Introduction: Introduction to artificial intelligence, background and applications, Turing test, rational agents, intelligent agents, structure, behaviour and environment of intelligent agents.
II	Knowledge Representation: Propositional logic, first order predicate logic, resolution principle, unification, semantic nets, conceptual dependencies, frames, scripts, production rules, conceptual graphs.
III	Reasoning with Uncertain Knowledge: Uncertainty, non-monotonic reasoning, truth maintenance systems, default reasoning and closed world assumption, Introduction to probabilistic reasoning, Bayesian probabilistic inference, introduction to fuzzy sets and fuzzy logic, reasoning using fuzzy logic.

IV	Problem Solving and Searching Techniques: Problem characteristics, production systems, control strategies, breadth first search, depth first search, hill climbing and its variations, heuristics search techniques: best first search, A* algorithm, constraint satisfaction problem, means-end analysis.
V	Game Playing: introduction to game playing, min-max and alpha-beta pruning algorithms. Prolog Programming: Introduction to Programming in Logic (PROLOG), Lists, Operators, basic Input and Output.
VI	Understanding Natural Languages: Overview of linguistics, Chomsky hierarchy of grammars, parsing techniques.
VII	Ethics in AI, Fairness in AI, Legal perspective
	Suggested Books
Sl. No.	Name of Authors/Books/Publishers
1.	Rich, E. & Knight, K. (2012). Artificial Intelligence. 3rd edition. Tata McGraw Hill.
2.	Russell, S.J. & Norvig, P. (2015) Artificial Intelligence - A Modern Approach. 3rd edition. Pearson Education
3.	Bratko, I. (2011). Prolog Programming for Artificial Intelligence. 4th edition. Pearson Education
4.	Clocksin, W.F. & Mellish (2003), Programming in PROLOG. 5th edition. Springer
5.	Kaushik, S. (2011). Artificial Intelligence. Cengage Learning India.
6.	Patterson, D.W. (2015). Introduction to Artificial Intelligence and Expert Systems. 1st edition. Pearson Education.
Mode of Evaluation: Internal Assessment / End Semester Exam	

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