



KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY
Deemed to be University
BHUBANESWAR-751024
School of Computer Engineering

Lesson Plan

Artificial Intelligence (CS30002)

Lectures:	3 Hrs / Week	Internal Assessment Marks:	50
		Activities:	30
		<ul style="list-style-type: none">• Minimum Activities: 05 and types are quiz, assignment, viva, etc.• Faculty must share the continuous evaluation for 15 marks each before the Mid-semester and End-semester exams, respectively.	
		Mid Sem Exam:	20
		End Term Marks:	50
Credits:	3		
Groups:	6 th Semester, B.Tech.		
Faculty Name:-	G. B. Mund		
Contact Details:-	Cabin C-301, Campus 25, mund@kiit.ac.in, 9437306625.		

Course Objectives:

CO1:-To understand the various characteristics of Intelligent agents

CO2:-To learn the different search strategies in AI

CO3:-To learn to represent knowledge in solving AI problems.

CO4:-To understand the ways of planning and acting in the real world

CO5:-To know about the models behind the AI application.

Module No. & Name	Topic/Coverage	No. of lectures	Lecture Serial no.
1. Introduction	<p>1. Introduction:- Use and Application.</p> <p>2. Definition:- Rationality, Thinking Humanly, Acting Humanly, Thinking Rationally and Acting Rationally. Turing Test, Four Capabilities for A.I system.</p> <p>3. Future of Artificial Intelligence.</p>	2	1-2
2. Intelligent Agents	<p>1. Characteristics of Intelligent Agents:- Agent Autonomy, Actuators ,Sensors, Environment, Performance Measure , Agent function and Agent Program. (Vacuum Cleaner Example, etc.)</p> <p>2. Agents and Environment:- Rational Agent , Discuss various environments, Specification of Task Environment (Using Examples).</p> <p>3. Typical Intelligent Agents and their Types:- Simple Reflex, Model based, Goal based and Utility based.(Discuss with Diagram).</p>	3	3-6
3. Solving Problems by Searching	1. Defining a problem for state space searching. (State Space Representation of Water-Jug Problem, N-Queen Problem, Monks and Demons problem, 8-Puzzle problem, etc.) <i>(One or Two problem to be explained in class others can be given for practice).</i>	1	7-19
	2. Search Strategies:- Search Tree, Solution Path, Nodes, Open List, Closed List, concept of space and time complexity.	1	
	3. Uninformed Strategies:- BFS, Uniform Cost Search, DFS, Iterative Deepening, Depth Limited and Bidirectional. Discuss the Space	8	

	and Time complexity of each Strategy.		
	4. Informed (Heuristics Strategies):- Concept of Heuristics, Admissibility and consistency, Greedy Best First Search, A* Algorithm. Discuss Admissibility, Consistency and Optimality of A*.	3	
4. Beyond Classical Search	1. Local Search Algorithms and Optimization Problems :- Objective Function , Global and Local Minimum/Maximum , Hill Climbing , Problems with Hill Climbing and Solution, Steepest Hill Climbing , Simulated Annealing, Genetic Algorithm (Fitness Function, Crossover and Mutation).	4	20-27
	2. Backtracking Search:- Concept of Constraint Satisfaction Problem , Formulation of problem into CSP. (Crypt-Arithmetic Problem and Map Coloring Problem).	2	
	3. Adversarial Searching :- Concept of Two Players Game, Min-Max Algorithm , Alpha-Beta Pruning. (Tic-tac-toe as an Example)	2	
5. Knowledge Representation.	1. Basic of Proposition Logic, Truth Tables, Atomic Sentences, Complex Sentences, Quantifiers , Connectives. 2. First Order Predicate Logic. 3. Unification. 4. Forward Chaining and Backward Chaining. 5. Resolution. 6. Knowledge Representation using First order Predicate logic. 7. Logical Agents (Knowledge-based agents, the Wumpus World, entailment, inference,	5	28-32

	sound and complete inference algorithms, propositional logic, various inference procedures such as model checking and theorem proving, forward and backward chaining etc.)		
6.Planning	1. Planning with state-space search. 2. Partial-order planning. 3. Planning graphs, 4. planning and acting in the real world. 5. Plan generation systems.	2	33-35
7.Probabilistic Reasoning.	1. Uncertainty and Review of probability. 2.Probabilistic Reasoning. 3.Bayesian networks. 4.Inferences in Bayesian networks. 5. Temporal models and Hidden Markov models.	2	36-37
	END SEMESTER EXAM <u>NOTE:</u> <i>Inform total internal marks (50) to students prior to their End Sem Exam.</i>		

Text Books:

1. Artificial Intelligence: A Modern Approach, Stuart Russel, Peter Norvig, Pearson Education

Reference Books:

1. Artificial Intelligence, Rich, Knight and Nair, Tata McGraw Hill.
2. Principles of Artificial Intelligence, Nils J. Nilsson, Elsevier, 1980.

Evaluation Scheme:

ES	Evaluation	Percentage
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No.	Component	of Evaluation
1	Mid-Semester Examination	20
2	Activities	30
3	End-Semester Examination	50

Activity based Teaching and Learning:

Considering the guidelines circulated and after discussing with the faculty members, following activity based teaching and learning is proposed:

■ **Activity List**

Component wise distributions of the activities are listed below.

- Problem Solving Assignment
- Critical Thinking Assignment
- Quiz
- Viva / Presentation

Course Materials: Course Material will be provided for all topics which can be used as reference. The material consists of –

- Lecture Notes
- Class Work
- Home Work
- Supplementary Reading (including online study aids)