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*
		• *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:	B.Tech.		
Faculty Name:-			
Contact Details:-			

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	1.Introduction:- Use and Application. 2. Definition:- Rationality, Thinking Humanly, Acting Humanly, Thinking Rationally and Acting Rationally. Turing Test, Four Capabilities for A.I system. 3.Future of Artificial Intelligence.	2	1-2
2. Intelligent Agents	1.Characteristics of Intelligent Agents:- Agent Autonomy, Actuators ,Sensors, Environment, Performance Measure , Agent function and Agent Program. (Vacuum Cleaner Example, etc.) 2. Agents and Environment:- Rational Agent , Discuss various environments, Specification of Task Environment (Using Examples). 3. Typical Intelligent Agents and their Types:- Simple Reflex, Model based, Goal based and Utility based.(Discuss with Diagram). **ACTIVITY- 1 [6 marks]** **(Must be conducted by 20.12.2024 covering Module nos. 1 & 2)**	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.) *(One or Two problem to be explained in class others can be given for practice).*	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	**8**	

	Search , DFS , Iterative Deepening, Depth Limited and Bidirectional. Discuss the Space 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*. **ACTIVITY-2 [6 marks]** **(Must be conducted by 20.01.2025 covering part of Module no. 3)**	**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) **ACTIVITY-3 [6 marks]** **Mid -Semester** **(Must be conducted by 15.02.2025 covering Module nos. 4)**	**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	5	28-32

	Chaining. 5. Resolution. 6. Knowledge Representation using First order Predicate logic. 7. Logical Agents (Knowledge-based agents, the Wumpus World, entailment, inference, sound and complete inference algorithms, propositional logic, various inference procedures such as model checking and theorem proving, forward and backward chaining etc.) **ACTIVITY-4 [6 marks]** **(Must be conducted by 15.03.2024 covering Module no. 5 prior to Mid Semester Exam)** ***<u>NOTE</u>: 50% of Activities marks i.e. 15 marks to be announced to students before AI mid semester exam***		
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. **ACTIVITY-5 [6 marks]** **(Must be conducted by 25.03.2025 covering Module nos. 5, 6 and 7)**	2	36-37

	END SEMESTER EXAM ***<u>NOTE</u>: Inform total internal marks (50) to students prior to their End Sem Exam.***		

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 No.	Evaluation Component	Percentage 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)