



KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY
BHUBANESWAR-751024
School of Computer Engineering

Artificial Intelligence (CS30002)

Lectures:	3 Hrs / Week	Internal Assessment:	50
		<i>Activities: 30</i>	
		<i>Mid Semester: 20</i>	
		End Semester Marks:	50
Credits:	3		
Groups:	B.Tech. (CSE)		
Faculty Name:-	G. B. Mund		
Contact Details:-	9437306625, Cabin No: F114, Campus !5, Block-A.		

Module	Topic / Coverage
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. 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).

	<p>3. Typical Intelligent Agents and their Types:- Simple Reflex, Model based, Goal based and Utility based.(Discuss with Diagram).</p>
3. Solving Problems by Searching	<p>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></p>
	<p>2. Search Strategies:- Search Tree, Solution Path, Nodes, Open List, Closed List, concept of space and time complexity.</p>
	<p>3.Uninformed Strategies: - BFS, Uniform Cost Search , DFS , Iterative Deepening, Depth Limited and Bidirectional. Discuss the Space and Time complexity of each Strategy.</p>
	<p>4. Informed (Heuristics Strategies): Concepts of Heuristics, Admissibility and consistency, Greedy Best-First Search , A* Algorithm. Discuss Admissibility, Consistency and Optimality of A*.</p>
4. Beyond Classical Search	<p>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).</p>
	<p>2. Backtracking Search:- Concept of Constraint Satisfaction Problem , Formulation of problem into CSP. (Crypt-</p>

	Arithmetic Problem and Map Coloring Problem).
	3. Adversarial Searching: Concept of Two Players Game, Min-Max Algorithm , Alpha-Beta Pruning. (Tic-tac-toe as an Example)
5. Knowledge Representation.	1. Basic of Proposition Logic , Truth Tables, Atomic Sentences, Complex Sentences, Quantifiers , Connectives. 2. First Order Predicate Logic. 3. Unification. 4. Resolution. 5. Logical Agents (Knowledge-based agents, the Wumpus World, entailment, inference, sound and complete inference algorithms, propositional logic, various inference procedures such as model checking)
6.Planning	1. Planning with state-space search. 2. Partial-order planning.
7.Probabilistic Reasoning.	1. Uncertainty and Review of probability. 3. Bayesian networks. 4. Inferences in Bayesian networks.

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.