

Code: BCA-4004T BCA-4004P	CC-XII	Artificial Intelligence	3L+T:4P	3 Credits (45 hours theory and 60 hours Practical)
Max Marks: 100; Theory: 100 (Int: 25; Ext: 75) ; Practical : 100				
Course Outcomes: Upon completion of the course, students will be able to				
CO1: Understand the characteristics of rational agents, and the environment in which they operate, and gain insights about problem-solving agents.				
CO2: Gain insights about Uninformed and Heuristic search techniques and apply them to solve Search applications.				
CO3: Appreciate the concepts of knowledge representation using Propositional logic and Predicate calculus and apply them for inference/reasoning.				
CO4: Obtain insights about Planning and handling uncertainty through probabilistic reasoning and fuzzy sets.				
CO5: Obtain a basic understanding of the AI domains and their applications and examine the legal and ethical issues of AI				
Unit	Topics	Purposed lectures		
I	Introduction to AI What is AI? Intelligent Agents: Agents and environment, the concept of Rationality, the nature of environment, the structure of Agents. Knowledge-Based Agents: Introduction to Knowledge-Based Agents, The Wumpus World as an Example World. Problem-solving: Problem-solving agents.	9		
II	Advanced Search Techniques Uninformed Search: DFS, BFS, Iterative Deepening Search. Informed Search: Best First Search, A* search, AO* search. Adversarial Search & Games: Two-player zero-sum games, Minimax Search, Alpha-Beta pruning. Constraints and Constraint Satisfaction Problems (CSPs), Backtracking search for CSP. Evolutionary Search Techniques: Introduction to evolutionary algorithms, Genetic algorithms,	12		

	Applications of evolutionary search in AI.	
III	Logical Reasoning and Uncertainty Logic: Propositional logic, First-order predicate logic, Propositional versus first-order Inference, Unification and lifting. Inference: Forward chaining, Backward chaining, Resolution, Truth maintenance systems. Introduction to Planning: Blocks World problem, Strips; Handling Uncertainties: Non-monotonic reasoning, Probabilistic reasoning, Introduction to Fuzzy set theory.	12
IV	Domains and Applications of AI Domains in AI: Introduction to Machine Learning, Computer Vision, Robotics, Natural Language Processing, Deep Neural Networks, and their Applications. Expert Systems: The architecture and role of expert systems include two case studies. Legal and Ethical Issues: Concerns related to AI.	12
Text Books: <ol style="list-style-type: none"> 1. M.C. Trivedi, A Classical Approach to Artificial Intelligence, Khanna Book Publishing Company, 2024 (AICTE Recommended Textbook). 2. Nilsson Nils J, Artificial Intelligence: A new Synthesis, Morgan Kaufmann Publishers Inc. San Francisco, CA, ISBN: 978-1-55-860467-4. 3. Dan W Patterson, Introduction to Artificial Intelligence & Expert Systems, PHI Learning 2010. 4. Rajiv Chopra, Data Science with Artificial Intelligence, Machine Learning and Deep Learning, Khanna Book Publishing Company, 2024. 		
Reference Books: <ol style="list-style-type: none"> 1. M.C. Trivedi, Introduction to AI and Machine Learning, Khanna Book Publishing Company, 2024. 2. Russell, S. and Norvig, P., "Artificial Intelligence - A Modern Approach", 3rd edition, Prentice Hall 3. Van Hirtum, A. & Kolski, C.(2020). Constraint Satisfaction Problems: Algorithms and Applications. Springer 4. Rajiv Chopra, Machine Learning and Machine Intelligence, Khanna Book Publishing Company, 2024. 		