

B.TECH. (CSE/CS/CE)
SEVENTH SEMESTER (DETAILED SYLLABUS)

Artificial Intelligence (BCS701)		
Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course, the student will be able to understand		
CO 1	Understand the fundamentals of Artificial Intelligence, intelligent agents, and various approaches to problem-solving in AI.	K2
CO 2	Apply uninformed and informed search strategies, heuristics, and optimization techniques to solve classical AI problems and games.	K3
CO 3	implement logical reasoning techniques using propositional and first-order logic, including inference strategies and knowledge representation methods.	K4
CO 4	Analyze uncertainty in knowledge representation using probabilistic reasoning, fuzzy logic, and basic neural network concepts.	K4
CO 5	Evaluate and demonstrate AI applications in areas such as natural language processing (NLP), robotics, multi-agent systems, and Explainable AI (XAI) through real-world problem examples.	K5
DETAILED SYLLABUS		3-0-0
Unit	Topic	Proposed Lecture
I	Introduction to Artificial Intelligence & Intelligent Agents: Definition and scope of AI, History and applications of AI, Characteristics of Intelligent Agents, Types of agents and environments, Agent architecture, Problem Solving Approach to Typical AI problems, Problem-solving agents. Example problems and approaches.	08
II	Problem Solving & Search Strategies: Uninformed Search Strategies: BFS, DFS, Iterative Deepening, Informed Search Strategies: Greedy Best-First Search, A* Search, Heuristics and Optimization, Hill Climbing, Simulated Annealing, Constraint Satisfaction Problems, Game Playing: Min-max, Alpha-Beta Pruning, Stochastic & Partially Observable Games.	08
III	Knowledge Representation & Reasoning: Propositional and First Order Logic, Syntax, Semantics, and Inference, Knowledge-based agents: Wumpus world, Logic Programming using Prolog, Forward and Backward Chaining, Resolution, Ontological Engineering and Reasoning.	08
IV	Uncertainty & Learning Techniques: Introduction to uncertainty and probabilistic reasoning, Bayes' Rule, Bayesian Networks, Fuzzy logic and handling imprecision, Neural Networks (basics only): Perceptron, Backpropagation (intro level), Fundamentals of Machine Learning in AI context, Introduction to supervised and unsupervised learning.	08
V	Applications of AI & Multi-Agent Systems: Natural Language Processing, Machine Translation, Information Retrieval and Extraction, Robotics: Perception, Planning, and Motion, Speech Recognition, Software Agents: Architecture, Communication, Trust, Multi-agent Negotiation and Reputation. Explainable AI (XAI) – Importance of interpretability, techniques for explaining black-box models, trust in AI, case studies in NLP and vision.	08
Recommended Textbooks:		
<ol style="list-style-type: none"> 1. Stuart Russell & Peter Norvig, <i>Artificial Intelligence: A Modern Approach</i>, 4th Edition, Pearson, 2022 2. Ivan Bratko, <i>Prolog: Programming for Artificial Intelligence</i>, 4th Edition, Addison-Wesley 3. Nils J. Nilsson, <i>The Quest for Artificial Intelligence</i>, Cambridge University Press 4. David Poole & Alan Mackworth, <i>Artificial Intelligence: Foundations of Computational Agents</i>, Cambridge Press 		