23CA21T1- ARTIFICIAL INTELLIGENCE

(AI&DS)

Course Category:	Professional Core	**Credits:**	3
Course Type:	Theory	**Lecture-Tutorial-Practical:**	3-0-0
Prerequisite:	Knowledge in Computer Programming. A course on "Mathematical Foundations of Computer Science".Background in linear algebra, data structures and algorithms, and probability	**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	30 70 100
Objectives:	**Students undergoing this course are expected:**		
	• The student should be made to study the concepts of Artificial Intelligence. • The student should be made to learn the methods of solving problems using Artificial Intelligence. • The student should be made to introduce the concepts of Expert Systems. • To understand the applications of AI, namely game playing, theorem proving, and machine learning. • To learn different knowledge representation techniques		

Course Outcomes	**Upon successful completion of the course, the students will be able to:**	
	CO1	Understand intelligent agents that solve problems effectively by interacting with diverse environments. (L2)
	CO2	Apply various search strategies and algorithms, to solve complex problems and optimize decision-making in game-playing scenarios. (L3)
	CO3	Effectively represent and reason with knowledge using predicate logic and applying rules-based deduction systems. (L3)
	CO4	Apply first-order logic and various inference techniques to solve logical problems. (L3)
	CO5	Understand the expert systems by their architecture, roles, and knowledge acquisition techniques. (L2)
Course Content	**UNIT-I** **Introduction:** AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation. **UNIT-II** **Searching:** Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Hill climbing, A* ,AO* Algorithms, Problem reduction, Game Playing-Adversial search, Games, mini-max algorithm, optimal decisions in multiplayer games, Problem in Game playing, Alpha-Beta pruning, Evaluation functions. **UNIT-III** **Representation of Knowledge:** Knowledge representation issues, predicate logic-	

	logic programming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems. Reasoning under uncertainty, review of probability, Bayes' probabilistic interferences and dempstershafer theory. **UNIT-IV** **Logic concepts:** First order logic. Inference in first order logic, propositional vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution, Learning from observation Inductive learning, Decision trees, Explanation based learning, Statistical Learning methods, Reinforcement Learning. **UNIT-V** **Expert Systems:** Architecture of expert systems, Roles of expert systems – Knowledge Acquisition Meta knowledge Heuristics. Typical expert systems – MYCIN, DART, XCON: Expert systems shells.
Text Books & References Books	**TEXTBOOKS:** 1. S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education. 2. Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", Mc Graw Hill. **REFERENCE BOOKS:** 1. David Poole, Alan Mackworth, Randy Goebel,"Computational Intelligence: a logical approach", Oxford University Press. 2. G. Luger, "Artificial Intelligence: Structures and Strategies for complex Problem solving", Fourth Edition, Pearson Education. 3. J. Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers. 4. Artificial Intelligence, SarojKaushik, CENGAGE Learning.
E-Resources	1. https://ai.google/ 2. https://swayam.gov.in/nd1_noc19_me71/preview