# 23CA21T1 - ARTIFICIAL INTELLIGENCE

(CSE (AI&ML))

|  |  |  |  |
| --- | --- | --- | --- |
| 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: | * 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 problemsolving”, 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> | |