**AI32D1 FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE 3 0 0 3**

**OBJECTIVES**

- Understand the basic concepts of intelligent agents.
- Develop general-purpose problem-solving agents, logical reasoning agents, and agents that reason under uncertainty.
- Employ AI techniques to solve some of today's real-world problem' s.

| **Subject Code:** AI32D1 | **Subject Name:** Fundamentals of Artificial Intelligence | |
|---|---|---|
| **Course Outcome – COs** At the end of the course students should be able to, | | **Cognitive Skill** |
| CO- 01 | Explain autonomous agents that make effective decisions in fully informed, partially observable, and adversarial settings. | U |
| CO- 02 | Choose appropriate algorithms for solving given AI problems | A |
| CO- 03 | Design and implement logical reasoning agents | R, A |
| CO- 04 | Design and implement agents that can reason under uncertainty | R, A |
| CO- 05 | Understand the basic areas of artificial intelligence including problem solving, knowledge representation, reasoning, decision making, planning, perception and action. | U |

**UNIT I: AI AGENTS 9**

Introduction to AI – Agents and Environments – Concept of rationality – Nature of environments – Structure of agents – Problem solving agents–Search algorithms– Uninformed search strategies.

**UNIT II: PROBLEM SOLVING 9**

Heuristic search strategies–heuristic functions - Local search and optimization problems – Local search in continuous space – Search with non-deterministic actions – Search in partially observable environments – Online search agents and unknown environments.

**UNIT III: THEORY OF GAME PLAYING 9**

Game theory – Optimal decisions in games – Alpha-beta search – Monte-Carlo tree search – Stochastic games– Partially observable games. Constraint Satisfaction Problems – Constraint propagation – Backtracking search for CSP – Local search for CSP– Structure of CSP.

**UNIT IV: KNOWLEDGE BASED LOGICAL AGENTS 9**

Knowledge-based agents – Propositional logic – Propositional theorem proving – Propositional model checking– Agents based on propositional logic. First-order logic – Syntax and semantics – Knowledge representation and engineering – Inferences in first-order logic–Forward chaining– Backward chaining– Resolution.

**UNIT V: KNOWLEDGE REPRESENTATION 9**

Ontological engineering–Objects and categories–Events–Mental objects and Modal logic– Reasoning systems for categories – Reasoning with default information. Classical planning–Algorithms for classical

planning–Heuristics for planning– Hierarchical planning–Non-deterministic domains–Time, Schedule, and Resources– Analysis.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**


1. Stuart Russel and Peter Norvig, “Artificial Intelligence: A Modern Approach”, Fourth Edition, Pearson Education, 2020.


**REFERENCES**


1. Dan W. Patterson, “Introduction to AI and ES”, Pearson Education,2007.
2. Kevin Night, Elaine Rich, and Nair B., “Artificial Intelligence”, McGraw Hill,2008.
3. Patrick H. Winston, "Artificial Intelligence ", Third edition, Pearson Edition,2006.
4. Deepak Khemani, “Artificial Intelligence”, Tata McGraw Hill Education, 2013.
5. Artificial Intelligence by Example: Develop machine intelligence from scratch using real artificial intelligence use cases -by Dennis Rothman, 2018.