

**CB/CD/CM/
CS/IT222**

ARTIFICIAL INTELLIGENCE

**L T P C Int Ext
3 - - 3.0 30 70**

Semester IV [Second Year]

COURSE OBJECTIVES:

The main objectives of this course are to:

1. Introduce fundamental concepts of artificial intelligence.
2. Impart knowledge on problem solving using uninformed, informed, local and adversarial search strategies.
3. Create awareness on formalization of knowledge and reasoning.

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Explain the fundamental concepts of artificial intelligence
2. Apply search strategies for solving real world problems
3. Solve Constraint Satisfaction Problems
4. Utilize game playing strategies for solving problems
5. Infer knowledge using propositional and predicate logic
6. Summarize the algorithms for classical planning

UNIT I

[CO:1,2] (12)

Introduction: What Is AI? The Foundations of AI, the History of AI, the State of the Art.

Intelligent Agents: Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

Solving Problems by Searching: Problem-Solving Agents, Example Problems, Search Algorithms, Uninformed Search Strategies.

UNIT II

[CO:2,3] (12)

Solving Problems by Searching: Informed (Heuristic) Search Strategies, Heuristic Functions.**Search in Complex Environments:** Local Search and Optimization Problems, Search with Non-Deterministic Actions, Searching with Partial Observations., Online Search Agents and Unknown Environments.

Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation: Inference in CSPs, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.

UNIT III

[CO:4,5] (12)

Adversarial Search and Games: Game Theory, Optimal Decisions in Games, Heuristic Alpha-Beta Tree Search.

Logical Agents: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT IV

[CO:5,6] (12)

First-Order Logic: Syntax and Semantics of First-Order Logic, Using First Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and First-Order Inference, Forward Chaining, Backward Chaining, Resolution.

Automated Planning: Definition of Classical Planning, Algorithms for Classical Planning, Heuristics for

Planning, Hierarchical Planning.

LEARNING RESOURCES:

TEXT BOOK:

Artificial Intelligence-A Modern Approach, Stuart Russell and Peter Norvig, Fourth Edition, Pearson Education

REFERENCE BOOK(s):

1. Artificial Intelligence, E. Richard K.Knight,3rdEdn.,(TMH)
2. Artificial Intelligence, 3rdEdn.,Patrick Henny Winston,3rdEdn.,Pearson Education.
3. A First Course in Artificial Intelligence, Deepak Khemani, Tata Mc-Grah Hill.
4. Artificial Intelligence and Expert systems-Patterson, Pearson Education.
5. Artificial Intelligence, Saroj Kaushik, CENGAGE Learning