

Artificial Intelligence

(Common to CSE & IT)

III B-Tech VI-Semester(20CSIT604/PE04)

Lectures:3 Periods/Week	Tutorial: 0	Practical: 0
CIA Marks: 30	SEE Marks: 70	Credits: 3

Prerequisites:

1. A course on Advanced Data Structures.
2. A course on Design and Analysis of Algorithms.
3. A course on Mathematical Foundations of Computer Science.

Course Objectives:

Student will be able

- 1.To understand the fundamental concepts of artificial intelligence, And their environment, various Search techniques.
2. To Learn the knowledge representation using predicate logic and rules.
3. To Learn the planning techniques.
- 4 To Learn how to design and solve Learning techniques and Expert systems.

Course Outcomes:

After the course the student are expected to be able to

- 1.Understand the fundamental concepts of artificial intelligence, search techniques for solving simple AI problems and their environments.
2. Apply knowledge representation using predicate logic and rules.
3. Utilize the planning techniques
4. Possess the knowledge of the concepts of Learning and Expert Systems

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	2	-	1	-	1	2	1	-	-	-
CO2	-	-	2	-	2	-	2	3	-	2	1	-
CO3	-	2	-	-	-	2	-	-	1	-	2	-
CO4	-	1	-	1	-	-	1	-	1	-	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO1	PSO2	PSO3
CO1	1	1	1
CO2	1	2	2
CO3	2	1	1
CO4	2	2	1

UNIT-I

(14 Periods)

Introduction to AI: What is AI? , Foundations of AI, History of AI, State of the Art. **Intelligent Agents:** Agents and Environments, Good Behavior: Concept of Rationality, The Nature of Environments And The Structure of Agents. **Solving Problems by Searching:** Problem Solving Agents, Searching for Solutions, **Uninformed Search Strategies:** Breadth First Search, Uniform Cost Search, Depth First Search, Iterative Deepening DFS and Bi-directional Search. **Informed (Heuristics) Search Strategies:** Greedy BFS, A* Algorithm, AND-OR Search trees, **Constraint Satisfaction Problems:** Defining Constraint Satisfaction Problems, Local Search in CSP.

UNIT-II

(14 Periods)

Logical Agents: Knowledge Based Agents, The Wumpus World, Logic and Propositional Logic, **Propositional Theorem Proving:** Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and Backward chaining. **First Order Logic:** Representation, Revisited Syntax and Semantics of First Order Logic, Using First Order Logic, Knowledge Engineering in First Order Logic. **Inferences in First Order Logic:** Propositional vs. First Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

UNIT-III

(14 Periods)

Knowledge Representation: Ontological Engineering, Categories and Objects, Events, Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

Slot and Filler Structures: Semantic Nets, Conceptual Dependency, Scripts. **Planning:** Overview - An Example Domain, The Blocks World, Component of Planning Systems, Goal Stack Planning, Hierarchical planning, Reactive systems.

UNIT-IV

(14 Periods)

Learning: Introduction to learning, Rote learning, Learning by taking advice, Learning in problem solving, Learning from examples, Induction Learning, Explanation Based Learning. **Expert Systems:** Representing and using domain knowledge, Expert system shells, Explanation, Knowledge Acquisition.

TEXT BOOKS:

1. Stuart Russel and Peter Norvig, Artificial Intelligence – A Modern Approach, 3rd Edition, Pearson Education/ PHI..
2. Elaine Rich & Kevin Knight, Artificial Intelligence, 3rd Edition, (TMH).

REFERENCES:

1. Patrick Henry Winston, Artificial Intelligence, Pearson Education
2. Saroj Kaushik. Artificial Intelligence. CENGAGE Learning, 1 edition, 2020.