



COURSE CONTENT

ARTIFICIAL INTELLIGENCE								
IV Semester: CSE / CSM								
VI Semester : CSD								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
24X0512	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
Prerequisites: Data structures, Discrete Mathematics								

Course Overview:

This course aims to introduce the fundamental concepts of artificial intelligence (AI). Students will develop a broad understanding of AI technologies, their implications, and their potential applications in various fields. The course will emphasize practical examples and real-world case studies to facilitate comprehension and inspire innovative thinking.

Course Objectives:

The students will try to learn

- The fundamental concepts and subfields of AI.
- Real-world applications of AI across various industries.
- The knowledge base and application of reasoning
- First-order logic to solve real world problems.
- Recognize the potential of AI to drive innovation and transformation in different domains.

Course Outcomes: After successful completion of the course, students should be able to

- Understand the foundations, history, and core concepts of Artificial Intelligence, including intelligent agents, environments, propositional logic, and problem-solving using uninformed search strategies.
- Apply informed search techniques and heuristic methods to solve complex problems.
- Represent knowledge using propositional and first-order logic, and design knowledge-based agents capable of reasoning in structured environments such as the Wumpus World.
- Demonstrate the ability to perform logical inference using forward chaining, backward chaining, resolution, and unification.
- Implement AI planning solutions using situation calculus, partial-order planning, hierarchical decomposition, and practical planning techniques while addressing real-world constraints such as resources and uncertainty.

Module-I

[9]

Artificial Intelligence: What is AI, Foundations and History of AI. Propositional and first order logic.

Intelligent Agents: Introduction, how Agents Should Act, Structure of Intelligent Agents, Agent programs, Simple reflex agents, Goal based agents, Utility based agents, Environments and Environment programs.

Problem Solving by Search: Problem-Solving Agents, Formulating Problems, Example Problems, Searching for Solutions, Search Strategies (Breadth-first search, Uniform cost search, Depth-First Search, Iterative deepening Depth- First search, Bidirectional search).

Module-II

[8]

Informed Search Methods: Best-First Search, Heuristic Functions, Memory Bounded Search, Iterative Improvement Algorithms.

Game Playing: Introduction, Games as Search Problems, Perfect Decisions in Two-Person Games, Imperfect Decisions, Alpha-Beta Pruning, Games That Include an Element of Chance, State-of-the- Art Game Programs.

Module-III

[9]

Knowledge and Reasoning: A Knowledge-Based Agent, The Wumpus World Environment, Representation, Reasoning, and Logic, Propositional Logic, An Agent for the Wumpus World.

First-Order Logic: Syntax and Semantics, Extensions and Notational Variations, Using First-Order Logic, Logical Agents for the Wumpus World, A Simple Reflex Agent, Representing Change in the World Building a Knowledge Base: Properties of Good and Bad Knowledge Bases, Knowledge Engineering, The Electronic Circuits Domain, General Ontology, Application: The Grocery Shopping World.

Module -IV

[10]

Inference in First-Order Logic: Inference Rules Involving Quantifiers, An Example Proof, Generalized Modus Ponens, Forward and Backward Chaining, Resolution: A Complete Inference Procedure, Completeness of resolution.

Logical Reasoning Systems: Introduction, Indexing, Retrieval, and Unification, Logic Programming Systems, Theorem Provers, Forward-Chaining Production Systems, Frame Systems and Semantic Networks, Description Logics, Managing Retractions, Assumptions, and Explanations

Module-V

[9]

Planning: A Simple Planning Agent, From Problem Solving to Planning, Planning in Situation Calculus, Basic Representations for Planning, A Partial-Order Planning Example, A Partial-Order Planning Algorithm, Knowledge Engineering for Planning.

Practical Planning: Practical Planners, Hierarchical Decomposition, Analysis of Hierarchical Decomposition, Resource Constraints.

TEXTBOOKS:

1. Artificial Intelligence A Modern Approach, Stuart Russell and Peter Norvig, 3rd Edition, Pearson Education

REFERENCES:

1. Artificial Intelligence, E.Rich and K.Knight, , 3rd Edition, TMH
2. Artificial Intelligence, Patrick Henny Winston, 3rd Edition, Pearson Education.
3. Artificial Intelligence, ShivaniGoel, Pearson Education.
Artificial Intelligence and Expert systems – Patterson, Pearson Education

ELECTRONIC RESOURCES

1. <https://www.geeksforgeeks.org/c/c> -
2. <https://www.programiz.com/c> -
3. <https://www.w3schools.com/c/>
4. <https://www.codechef.com/learn/course/c>

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech-talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper–I
8. Model question paper–II
9. Lecture notes
10. E-Learning Readiness Videos

