Artificial Intelligence

Subject Code : 18DS5DE12 **Total Contact Hours : 45**
Credits : 03 **L-T-P : 3-0-0**

Prerequisite: Mathematics

Course Objectives:

- To understand the basic concepts of Artificial Intelligence, terminologies related to AI in present business world.
- To understand the application of artificial neural networks in Artificial Intelligence.
- To understand the application and importance of Deep Learning in Artificial Intelligence.
- To understand the application of Natural language processing techniques in Artificial Intelligence.
- To understand the application and importance of Computer Vision in Artificial Intelligence.
- To understand the different applications and techniques involved in AI for real time scenarios.

Unit -I: (9 Hours)

Introduction to AI

What is AI? , Thinking humanly, Acting rationally, The Foundations of Artificial Intelligence, The History of Artificial Intelligence, The gestation of artificial intelligence, AI becomes an industry, Knowledge-based systems, The return of neural networks, The State of the Art, Intelligent Agents, How Agents Should Act, Structure of Intelligent Agents, Simple reflex agents, Goal-based agents, Utility-based agents , Environments, Environment programs.

Unit -II: (9 Hours)

Problem-solving

Solving Problems by Searching, Problem-Solving Agents, Formulating Problems, Well-defined problems and solutions, Measuring problem-solving performance, Toy problems, Searching for Solutions, Search Strategies, Avoiding Repeated States, Constraint Satisfaction Search, Informed Search Methods, Best-First Search, Heuristic Functions, Memory Bounded Search, Iterative Improvement Algorithms, Applications in constraint satisfaction problems.

Unit -III: (9 Hours)

Knowledge and reasoning

A Knowledge-Based Agent, Representation, Reasoning, and Logic, Prepositional Logic, An Agent for the Wumpus World, Problems with the propositional agent, First-Order Logic, Syntax and Semantics, Extensions and Notational Variations, Using First-Order Logic, A Simple Reflex Agent, Deducing Hidden Properties of the World, Toward a Goal-Based Agent, Building a Knowledge Base, Knowledge Engineering, General Ontology, The Grocery Shopping World, Inference Rules Involving Quantifiers, Generalized Modus Ponens, Forward and Backward Chaining, Completeness, Resolution: A Complete Inference Procedure, Completeness of resolution.

Unit -IV: **(9 Hours)**

Acting logically

A Simple Planning Agent, From Problem Solving to Planning, Planning in Situation Calculus, Basic Representations for Planning, A Partial-Order Planning Algorithm, Planning with Partially Instantiated Operators, Knowledge Engineering for Planning, Practical Planners, Hierarchical Decomposition, Analysis of Hierarchical Decomposition, More Expressive Operator Descriptions, Resource Constraints, Planning and Acting, Conditional Planning, A Simple Re-planning Agent, Fully Integrated Planning and Execution

Module 5: **(9 Hours)**

Generalized Models

A General Model of Learning Agents, Components of the performance element, Representation of the components, Inductive Learning, Learning Decision Trees, Using Information Theory, Learning General Logical Descriptions, Computational Learning Theory, Learning in Neural and Belief Networks, Neural Networks, Perceptrons, Multilayer Feed-Forward Networks, Applications of Neural Networks, Bayesian Methods for Learning Belief Networks, Reinforcement Learning, Passive Learning in a Known Environment, Passive Learning in an Unknown Environment, Generalization in Reinforcement Learning, Genetic Algorithms and Evolutionary Programming, Explanation-Based Learning, Learning Using Relevance Information, Inductive Logic Programming.

Course Outcome:

1. Define and outline the basics, importance and application of Artificial Intelligence.
2. Apply the technique of Artificial Neural Network in finding out the importance of predictable power in AI.
3. Outline the application of Deep Learning in Artificial Intelligence.
4. Able to calculate, test and tune the assumptions of Artificial Intelligence techniques and interpret their parameters for the model building.
5. Apply and use Natural language processing and understand its importance in sentimental analysis.
6. Able to use computer vision techniques to understand the importance of Artificial Intelligence in real time imaging process.

Text Book:

1. Artificial Intelligence, A Modern Approach, Stuart J. Russell and Peter Norvig

Reference Book:

1. Artificial Intelligence (Sie) (English, Paperback, Knight Kevin)
2. Artificial Intelligence: An Essential Beginner's Guide to AI, Neil Wilkins