

SEMESTER-II - BSc AI
COURSE 4: ARTIFICIAL & COMPUTATIONAL INTELLIGENCE

Unit 1: Introduction to Artificial Intelligence and PEAS Framework

Introduction to AI: Definition, history, applications, and scope.

The PEAS framework: Performance Measure, Environment, Actuators, Sensors, Examples of PEAS in real-world AI systems.

Intelligent agents: Intelligent agents and their environments, Types of intelligent agents - Simple reflex, model-based, goal-based, utility-based; rationality.

Unit 2: Expert Systems

Definition and components of Expert Systems (Knowledge Base, Inference Engine, User Interface); Rule-based systems and knowledge representation; Examples of expert systems; decision support; Limitations and comparison with AI agents; Role of expert systems in AI evolution.

Unit 3: Search Strategies in AI

Problem-solving as search: problem formulation, states, actions, goal test.

Uninformed (Blind) Search: Breadth-first search, Depth-first search.

Informed (Heuristic) Search: Greedy best-first search, A* algorithm; Applications of search in AI problems.

Unit 4: Introduction to Machine Learning

What is machine learning, definitions, Types of learning: Supervised, Unsupervised, Reinforcement learning (basic ideas); Classification, Regression, Clustering and Association, Basic learning algorithms overview and applications.

Unit 5: Computational Intelligence and Ethics in AI

Overview of computational intelligence (Basics of neural networks); Role of computational intelligence in AI; Ethics and societal challenges in AI; Responsible AI, fairness, transparency, and safety concerns.

Recommended Textbooks

- Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 4th Edition
- Elaine Rich, Kevin Knight, Artificial Intelligence, 3rd Edition