

**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