

MCA –SECOND SEMESTER

Course title: **Artificial Intelligence**
 Course no: **PSCSATE255**
 No. of credits: **04**
 Total marks: **100**

Minor Test 1: **20 Marks of 1.5 hours duration**
 Minor Test 2: **20 Marks of 1.5 hours duration**
 Major Test: **60 Marks of 3.0 hours duration**

For examinations to be held in May- 2022, 2023, and 2024

Course Objectives & Learning Outcomes

1. To provide a strong foundation of fundamental concepts in Artificial Intelligence
2. To analyze and design a real-world problem for implementation and understand the dynamic behavior of a system.
3. To enable the student to apply these techniques in applications which involve perception, reasoning and learning.
4. To use different machine learning techniques to design AI machine and enveloping applications for real world problems.

UNIT-I Introduction

Introduction to AI: History of AI, Basic Elements of AI, Introduction to Turing Machine, Turing Test and Rational Agent Approaches; State Space Representation of Problems, Game Playing, Min-Max Search, Alpha Beta Cutoff Procedures. Introduction to Expert system, Expert System Life Cycle, Study of existing expert systems like MYCIN and DENDRAL.

UNIT-II Searching Techniques

Heuristic Search techniques-Hill Climbing, Best first search: OR graph, A* algorithm, Problem Reduction: AND-OR graph, The AO* Algorithm. Constraint satisfaction: Introduction and algorithm.

UNIT-III Knowledge Representation

Knowledge Representation Structures: Prepositional Logic, **First Order Predicate Logic**, CNF, DNF, Prenex Normal Form, Resolution, Unification, Inference Mechanisms Semantic Nets, Frames, Scripts, conceptual dependences, Procedural & Declarative knowledge, Reasoning, Uncertainty.

UNIT-IV Multi Agent Systems and Genetic Algorithms

Multi Agent Systems: Agents and Objects; Agents and Expert Systems; Generic Structure of Multiagent System, Semantic Web, Agent Communication, Knowledge Sharing using Ontologies, Agent Development Tools. Genetic Algorithms (GA): Encoding Strategies, Genetic Operators, Fitness Functions and GA Cycle; Problem Solving using GA.

UNIT-V Understanding Natural Languages

Understanding Natural Languages: Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets, Fillmore's grammar; grammar-free analyzers, sentence generation.

SUGGESTED READINGS:

1. Kevin Knight, Elaine Rich, B. Nair, "Artificial Intelligence", McGraw Hill Education.
2. Charniak, E., "Introduction of Artificial Intelligence", Narosa Publishing House.
3. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Pearson Education, 2nd Edition.
4. George F. Luger, "Artificial Intelligence", Pearson Education.
5. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", PHI.
6. Barrat, James, "Our final invention: Artificial intelligence and the end of the human era", Macmillan, 2013.

NOTE FOR PAPER SETTERS FOR MAJOR EXAMINATIONS -

The question paper shall be divided into sections A & B as below. No question shall be repeated in the question paper.

Section A - There shall be FIVE short answer type questions of THREE mark each. In this section, questions shall be covered from each unit and the candidates shall be required to answer all the questions. **(3 x 5 = 15 marks)**

Section B - There shall be THREE long answer type questions each set from Unit -III, IV and V with internal choice. Each question shall carry FIFTEEN marks. **(3 x 15 = 45 marks)**