

## SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

II MCA - II Semester

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16MCA225C

ARTIFICIAL INTELLIGENCE

### Course Objectives:

- To familiarize students with Artificial Intelligence techniques for building well-engineered and efficient intelligent systems
- In the applied point of view, some cutting edge applications of these systems will also be discussed.
- To have an appreciation for and understanding of both the achievements of AI and the theory underlying those achievements.
- To have an appreciation for the engineering issues underlying the design of AI systems.
- To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.
- To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs.
- To have a basic understanding of some of the more advanced topics of AI such as Learning.

### Syllabus:

#### UNIT I : Introduction

**Introduction:** What is AI? - The History of Artificial Intelligence - The State of the Art

**Intelligent Agents:** Agents & Environments - Structure of Agents.

**Solving Problems by Searching:** Problem Solving Agents – Example Problems- Searching for Solutions

#### UNIT II : Search Strategies

Uninformed Search Strategies -Avoiding Repeated States. Informed Search and Exploration: Informed (Heuristic) Search Strategies - Heuristic Functions - Local Search Algorithms and Optimization Problems - Local Search in Continuous Spaces – Defining Constraint Satisfaction Problems- Constraint Propagation: Inference in CSPs.

### **UNIT III : Knowledge and Reasoning**

**Logical Agents:** Knowledge-Based Agent - The Wumpus World – Logic - Propositional Logic - a Very Simple Logic - Propositional Theorem Proving - Effective Propositional Model Checking - Agents Based on Propositional Logic.

### **UNIT IV : First Order Logic & Knowledge Representation**

**First Order Logic:** Syntax and Semantic of First-Order Logic - Using First-Order Logic - Knowledge Engineering in First-Order Logic.

**Knowledge Representation:** Ontological Engineering - Categories and Objects - Events - Reasoning Systems for Categories - Reasoning with Default Information - The Internet Shopping World.

### **UNIT V : Uncertain Knowledge, Reasoning and Learning**

**Quantifying Uncertainty:** Acting Under Uncertainty - Basic Probability Notation - Inference Using Full Joint Distributions – Independence - Bayes' Rule and Its Use.

**Learning from Examples:** Forms of Learning - Supervised Learning - Learning Decision Trees – Artificial Neural Networks- Support Vector Machines - Ensemble Learning-Practical Machine Learning.

### **Course Outcomes:**

- Apply artificial intelligence techniques, including search heuristics, knowledge representation and reasoning.
- Describe the key components of the artificial intelligence (AI) field
- Analyze problem specifications and derive appropriate solution techniques for them
- Design and implement appropriate solutions for search problems (such as playing two-person games and solve problems by applying a suitable search method
- Analyze and apply knowledge representation.
- Use various symbolic knowledge representation to specify domains and reasoning tasks of a situated software agent.
- Use different logical systems for inference over formal domain representations, and trace how a particular inference algorithm works on a given problem specification.
- Students will also demonstrate an understanding of agent -based AI architectures

### **TEXT BOOKS:**

1. Artificial Intelligence A Modern Approach, Third Edition , Stuart J. Russell and Peter Norvig Pearson Education, 2015.

## REFERENCES:

1. Artificial Intelligence, Third Edition, Elaine Rich, Kevin Knight and Shiva shankar B Nair Tata McGraw Hill.
2. Artificial Intelligence-Structures and Strategies for Complex Problem Solving, Fifth Edition, George F. Luther, Pearson Education.
3. Introduction to Artificial Intelligence, Eugene Charniak and Drew McDermott, Pearson Education.

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