



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

## COURSE CONTENT

LOGIC PROGRAMMING FOR ARTIFICIAL INTELLIGENCE									
<b>III Semester: CSE (AI&amp;ML)</b>									
Course Code	Category	Hours / Week				Credits	Maximum Marks		
		L	T	P	C		CIA	SEE	Total
ACAD01	Core	3	0	0	3	40	60	100	
<b>Contact Classes: 48</b>	<b>Tutorial Classes: NIL</b>	<b>Practical Classes: NIL</b>			<b>Total Classes: 48</b>				
<b>Prerequisite: Python Programming</b>									

### I. COURSE OVERVIEW:

Artificial intelligence (AI) is the simulation that examines to achieve intelligent human behaviors on machines especially on a computer system. This course provides the ideas, methods, and problem-solving paradigms that helps in providing solutions to real-world problems without human effort. Furthermore, it is a mathematical language that enables knowledge to be expressed precisely and unambiguously, making it perfect for usage in AI systems. AI applications are becoming increasingly common in a wide variety of applications including machine language, deep learning, natural language processing, computer vision, and robotics.

### II. COURSES OBJECTIVES:

#### The students will try to learn:

- I Knowledge representation in solving AI problems and different search strategies and learn different search strategies.
- II The characteristics of Intelligent agents and the way the AI agents plan and act in the real world.
- III Handling uncertainty, reasoning the complex problems and models behind the AI applications.

### III. COURSE OUTCOMES:

#### At the end of the course students should be able to:

- CO1 Explain the ability to design a plan for the real-world problems and mapping it to the digital world.
- CO2 Choose appropriate problem-solving methods and optimize the search results.
- CO3 Develop agents through knowledge representation for any given AI based problem using logic programming.
- CO4 Discover how planning helps to automate complicated tasks, manage complex procedures, and optimize them for better results.
- CO5 Examine the uncertainty in designing AI systems and propose methods for reasoning.
- CO6 Model AI methods to identify problems that are amenable solved through their applications.

### IV. COURSE SYLLABUS:

#### MODULE – 1: INTRODUCTION (09)

Introduction - Definition - Future of Artificial Intelligence - Characteristics of Intelligent Agents - Typical Intelligent Agents - Problem Solving Approach to Typical AI problems.

#### MODULE – 2: PRODUCTION SYSTEMS (09)

Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs.

#### MODULE – 3: PROBLEM-SOLVING METHODS AND KNOWLEDGE REPRESENTATION (10)

Problem solving Methods - Search Strategies - Uninformed - Informed - Heuristics - Local Search Algorithms and

Optimization Problems - Searching with Partial Observations - Backtracking Search - Performance of Search Algorithms.

Using Predicate Logic: Representing Simple Facts in Logic, Representing Instance and ISA Relationships, Computable Functions and Predicates, Properties of Wff, Clausal Forms, Conversion to clausal forms, Resolution.

#### **MODULE – 4: PLANNING AND LEARNING (10)**

Planning with State-Space Search - Partial-Order Planning - Planning Graphs - Planning and Acting in the Real World - Plan Generation Systems.

Learning – Learning and its types – Discovery – Clustering – Analogy - Neural Net and Genetic Learning - Reinforcement Learning.

#### **MODULE – 5: UNCERTAIN KNOWLEDGE AND REASONING (10)**

Symbolic Reasoning Under Uncertainty: Introduction to Non monotonic Reasoning - Logics for Non monotonic Reasoning - Implementation Issues - Augmenting a Problem-solver.

Uncertainty - review of probability - probabilistic Reasoning - Bayesian networks - inferences in Bayesian networks - Temporal models - Hidden Markov models.

#### **V. TEXT BOOKS:**

1. S. Russel, P. Norvig, “Artificial Intelligence – A Modern Approach”, Third Edition, Pearson Education, 2015.

#### **VI. REFERENCE BOOKS:**

1. Kevin Night, Elaine Rich, Nair B., “Artificial Intelligence (SIE)”, Third Edition, McGraw Hill, 2017.
2. Dan W. Patterson, “Introduction to AI and ES”, Pearson Education, 2007.

#### **VII. ELECTRONICS RESOURCES:**

1. Department of Computer Science, University of California, Berkeley, <http://www.youtube.com/playlist?list=PLD52D2B739E4D1C5F>
2. NPTEL: Artificial Intelligence, <https://nptel.ac.in/courses/106105077/>
3. <http://www.udacity.com/> 4. <http://www.library.thinkquest.org/2705/>
4. <http://www.ai.eecs.umich.edu/>

#### **VIII. MATERIALS ONLINE**

1. Course Template
2. Tutorial Question Bank
3. Definition and Terminology
4. Tech-Talk topics
5. Assignments
6. Model question paper - I
7. Model question paper - II
8. Lecture notes
9. Early learning readiness videos (ELRV)
10. PowerPoint Presentations