SEMESTER - I

SUBJECT: INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Semester:	1	**CIE Marks:**	50
Course Code:	23ETC15A	**SEE Marks:**	50
Hours/Week (L:T:P):	3: 0 : 0	**Duration of SEE (Hours):**	3 hrs.
Type of Course	ETC	**Credits**	3

Prerequisites: **None**

Course Learning Objectives: The course will enable students to:

CLO1	To interpret various concepts like agents, environment in applications to AI.
CLO2	To understand and compare the various search strategies used by the agents.
CLO3	To relate and contrast different learning paradigms and understand the data.
CLO4	To understand the applications of AI in the development of Expert System.

CONTENTS	No. of Hours	RBT Level
Module 1: Introduction to AI What is AI? History of AI, Agents and Environments, Structure of Agents, Types of Agents: Simple reflex agents, Model-based reflex agent, Goal-based agents, Utility-based agents, Learning agents. **Textbook 1: Chapter 1 and 2**	**8**	**L2**
Module 2: Search Algorithms Search strategies, Best First Search, A*, AO*, Hill Climbing, Generate & Test, Alpha-Beta pruning, Min-max search, **Textbook 1: Chapter 3**	**8**	**L2**
Module 3: Data preprocessing Types of Data: Structured and Unstructured Data, Quantitative and Qualitative Data, Four Levels of data (Nominal, Ordinal, Interval, Ratio Level). Data Transformation: Handling imbalanced data, Handling time series data, Function, Power and Quantile transformers **Textbook 3: Chapter 3**	**8**	**L2**
Module 4: Feature Engineering and Learning Feature Engineering: Processes, Techniques Forms of Learning: Introduction to Supervised, Unsupervised, Semi Supervised, Self-Supervised, Weakly Supervised and Reinforcement Learning. **Textbook 3: Chapter 7**	**8**	**L2**
Module 5: Expert Systems What an expert system is; how it works and how it is built, basic components of an expert system, Expert System Architectures, Examples of Expert Systems. Rule-based Expert systems: Structure of rule based expert system, Conflict resolution, Uncertainty Management, Advantages & disadvantages of rule-based.Fuzzy based expert System (Mamdani and Sugeno Fuzzy Inference Systems) **Textbook 2: Chapter 20**	**8**	**L2**

COURSE OUTCOMES (CO): Upon completion of this course, student will be able to:

CO1	Elucidate the reasons behind AI for being an important field of study, and understand the types of agents, environments, and their relationships
CO2	Describe the Informed search algorithms that make up the fundamental building blocks of AI.
CO3	Understand the importance of preprocessing, types of data, and data transformation.
CO4	Understand different forms of learning and the importance of the structure of the data used by the agent.
CO5	Explore the application of AI ideas in the development of expert systems.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3		2							2	3	
CO2	3	3	3		2							2	3	
CO3	3	3	3		2							2	3	
CO4	3	3	3		2							2	3	
CO5	3	3	3		2							2	3	
Average	3	3	3		2							2	3	

High-3: Medium-2: Low-1

Note: Kindly discuss the relevant case studies.

Textbooks:

1. Artificial Intelligence – A Modern Approach‖, by Stuart J. Russell and Peter Norvig, 3rd EditionPearson 2015.
2. Artificial Intelligence – E. Rich and Knight, 3rd Edition, McGraw Hill International, 2016.
3. Data preprocessing in Data Mining - Salvador García, JuliánLuengo Francisco Herrera, Springer.

Reference Books:

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, CliffordStein, 3rd Edition, PHI.