MAI403-1- ARTIFICIAL INTELLIGENCE

Total Teaching Hours For Semester:30

Max Marks:50 **Credits:2**

Course Description

This course covers the basics of AI, including intelligent agents, search strategies, adversarial search, probabilistic reasoning, and AI ethics. Students will gain practical experience in implementing AI systems and addressing ethical concerns like bias and fairness.

Course Objectives

The objective is to explore AI concepts, focusing on intelligent agents, search strategies, game-playing AI, probabilistic reasoning, and ethical challenges like fairness and bias.

Course Outcomes

CO1: Implement an agent and measure problem-solving performance.

CO2: Apply search strategies and evaluate efficiency.

CO3: Develop game AI and measure decision accuracy.

CO4: Apply Bayesian Networks and assess accuracy.

CO5: Implement ethical decision-making and evaluate fairness.

Unit-1 **Teaching Hours: 6**

INTELLIGENT AGENTS

Problem-Solving Agents - Example Problems**,** Intelligent Agents: Agents and Environments, Good Behavior: The concept of rationality – The nature of Environments, The Structure of Agents -Expert Systems-Types of Expert Systems

Unit-2 **Teaching Hours: 6**

SEARCH IN COMPLEX ENVIRONMENTS

Uninformed Search Strategies - Informed (Heuristic) Search Strategies - Heuristic Functions.
Local Search and Optimization Problems - Local Search in Continuous Spaces - Search with Nondeterministic Actions-Search in Partially Observable Environments.

Unit-3 **Teaching Hours: 6**

ADVERSARIAL SEARCH AND GAMES

Game Theory - Optimal Decisions in Games - Heuristic Alpha–Beta Tree Search - Monte Carlo Tree Search - Stochastic Games - Partially Observable Games - Limitations of Game Search Algorithms

Unit-4 **Teaching Hours: 6**

QUANTIFYING UNCERTAINTY

Probabilistic Reasoning. Representing Knowledge in an Uncertain Domain-The Semantics of Bayesian Networks-Exact Inference in Bayesian Networks-Approximate Inference for Bayesian Networks-Causal Networks

Unit-5 **Teaching Hours: 6**

AI AND ETHICAL CHALLENGES

Ethical Considerations on AI, Case Studies Planning and Acting in the Real World: Biased AI covers gender bias, stereotypes, and search engine bias. AI in Law explores justice automation, transparency, and privacy risks. AI & Art examines copyright issues and creativity. Autonomous Cars discuss ethical decision-making and safety.

Essential Reading

[1] E. Rich and K. Knight, Artificial Intelligence, 3rd Edition, New York: TMH, 2019(refer for **Unit1, Unit2** and **Unit3**)

[2] S. Russell and P. Norvig, Artificial Intelligence A Modern Approach, 3rd Edition, Pearson Education, 2019.(refer for **Unit4**)

Recommended Reading

[1] Eugene Charniak and Drew McDermott, Introduction to Artificial Intelligence, 2nd Edition. Pearson Education, 2005.

[2] George F Luger, Artificial Intelligence Structures and Strategies for Complex Problem Solving, 4th Edition. Pearson Education, 2008

[3] N.L. Nilsson, Artificial Intelligence: A New Synthesis, 1st Edition. Morgan Kaufmann, 2000

Web links

(Unit5)

https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai
https://www.unesco.org/en/artificial-intelligence/recommendation-ethics
https://www.unesco.org/en/artificial-intelligence/recommendation-ethics/cases

CO – PO Mapping

	PO1:Disciplinary Expertise	PO2:Critical Thinking and Problem Solving	PO3:Research Skills	PO4:Communication Skills	PO5: Technological Skills	PO6:Social and Environmental Responsibility	PO7:Leadership and Employability:
CO1	3	3	2	1	3	1	1
CO2	1	3	1	1	3	2	1
CO3	2	3	2	2	3	2	2
CO4	1	2	3	1	2	2	2
CO5	2	3	3	2	2	3	1

Evaluation Pattern

50 %	50%
CIA	ETE