UNIVERSITY OF MADRAS

B.Sc. DEGREE PROGRAMME IN COMPUTER SCIENCE

SYLLABUS WITH EFFECT FROM 2023-2024

Year: III **Semester: VI**

Artificial Intelligence	**325E6A**
Credits 3	**Lecture Hours:5 per week**

Learning Objectives: (for teachers: what they have to do in the class/lab/field)

- To Acquire Knowledge on various AI Techniques and Expert Systems
- To have enriched knowledge regarding heuristic search, Knowledge representation and Expert systems

Course Outcomes: (for students: To know what they are going to learn)

CO1: Develop an understanding of modern concepts in AI and where they can be used

CO2: Design, implement and apply novel AI techniques based on emerging real-world requirements

CO3: Develop an understanding of where and how AI can be used.

Units	**Contents**
I	Introduction–Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents–Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.
II	Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems -Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games
III	Knowledge Representation First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation –Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories -Reasoning with Default Information
IV	Software Agents Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems.
V	Representing knowledge using rules: Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge Brief explanation of Expert Systems- Definition- Characteristics-architecture- Knowledge Engineering- Expert System Life Cycle-Knowledge Acquisition Strategies- Expert System Tools.

Learning Resources:

Recommended Texts

1. Elaine Rich and Kevin Knight, Shiva Shankar Nair, "Artificial Intelligence", McGraw-Hill Companies, 3rd edition.

Reference Books

1. Stuart Russell & Peter Norvig , "*Artificial Intelligence A Modern Approach*", Perason, 2nd Edition.
2. George F Luger , "*Artificial Intelligence"*, Pearson 2002, 4th Edition.
3. V S Janaki Raman, K Sarukesi, P Gopalakrishnan, "*Foundations of Artificial Intelligent and Expert Systems*", MacMillan India limited.

Web resources

1. NPTEL & MOOC courses titled Artificial Intelligence and Expert Systems
2. https://nptel.ac.in/courses/106106140/
3. https://nptel.ac.in/courses/106106126/