UNIVERSITY OF MADRAS
MASTER OF COMPUTER APPLICATIONS (MCA) DEGREE PROGRAMME
SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Paper	**Artificial Intelligence**		
Core- X Theory	II Year & III Semester	Credit:4	535C3B

Objectives:

- To impart knowledge about Artificial Intelligence.
- To give understanding of the main abstractions and reasoning for intelligent systems.
- To enable the students to understand the basic principles of Artificial Intelligence in various applications.
- To identify the scope of Artificial Intelligence in real life applications
- To enable decoding of human thinking process and find the ways of making the machine decide intelligently in lieu of number crunching.

Outcomes:

- Solve basic AI based problems.
- Define the concept of Artificial Intelligence.
- Apply AI techniques to real-world problems to develop intelligent systems.
- Select appropriately from arrange of techniques when implementing intelligent systems.
- Possess the basic knowledge of different machine learning techniques.

Unit I: AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

Unit II: Searching- Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Hill climbing, A*, AO* Algorithms, Problem reduction, Game Playing-Adversial search, Games, mini-max algorithm, optimal decisions in multiplayer games, Problem in Game playing, Alpha-Betapruning, Evaluation functions.

Unit III: Knowledge representation issues, predicate logic- logic programming, semanticnets-frames and inheritance, constraint propagation, representing knowledge using rules,rules-based deduction systems. Reasoning under uncertainty, review of probability, Baye's probabilistic interferences and dempster Shafertheory.

Unit IV: First order logic. Inference in first order logic, propositional vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution, learning from observation Inductive learning, Decision trees, Explanation based learning, Statistical Learning methods, Reinforcement Learning.

Unit V: Expert systems:- Introduction, basic concepts, structure of expert systems, thehuman element in expert systems how expert systems works, problem areas addressed byexpert systems, expert systems success factors, types of expert systems, expert systems and the internet interacts web, knowledge engineering, scope of knowledge, difficulties, in knowledge acquisition methods of knowledge acquisition, machine learning, intelligent agents, selecting an appropriate knowledge acquisition method, societal impacts reasoning in artificial intelligence, inference with rules, with frames: model based reasoning, case based reasoning, explanation & meta knowledge inference with uncertainty representing uncertainty.

Recommended Texts:

1. S. Russel and P. Norvig, 2003,"ArtificialIntelligence – A Modern Approach",SecondEdition, Pearson Education.

Reference Books:

1. David Poole, Alan Mackworth, Randy Goebel, 1998, "Computational Intelligence : alogicalapproach",Oxford UniversityPress.

2. G.Luger,2001,"ArtificialIntelligence:StructuresandStrategiesforcomplexproblem solving",Fourth Edition,Pearson Education.

3. J.Nilsson,1998,"Artificial Intelligence:AnewSynthesis",ElsevierPublishers.

4. Elaine Rich, Kevin Knight and Shivashankar B Nair, 2010, Artificial Intelligence, 3rded.,Tata McGrawHill.

5. Dan W. Patterson, 1995, Introduction to Artificial Intelligence and Expert Systems, PearsonEducation.

Web References:

1. https://artint.info/index.html

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Outline the applicability, strength and weakness of artificial intelligence in	K1-K6
CO2	solving computational problems	K1-K6
CO3	Demonstrate the role of knowledge representation, problem solving and learning in Intelligent-system engineering	K1-K6
CO4	Identify the characteristics of AI, Knowledge representation, Experts systems and its variants with ANN and robotics.	K1-K6
CO5	Assess the scientific background through various real time examples	K1-K6

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5 Evaluate, K6- Create

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	M	M	L	S	L	L
CO2	S	M	S	M	S	S	M	L	M	L
CO3	M	S	S	S	M	S	L	M	L	M
CO4	S	L	M	M	S	L	L	M	M	S
CO5	S	M	S	S	M	M	L	S	L	L

S- Strong; M-Medium; L-Low