

Course Code	Course Title	L	T	P	C
OLMCA601	Artificial Intelligence	3	1	0	4
Pre-requisite	NIL	Syllabus version			
Course Objectives		1.0			
1. To present an overview of artificial intelligence (AI) principles and approaches.					
2. To develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents: Search, Knowledge representation, inference, logic, and learning.					
3. To investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.					
Course Outcome					
1. Gain knowledge of artificial intelligence principles and its foundations, representation and learning.					
2. Illustrate the construction of learning and expert system					
3. Formalize a given problem in the language/framework of different AI methods.					
4. Apply different search techniques for solving real world complex problems and select the most appropriate solution by comparative evaluation.					
5. Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.					
Module:1	Introduction to Artificial Intelligence				
Introduction, Brief History, Intelligent Systems, Categorization of Intelligent Systems, Components of AI Program, Foundations of AI, Sub-areas of AI, Applications, Development of AI Languages, Current Trends in AI, Future of AI.					
Module:2	Intelligent Agents				
Rational Agents, Mapping from Sequences to Actions, Properties of Environments, Structure of Intelligent Agents, Types of Agents: Simple Reflex Agents, Goal Based Agents, Utility Based Agents.					
Module:3	Searching Strategies				
Problem Solving Agents- Searching for solutions – Problem space – State space – Blind space, Uninformed search strategies – (Breadth First, Uniform cost, Depth First, Depth Limited, Iterative deepening depth first, bidirectional), informed search strategies – (Greedy best first, A*, Optimality of A*, Memory bounded), Heuristic Functions.					
Module:4	Knowledge Representation and Reasoning				
First Order Logic: Syntax and Semantics of First-Order Logic, using First order logic, Knowledge Engineering in First-Order Logic. Inference in First Order Logic- Unification and Lifting, Forward Chaining, Backward chaining, resolution.					
Module:5	Uncertainty and Knowledge Reasoning				
Probabilistic Reasoning - Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Relational and First-Order Probability Models.					
Module:6	Neural Network based Learning Systems				
Neural Networks and their biological roots and motivations, Learning rules and activation functions, Single layer and Multilayer Perceptron's , Feed forward and Back propagation networks, Architecture of Backpropagation (BP) Networks, Architecture of Deep Network, Restricted Boltzmann Machines.					
Module:7	Expert Systems				
Introduction, Basic concepts, Structure of expert systems, the human element in expert systems, How expert systems works, Problem areas addressed by expert systems, Expert systems success factors, Types of expert systems, Expert systems and the internet interacts web.					
	Total Lecture Hours		120 hours		

Text Book(s)			
1.	Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI, Pearson Education, 2020.		
Reference Books			
1.	Artificial Intelligence – Structures and Strategies for Complex Problem Solving , George F Luger, Addison Wesley, Fifth Edition, 2004.		
2.	Artificial Intelligence, Sixth Edition, Patrick Henry Winston., Pearson Edition, 2009.		
Mode of Evaluation: Quiz/Assignment/Mid-Term, FAT			
Recommended by Board of Studies		27-07-2022	
Approved by Academic Council		N0.67	Date 08-08-2022