

Course Code	Course Title	L	T	P	C
PMDS601L	ARTIFICIAL INTELLIGENCE	3	0	0	3
Pre-requisite	NIL	Syllabus version			
		1.0			
Course Objectives					
<div>1. To sketch an overview of artificial intelligence (AI) principles and approaches.</div> <div>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.</div> <div>3. To demonstrate the applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.</div>					
Course Outcome					
At the end of the course, the students will be able to: <div>1. Gain knowledge of artificial intelligence principles and its foundations, representation and learning.</div> <div>2. Illustrate the construction of learning and expert system.</div> <div>3. Formalize a given problem in the language/framework of different AI methods.</div> <div>4. Apply different search techniques for solving real world complex problems and select the most appropriate solution by comparative evaluation.</div> <div>5. Attain the capability to represent various real life problem domains using logic-based techniques and use this to perform inference or planning.</div>					
Module: 1	Introduction to AI	2 hours			
Philosophy of artificial intelligence, Definitions - Evolution of AI - Applications of AI, Classification of AI- Intelligent Agents: Agents and Environment-Nature of Environment-Structure Environment					
Module: 2	Intelligent Agents	4 hours			
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	8 hours			
Problem Solving Agent - Blind Search- Performance measures - Informed Search: Introduction to Heuristics-Variants of heuristic search-uniform cost, A*, Greedy - Overview of Hill Climbing – Simulated Annealing – Genetic Algorithms – Adversarial Search – Minimax, Alpha beta pruning - Constraint Satisfaction Problem.					
Module: 4	Knowledge Representation and Reasoning	8 hours			
Logical Agents-Knowledge-Based Agents- The Wumpus World- Logic-Propositional Logic-Propositional Theorem Proving- 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,					

Propositional vs. First order logic-Forward Chaining, Backward chaining, resolution.			
Module: 5	Uncertainty and Knowledge Reasoning		7 hours
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	Design of Expert System		9 hours
Introduction to Expert system, 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.			
Module: 7	Applications of Artificial Intelligence		5 hours
AI in Business - Health care – Robotics - Social media - Defence – Cyber security.			
Module: 8	Contemporary Issues		2 hours
	Total Lecture hours		45 hours
Text Book(s)			
1	Elaine Rich, Kevin Knight, Artificial Intelligence, 2019, 3/Edition, Tata McGraw Hill.		
2	Deepak Khemani, A First Course in Artificial Intelligence, 2017, 1/Edition, Tata McGraw Hill Education.		
Reference Book (s)			
1	Stuart Russel and Peter Norvig, Artificial Intelligence, 2016, 3 rd Edition, Pearson.		
2	N.P. Padhy, Artificial Intelligence and Intelligent Systems, 2005, Oxford University Press.		
3	Ivan Bratko, PROLOG Programming, 2020, 4 th Edition, Pearson Education.		
Mode of Evaluation: CAT, Assignment, Quiz and FAT			
Recommended by Board of Studies		15.02.2024	
Approved by Academic Council		No. XX	Date DD-MM-YYYY

Course Code	Course Title	L	T	P	C
PMDS601P	ARTIFICIAL INTELLIGENCE LAB	0	0	2	1
Pre-requisite	NIL	Syllabus version			
		1.0			
Course Objectives					
<div><div>1. Understand the implementation procedures for the machine learning algorithms using Matlab /R/Python, Weka (Machine Learning software in JAVA).</div><div>2. Understand modern notions in data analysis-oriented computing and conduct experiments to design a component or a product applying all the relevant standards with realistic constraints.</div></div>					
Course Outcomes					
<div>At the end of the course, the students will be able to:</div> <div><div>1. Apply appropriate data sets to the Machine Learning algorithms.</div><div>2. Identify and apply Machine Learning algorithms to solve real world problems.</div></div>					
Indicative Experiments					
1	Facts, objects, predicates and variables in PROLOG.				
2	Rules and Unification in PROLOG.				
3	Arithmetic operators, simple input/output and compound goals in PROLOG.				
4	Recursion in PROLOG.				
5	Lists in PROLOG.				
6	String operations in PROLOG. Implement string operations like substring, string position, palindrome etc.				
7	Write a prolog program to implement all set operations (Union, intersection, complement etc in PROLOG.				
8	Solving Missionaries and cannibals problems and Water Jug Problem, 8-Queens Problem, Travelling Salesman Problem				

9	Wampus Problem using Logic, Monkeys and Bananas Problem using Logic.		
10	Development of Medical Expert system with Recommendation system		
		Total Laboratory Hours	30 hours
Text Book(s)			
1	Daume, H., A Course in Machine Learning, 2015, Alanna Maldonado.		
2	Elaine Rich and Kevin Knight, Artificial Intelligence, 2019, 3 rd Edition, Tata McGraw Hill.		
Reference Book(s)			
1	Christopher Bishop, Pattern Recognition and Machine Learning, 2013, Springer.		
2	Balas K Natarajan, Machine Learning, 2014, Elsevier Science.		
3	Tom Mitchell, Machine Learning, 2010, McGraw-Hill Education.		
Mode of Evaluation: Assignment and FAT			
Recommended by Board of Studies		15.02.2024	
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