Course Code	UCA20D06J	Course Name	ARTIFICIAL INTELLIGENCE	Course Category	D	Discipline Specific Elective Course	L	T	P	C
							4	0	4	6

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Applications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning

		Learning		
CLR-1 :	*Discover problems that are agreeable to solution by AI methods.*	1	2	3
CLR-2 :	*Study the basics of designing intelligent agents that can solve general purpose problems*	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
CLR-3 :	*Discover appropriate AI methods to solve a given problem*			
CLR-4 :	*Perform intellectual task as decision making, problem solving, perception, understanding*			
CLR-5 :	*Formalize a given problem using different AI methods*			
CLR-6 :	*Provides adaptive learning*			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	*Demonstrate fundamental understanding of the history of artificial intelligence and its foundations*	2	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-2 :	*Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning*	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-3 :	*Identify systems with Artificial Intelligence. evaluation of different algorithms on a problem formalization*	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-4 :	*Use classical Artificial Intelligence techniques, such as search algorithms,*	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-5 :	*Ability to apply Artificial Intelligence techniques for problem solving.*	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-6 :	*Ability to learn the current Artificial Intelligence techniques.*	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-

Duration (hour)		24	24	24	24	24
S-1	SLO-1	Introduction to Artificial Intelligence	Logical Reasoning-Introduction	Planning: designing programs to search for data or solutions to problems	Uncertain Knowledge and reasoning	Learning
	SLO-2	History of AI- AI Techniques	Knowledge Representation	Forward search and backward search	Quantifying uncertainty	Learning agents
S-2	SLO-1	Problem Solving with AI- AI models	Logical Agents: Knowledge based Agents	state-space search	Probability Theory: Uncertain Knowledge	Classification of learning
	SLO-2	Data Acquisition and Learning Aspects in AI	The Wumpus World & Logic	Represent the current state and goal state	Axioms of probability	Learning elements

S-3	SLO-1	Problem-Solving Process	Propositional logic	Problems to solve: Water Jug Problem	Bayes Theorem	Inductive Learning methods
	SLO-2	Formulating Problems	Propositional logic: Syntax & Syntax grammar	State representation: Initial, operator, goal state	Bayes' Rules & uses	Learning decision tree
S-4	SLO-1	Problem Types and Characteristics	Inference	Train travel problem	probabilistic Reasoning	Attribute based representation
	SLO-2	Problem Analysis and Representation	Implication by inference Types of reasoning	State representation: Initial, operator, goal state	Uncertainty: Causes of uncertainty:	Choosing an attributes
S 5-8	SLO-1	Lab1: program showing the various possibilities involved in solving a water jug problem.	La43: program for Tic Tac Toe game played by Single player against automated Computer player.	Lab7: Program for building a magic square of Odd number of Rows and columns.	Lab10: Program for solving A* shortest path algorithm.	Lab13: Program which demonstrate the precedence properties of operators in C language.
	SLO-2					
S-9	SLO-1	Agents- Examples of Agents	First-Order logic	partial-order planning	Probability	Decision tree learning
	SLO-2	Types of agents	Syntax of First-Order logic	Basic representation Operator representation	Probability of occurrence\	Hypothesis Spaces
S-10	SLO-1	General Search algorithm Uniformed Search Methods	Basic elements of First order logic Reducing first-order inference	planning graphs	Conditional probability	Information theory
	SLO-2	Heuristic Search Techniques	Quantifiers in First-order logic	Planning graph of feeding	Probability occurrence for the problem	Information gain
S-11	SLO-1	BFS, Uniform Cost Search	Inference in first order logic and Generalized rules for FOL	Uses of planning graph	Bayesian networks	Explanation based learning
	SLO-2	Depth First search , Depth Limited search (DLS)	FOL inference rules for quantifier	Planning graph example	Types of Bayesian Network	Hypothesis
S-12	SLO-1	Iterative Deepening search algorithm	Forward chaining	Graph plan algorithm	Building model op Bayesian Network	Statistical Learning methods
	SLO-2	Iterative Deepening search for DFS	Properties of forward chaining	Using planning graphs for heuristics	Directed Acyclic Graph	Naïve Bayes
S 13-16	SLO-1	Lab2: Program for solving a water jug problem using Breadth first search and Depth first search	Lab5: program for Tic Tac Toe game played by two different human players.	Lab8: Program for building a magic square of Even number of Rows and columns.	Lab11: Program which demonstrates Best First Search.	Lab14:program to calculate factorial of a number
	SLO-2					
S-17	SLO-1	Informed Search-Introduction	Fast conversion of forward chaining	planning and acting in the real world	Conditional probability	Instance base learning
	SLO-2	General tree search: Evaluation function	Properties of forward chaining Examples for forward chaining	Basic Planning	Bayesian Network Graph	Neural Networks
S-18	SLO-1	General graph search: Evaluation function	Backward Chaining	Real world: JOB shop scheduling	Inferences in Bayesian networks	Reinforcement Learning
	SLO-2	Generate and Test BFS	Properties of Backward chaining Examples for Backward chaining	Critical path method	Components of Bayesian Network	Elements of reinforce learning
S-19	SLO-1	Generate and Test A* algorithm	Unification	Forward march	Temporal models	Reinforcement learning problem
	SLO-2	Generate and Test AO* algorithm	Conditions for Unification & Unification algorithm	Backward march	Inference in temporal models	Agent environment interface
S-20	SLO-1	constraint satisfaction	Resolution for inference rule	Limited resources	Hidden Markov models	Steps for Reinforcement learning
	SLO-2	Perform the task for given CSP:	Steps for Resolution	Hierarchical Planning	HMM components	Problem solving methods for RL
S	SLO-1	Lab3: program to find out route	Lab6:program to implement Tower	Lab 9:program to implement five	Lab12:program to solve 8-Queens	Lab15:program to implement five

21-24	SLO-2	distance between two cities	of Hanoi	House logic puzzle problem	problem	House logic puzzle problem

Learning Resources	Russel.SandNorvig.P, (2003), "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education

Learning Assessment

Level	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers

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