

Branch Name:	MCA
Program Code:	CS201
Course Name:	Introduction to Artificial Intelligence
Course Code:	4CS2010203T
Pre-requisite Course:	Basic programming concepts, data structures, discrete mathematics, fundamentals of algorithms and complexity, probability theory

Course Objective:

1. Introduce the core principles and historical development of AI.
2. Familiarize students with intelligent agent design and problem-solving strategies such as search algorithms.
3. Equip students with knowledge of knowledge representation, reasoning, and planning techniques.
4. Develop understanding of Prolog, logical Programming learning.
5. Expose students to applications of AI in areas like Search, Games and Problem Solving.
6. Encourage ethical awareness and critical thinking regarding the societal impact of AI technologies.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	-	3	60	40	-	-	100

Course Contents:			
Unit No	Topics	Total Hours	Weightage (%)
1	Introduction and Logics: Basics of artificial intelligence, the history of AI, agents, knowledge-based systems. Propositional Logic: Syntax, Semantics, Proof Systems, Resolution, Horn Clauses, Computability and Complexity, Applications and Limitations First-order Predicate Logic: Logic Syntax, Semantics, Quantifiers and Normal Forms, Basic Examples of First-order Logic Statements	11	25
2	Limitations of Logic: The Search Space Problem, Decidability and Incompleteness, The Flying Penguin, Modeling Uncertainty Python arrays, Access the Elements of an Array, array methods, Lambda function.	05	10

3	Logic Programming with PROLOG: PROLOG Systems and Implementations, Simple Examples, Execution Control and Procedural Elements, Lists, Self-modifying Programs, A Planning Example, Constraint Logic Programming	05	10
4	Search, Games and Problem Solving: Introduction, Uninformed Search, Breadth-First Search, Depth-First Search, Iterative Deepening, Comparison, Cycle Check, Heuristic Search, Greedy Search, A★-Search, Route Planning with the A★ Search Algorithm, IDA★-Search, Empirical Comparison of the Search Algorithms, Summary, Games with Opponents, Minimax Search, Alpha-Beta-Pruning, Non-deterministic Games, Heuristic Evaluation Functions, Learning of Heuristics, State of the Art.	12	30
5	Reasoning with Uncertainty: Reasoning with Uncertainty, Computing with Probabilities, Conditional Probability, The Principle of Maximum Entropy, An Inference Rule for Probabilities, Maximum Entropy Without Explicit Constraints, Conditional Probability Versus Material Implication, MaxEnt-Systems, The Tweety Example, Reasoning with Bayesian Networks, Independent Variables, Graphical Representation of Knowledge as a Bayesian Network, Conditional Independence, Practical Application, Software for Bayesian Networks, Development of Bayesian Networks	12	25

Textbooks:

1. Introduction to Artificial Intelligence, By: Wolfgang Ertel, 2nd Edition, Springer

References Books:

1. Artificial Intelligence A Modern Approach, By: Stuart Russell and Peter Norving, 3rd Edition, Pearson Publication
2. First Course In Artificial Intelligence, By Deepak Khemani, Mc Graw Hill
3. Artificial Intelligence, By Elaine Rich and Kevin Knight, 2nd Edition, Mc Graw Hill
4. Artificial Intelligence: Making a System Intelligent, By: Dr. Nilakshi Jain, As per AICTE, Wiley Publication
5. Introduction to Artificial Intelligence, By: Eugene Charniak and Drew McDermott, Addison-Wesley Series in Computer Science
6. Artificial Intelligence: An Engineering Approach, By: Robert J. Schalkoff, Mc Graw Hill,
7. Programming in Prolog: Using the ISO Standard, By: William F. Clocksin, Christopher S. Mellish, 5th Edition, Springer

List of Useful websites / MOOCs

1. Learners are advised to opt for NPTEL and SWAYAM courses that are relevant to this course

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Apply formal logic systems to represent and reason with knowledge.	Remembering Understanding Applying
CLO2	Analyze the inherent limitations of classical logic in AI	Remembering Analyze
CLO3	Develop logic program using PROLOG	Applying
CLO4	Implement search strategies and game-playing algorithms for effective problem-solving in AI	Applying
CLO5	Apply probabilistic reasoning and Bayesian networks to handle uncertainty	Applying

Mapping of CLOs with Pos & PSOs

Course Learning Outcomes	Program Out comes (POs)												Program Specific Outcomes (PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1	M	M	H	L		L		L	L			L	L	L
CLO2	H	M	M	L		M		L		M		L		
CLO3	M	L	H	H	M	M	L	M			M	H	M	H
CLO4	H	H	H	M	M	H	M	H	M		M	H	H	M
CLO5	H	M	M	M		H	H	H	M		M	H	H	M

H: High, M: Medium, L: Low