

Course Code CSA2001	FOUNDAMENTALS IN AI and ML	Course Type	LTP
		Credits	4
Course Objectives: <ul style="list-style-type: none">To understand the various characteristics of Intelligent agentsTo learn about the different search strategies in AITo learn to represent knowledge in solving AI problemsTo understand the different ways of designing software agents and PrologTo learn the Machine Learning Techniques			
Course Outcomes: <p>At the end of the course, students should able to</p> <ul style="list-style-type: none">Analyze and Design problems using various AI techniquesSolve the prediction and Classifications problemsUndertand the Prolog Programming			
Student Outcomes (SO): a, b, c, l <p>a. An ability to apply the knowledge of mathematics, science and computing appropriate to the discipline</p> <p>b. An ability to analyze a problem, identify and define the computing requirements appropriate to its solution.</p> <p>c. An ability to design, implement and evaluate a system / computer-based system, process, component or program to meet desired needs</p> <p>l. An ability to apply mathematical foundations, algorithmic principles and computer science theory in the modeling and design of computer-based systems (CS)</p>			
Module No.	Module Description	No.of Hours	SO
1	UNIT I INTRODUCTION Introduction–Definition - Future of Artificial Intelligence Characteristics of Intelligent Agents - Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.	6	a, b, c
2	UNIT II PROBLEM SOLVING METHODS Problem solving Methods - Search Strategies- Uninformed - Informed - Heuristics - Local Search Algorithms and Optimization Problems - Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation - Backtracking Search - Game Playing – Optimal Decisions in Games – Alpha - Beta Pruning - Stochastic Games	10	a, b, c
3	UNIT III KNOWLEDGE REPRESENTATION First Order Predicate Logic – Prolog Programming – Unification Forward Chaining-Backward Chaining – Resolution – Knowledge Representation - Ontological Engineering-Categories and Objects –	8	a, b, i

	Events - Mental Events and Mental Objects - Reasoning Systems for Categories - Reasoning with Default Information.		
4	UNIT IV SOFTWARE AGENTS and PROLOG Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems. Facts and predicates, data types, goal finding, backtracking, simple object, compound objects, use of cut and fail predicates, recursion, lists, simple input/output, dynamic database.	11	a, b, i
5	UNIT V INTRODUCTION TO MACHINE LEARNING Learning – Types of Machine Learning – Supervised Learning – Reinforcement Learning - The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis –Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.	8	a, b, c
5	Guest Lecture on Contemporary Topics	2	
	Total Hours:	45	

Mode of Teaching and Learning: *Flipped Class Room, Activity Based Teaching/Learning, Digital/Computer based models, wherever possible to augment lecture for practice/tutorial and minimum 2 hours lectures by industry experts on contemporary topics*

Mode of Evaluation and assessment:

The assessment and evaluation components may consist of unannounced open book examinations, quizzes, student's portfolio generation and assessment, and any other innovative assessment practices followed by faculty, in addition to the Continuous Assessment Tests and Term End Examinations.

Text Book(s):

1. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition, 2009.

References:

1. Bratko, Prolog: Programming for Artificial Intelligence, Fourth edition, Addison-Wesley Educational Publishers Inc., 2011.
2. Stephen Marsland, Machine Learning – An algorithmic perspective, Second Edition,
3. Chapman and Hall/CRC Machine learning and Pattern Recognition Series, 2014.

Indicative List of Experiments

No.	Description of Experiment	SO
1	Study of facts, objects, predicates and variables in PROLOG.	1
2	Study of Rules and Unification in PROLOG.	1
3	Study of “cut” and “fail” predicate in PROLOG.	1
4	Study of arithmetic operators, simple input/output and compound goals in PROLOG.	1

5	Study of recursion in PROLOG.	1
6	Study of Lists in PROLOG.	1
7	Study of dynamic database in PROLOG.	1
8	Study of string operations in PROLOG. Implement string operations like substring, string position, palindrome etc.)	1
9	Write a prolog program to maintain family tree.	1
10	Write a prolog program to implement all set operations (Union, intersection, complement etc.)	1
11	Write a prolog program to implement Library Management system.	1

<i>Recommendation by the Board of Studies on</i>	01.07.2019
<i>Approval by Academic council on</i>	20.01.2020
<i>Compiled by</i>	Dr S Sountharajan