Course: MCA (A.Y.-II) 2020 **Semester:** 2

Prerequisite: Knowledge of data structures and discrete mathematics.

Rationale: To make students aware of knowledge representation, problem solving, heuristic search techniques, learning and development of expert system using prolog, machine learning in AI.

Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs/Week	Tutorial Hrs/Week	Lab Hrs/Week	Hrs/	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	1	2	-	5	20	20	20	60	30	150

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

Course Content

W - Weightage (%) , **T** - Teaching hours

Sr.	Topics	W	T
1	**Introduction** Definition, Basic elements of Artificial Intelligence (AI), Applications of AI,History of AI,AI techniques.	10	5
2	**Heuristic Search Techniques** Generate and test, Hill climbing, Best-First search, Problem reduction, Constraint satisfaction, Means-Ends analysis	13	6
3	**Problems, Problems Spaces and Search** Production systems, Problem characteristics, Production system characteristics, Design issues of search algorithms.	10	5
4	**Knowledge Representation** **Knowledge & Knowledge representation issues:** General concepts, Definition and importance of knowledge, Representations and mappings, Approaches to knowledge representation, Frame problem. **Using predicate knowledge:** Representing instance and Is-a relationship, Computable functions and predicates, Resolutions, Natural deduction.	13	6
5	**Representing Knowledge Using Rules** Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning.	10	5
6	**Symbolic Reasoning Under Uncertainty** Introduction To Nonmonotonic Reasoning, Logics For Non-monotonic Reasoning	10	5
7	**Statistical Reasoning** Probability And Bays' Theorem, Certainty Factors And Rule-Base Systems, Bayesian Networks, DempsterShafer Theory	10	5
8	**Prolog** Introduction, Converting English to facts and rules, Prolog terminology, Variables, Control structures, Arithmetic operators, Matching, Backtracking, Cuts	17	8
9	**Machine Learning** Introduction Features of ML,Needs of ML,Classification of ML,Applications of ML	7	3

Reference Books

1.	**Artificial Intelligence (TextBook)** By Elaine Rich and Kevin Knight | TMH
2.	**Artificial Intelligence :A Modern Approach** By Stuart J. Russell and Peter Norvig | PEARSON EDUCATION LIMITED
3.	**Artificial Intelligence and Expert Systems** By D.W.Patterson | PHI
4.	**Expert Systems Principles and Programming** By Giarratano & Riley son | Vikas Publishing House | 3rd Edition

Course Outcome

After Learning the Course the students shall be able to:

1. Summarize elements, techniques and applications of Artificial Intelligence.
2. Recognize problem characteristics and design issues in search algorithms.
3. Identify problem using suitable approach for representing knowledge into logic.
4. Describe various techniques for game playing and planning.
5. Describe essentials of natural language processing and prolog.

List of Practical

1.	**Write a program to implement Tic Tac Toe game.**
2.	**Write a program to implement BFS 8 Puzzle problem.**
3.	**Write a program to implement DFS Water Jug Problem.**
4.	**Write a program to implement N Queens Problem.**
5.	**Write a program to implement Tower of Hanoi Problem.**
6.	**Write a prolog program for the family tree.**
7.	**Write a program to solve N-Queens problem using Prolog.**
8.	**Write a program to solve 8 puzzle problem using Prolog.**
9.	**Case Study: Recent application of Artificial Intelligence in daily life. Ex. Voice recognition, face detection etc.**

Miscellaneous

Useful Links

https://sites.google.com/a/paruluniversity.ac.in/wcm/
https://www.javatpoint.com/artificial-intelligence-tutorial
https://www.tutorialspoint.com/artificial_intelligence/index.htm
https://www.geeksforgeeks.org/search-algorithms-in-ai/