

Devi Ahilya University, Indore, India Institute of Engineering & Technology			IV Year B.E. (Information Technology) (Full Time)				
Subject Code & Name	Instructions Hours per Week			Credits			
7ITRC3	L	T	P	L	T	P	Total
Artificial Intelligence	3	1	0	3	1	0	4
Duration of Theory Paper:3 Hours							

Course Objectives:

1. To impart knowledge about Artificial Intelligence.
2. To give understanding of the main abstractions and reasoning for intelligent systems.
3. To enable the students to understand the basic principles of Artificial Intelligence in various applications.

Course Outcome:

Students earned credits will develop ability to

CO.No.	COs	POs
CO1	Describe various characteristics of Intelligent Agents.	PO-1, PO-2, PO-3
CO2	Apply difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing	PO-1, PO-2, PO-3, PO-4
CO3	Examine AI problems as Constraint Satisfaction Problems.	PO-1, PO-2, PO-3
CO4	Justify the scope of Uncertainty in AI problem Solving and its applications	PO-2, PO-3, PO-4
CO5	Examine the issues involved in knowledge bases, reasoning systems and planning	PO-2, PO-3, PO-4
CO6	Apply knowledge to synthesize efficient algorithms in common engineering design situations	PO-5, PO-6, PO-9
CO7	Design and evaluate intelligent Expert System	PO-6, PO-9, PO-11,
CO8	Understand the fundamental concepts of neural network, Genetic algorithms	PO-1, PO-2, PO-3

CO-PO Relationship

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO1	3	3	3									
CO2	3	2	3	2								
CO3	2	3	3									
CO4		3	3	3								
CO5		2	2	3								
CO6					3	3			3			
CO7						3			3		2	
CO8	3	2	3									

* CO (rows) mention nil/very small/insignificant contribution to the PO(column) 1→ relevant and small significance 2 → medium or moderate and 3 →strong

COURSE CONTENTS

UNIT-I

Introduction: Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics Problem solving methods – Defining the problem as state space search, Problem graphs, Matching, Indexing and Heuristic functions.

UNIT-II

Search Techniques: Hill Climbing-Depth first and Breath first, heuristic search strategies- Best-first search, A*, AO* search, Constraints satisfaction, Means end analysis, simulated annealing, etc. Measure of performance and analysis of search algorithms. Adversarial search –Minimax search procedure, alpha-beta pruning, iterative deepening, genetic algorithms - Related algorithms, etc.

UNIT-III

Representation of Knowledge : Game playing - Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge. Knowledge representation -Production based system, Frame based system, Scripts, CD, Ontologies, Sementic web and RDF.

UNIT-IV

Knowledge Inference and Planning: Inference – Backward chaining, forward chaining, Rule value approach, uncertain knowledge and reasoning: Probabilistic reasoning, Bayesian networks, Fuzzy logic and reasoning, Theory-Bayesian Network-Dempster - Shafer theory. Planning overview, components of planning system, Goal stack planning, Hierarchal planning, and other planning techniques.

UNIT-V

Machine Learning and Expert Systems: Overview of different forms of learning, Statistical methods, Learning Decision Trees, Neural Networks, Clustering- basic agglomerative, divisive algorithm based on similarity/dissimilarity measures. Introduction to Natural Language Processing.

Architecture of expert systems, Roles of expert systems - Knowledge Acquisition –Meta knowledge. Typical expert systems - MYCIN, DART, XOON, Expert systems shells. Basic knowledge of Prolog programming language.

Learning Outcomes:

Upon completing the course, students will be able to:

- Familiar with Artificial Intelligence, its foundation and principles.
- Identify appropriate AI methods to solve a given problem.
- Examine the useful search techniques, knowledge representation techniques, Inference

methods; learn their advantages, disadvantages and comparison.

- Understand important concepts like Expert Systems, AI applications.
- Learn Prolog Programming to program intelligent systems.

BOOKS RECOMMENDED:

1. Kevin Night and Elaine Rich, Nair B., “Artificial Intelligence (SIE)”, Mc Graw Hill-2008.
2. Stuart Russel and Peter Norvig “AI – A Modern Approach”, 2nd Edition, Pearson Education 2007 Peter Jackson, “Introduction to Expert Systems”, 3 rd Edition, Pearson Education, 2007.
3. Dan W. Patterson, “Introduction to AI and ES”, Pearson Education, 2007. (Unit-III).
4. <http://nptel.ac.in>.
5. Carl Townsend, “Introduction to Turbo PROLOG”, BPB Publication.
6. Ivan Bratko, ”Prolog Programming for Artificial Intelligence”, 3rd Edition, Pearson Education.