

<b>Devi Ahilya University, Indore, India</b>				<b>IV Year B.E. (Mechanical Engg.)</b>			
<b>Institute of Engineering &amp; Technology</b>				<b>(Full Time)</b>			
<b>Subject Code &amp; Name</b>	<b>Instructions Hours per Week</b>			<b>Credits</b>			
<b>7MERE2</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Total</b>
<b>Artificial Intelligence</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>5</b>
<b>Duration of Theory Paper:</b>							
<b>3 Hours</b>							

**Course Objectives:**

1. The main objective of the subject is to introduce the students about the problems and techniques of AI.
2. The course content provides the theoretical aspects of AI and explore the ways that the current AI techniques can be used.
3. The objective of the subject to introduce the students about the Expert Systems and Machine Learning.
4. The objective of the subject to introduce the students about the fuzzy logic systems, Crisp sets and fuzzy sets.

**Pre requisite(s):** Data structures, Computer Programming, Applied Mathematics I, II, III & IV.

**COURSE CONTENTS**

**UNIT-I**

**Introduction to Artificial Intelligence:** Introduction and history of AI, Human intelligence versus artificial intelligence, Task domains of AI, Representations in AI, Introduction to AI techniques, Limitations of AI. Defining the AI problem as state space search, Problem characteristics and search techniques: Heuristic search techniques. Problem reduction and constraint satisfaction.

**UNIT-II**

**Knowledge Representation:** Introduction and need for a good representation, Ways of representing knowledge, Syntactic and semantic systems, Predicate logic, Production rules, Nonmonotonic systems , Statistical reasoning systems, Semantic nets, Frames , Conceptual dependency and Scripts. Problem solving: Inference and Resolution.

**UNIT-III**

**Expert Systems and Machine Learning:** Introduction, Rule based expert systems, Knowledge acquisition and Knowledge bases, Architecture of an expert system, Introduction to CLIPS(C Language Integrated Production System),Introduction to techniques for machine learning, Version spaces and Nearest Neighbour Algorithm, Introduction to machine vision.

**UNIT-IV**

**Neural Networks and Fuzzy Logic Systems:** Introduction, Supervised learning and Unsupervised learning, Neurons, Perceptrons, Multilayer neural networks, Recurrent networks , Unsupervised learning networks,

Learning in Neural Networks and applications of neural networks. Introduction to fuzzy logic systems, Crisp sets and fuzzy sets, fuzzy logic control, Neuro fuzzy systems.

## **UNIT-V**

**Planning and Language Processing:** Overview of planning and components of planning systems, Planning methods, Introduction to Natural language processing : Syntactic processing and Semantic analysis, Ambiguity and pragmatic analysis, Overview of programming languages of AI like LISP/PROLOG. Implementations of AI based applications in LISP/PROLOG.

### **Course Outcomes:**

Upon completing the course, student will be able to:

- CO1. Familiar with the history, concept of Artificial Intelligence.
- CO2. Familiar with Expert Systems and Machine Learning processes.
- CO3. Understand, analyse and solve problems in the fuzzy logic systems, Crisp sets and fuzzy sets.

### **BOOKS RECOMMENDED:**

- [1] Rich Elaine, Knight Kevin, Nair Shivashankar B., *Artificial Intelligence*, McGraw-Hill ,3e,2009.
- [2] Coppin Ben, *Artificial Intelligence Illuminated*, Narosa Publishing House ,2005
- [3] Charniak Eugene, McDermott Drew, *Introduction to Artificial Intelligence*, Pearson Education,2e,2007
- [4] Russell Stuart, Norvig Peter, *Artificial Intelligence A Modern Approach*, Pearson Education,2e,2007
- [5] Winston Patric Henry, *Artificial Intelligence* , Pearson Education Asia ,3e,2000.

## **LIST OF PRACTICAL ASSIGNMENTS**

1. Write a program to solve 8 queens problem.
2. Solve any problem using depth first search.
3. Solve any problem using best first search.
4. Solve 8-puzzle problem using best first search.
5. Solve Robot (traversal) problem using means End Analysis.
6. Solve traveling salesman problem.

**Course Objectives:**

1. The main objective of the subject is to introduce the students about the problems and techniques of AI.
2. The course content provides the theoretical aspects of AI and explore the ways that the current AI techniques can be used.
3. The objective of the subject to introduce the students about the Expert Systems and Machine Learning.
4. The objective of the subject to introduce the students about the fuzzy logic systems, Crisp sets and fuzzy sets.

**Course Outcome:**

Students earned credits will develop ability to

CO. No.	CO	PO
CO1	Familiar with the history, concept of Artificial Intelligence.	PO1, PO2, PO3
CO2	Familiar with Expert Systems and Machine Learning processes.	PO1, PO4, PO5
CO3	Understand, analyse and solve problems in the fuzzy logic systems, Crisp sets and fuzzy sets.	PO1, PO2, PO4

**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			3	3							
CO3	3	3		3								
CO4												
CO5												

\* CO (rows) mention nil/very small/insignificant contribution to the PO(column)

1 → relevant and small significance    2 → medium or moderate    and    3 → strong