Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester III
MCA-31 : Artificial Intelligence

Rationale:
The objective of this course to teach the concept of J2EE so they can easily development the application using Servlet, JSP , JDBC and other concept. Instruction shall be in a laboratory setting with continuous hands-on implementation of concepts and emphasis on developing application in AJP.

Prerequisite: Basic knowledge of Object Oriented Programming Language (Core Java)

Learning Outcomes:
On completion of this subject the student is expected to:

1. Identify problems that can be solved by search, and create search-based solution algorithms
2. Design intelligent agents
3. Choose the best search-based solving methods for a particular problem
4. Make use of formal approaches for representing and reasoning about knowledge
5. Build systems that use simple learning approaches to improve their performance

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

Sub Total Credit	Teaching scheme (per week)		Examination scheme				
			MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
4	3	2	25	25	50	50	150

Course Contents:

UNIT 1: INTRODUCTION TO ARTIFICIAL INTELLIGENCE [20%]
Artificial Intelligence: What is AI? Foundations of AI, Applications;

Problem Solving: Production Systems, State Space Search, Heuristic Search Techniques – Branch & Bound Search, Hill Climbing, Breadth First Search, A* Algorithm

UNIT 2: KNOWLEDGE REPRESENTATION & LOGIC CONCEPTS [25%]
Knowledge Representation Schemes: Semantic Networks, Frames, Scripts, Proposition and Predicate Logic, Rule Based Systems

Logic Concepts: Logical Study of Valid and Sound Arguments, Non-Logical Operators, Syntax of Propositional Logic, Semantics/Meaning in Propositional Logic, Interpretations of Formulas, Validity and Inconsistency of Propositions, Equivalent forms in the Prepositional Logic (PL), Normal Forms,

Syntax of First order Predicate Logic, Prenex Normal Form (PNF), (Skolem) Standard Form, Applications of FOPL

UNIT 3: NATURAL LANGUAGE PROCESSING [20 %]

Natural Language Processing: Sentence Analysis – Morphological, Syntactical, Semantic, Pragmatic and Discourse Analysis; Decision Trees, State Machines, Grammars & Parsers, Top down Parsing, Bottom up Parsing

UNIT 4: EXPERT SYSTEMS & INTELLIGENT AGENTS [20 %]

Expert Systems: Expert System Architecture, Expert System Shells, Examples of Expert Systems

Intelligent Agents: Classification of Agents, Working of an Agent, Task Environment of Agents (PEAS), Structure of Agents

UNIT 5: FUZZY SYSTEMS [15%]

Fuzzy Systems: Fuzzy Systems, Relations on Fuzzy Sets, Operations on Fuzzy Sets, Operations Unique to Fuzzy Sets

Text Books:

1. Artificial Intelligence by Saroj Kaushik, Cengage Learning
2. Introduction to Artificial Intelligence and Expert Systems by Dan W. Patterson, PHI
3. Artificial Intelligence for Games by Ian Millington, Morgan Kaufmann Publishers

Chapter & Topics –

Unit	Book	Chapter	Topic
1	1	1 & 2	1.1 to 1.9 2.1, 2.2, 2.3, 2.5.1,2.5.2, 2.5.3, 2.5.5, 2.5.6
2	1	4, 7 & 15	4.1, 4.2, 4.3, 4.4, 4.7, 4.8 7.1, 7.2, 7.3, 7.5 15.3
3	2	12	12.1, 12.2, 12.3, 12.4
	3	5	5.2, 5.3
4	1	8 & 14	8.1, 8.2, 8.3, 8.4, 8.5.4, 8.8, 8.9 14.1, 14.3, 14.4, 14.5, 14.6, 14.7
5	1	10	10.1, 10.2, 10.3

Reference Book:

1. Artificial Intelligence by Elaine Rich, Kevin Knight and , Cengage Learning
2. Artificial Intelligence – A Modern Approach by Stuart Russell & Peter Norvig, Pearson

Experiment List: (Practical Programs are to be performed in Turbo Prolog)

1. Write a program in Prolog to show the working of Arithematic operators.
2. Write a program in Prolog to show the operations on String.
3. Write a program in Prolog explaining the domains, predicates & clauses section.

4. Write the figure 6.1 medical diagnosis program given in the Prolog book and test it for following: What is the patient's name? He is suffering from which disease?
5. Write a program in Prolog to show the working of fail predicate.
6. Write a program in Prolog to show the working of repeat predicate.
7. Write a program in Prolog to show the working of recursion without repeat predicate.
8. Write a program in Prolog to show the working of cut predicate.
9. Write a program in Prolog to show the working of cut predicate with repeat predicate.
10. Write a program in Prolog to enter inventory parts using a compound object – part (number, description, quantity, cost)