



**Charotar University of Science and Technology**  
**Devang Patel Institute of Advance Technology and Research**  
**Department of Computer Engineering**



**Subject: ARTIFICIAL INTELLIGENCE**

**Subject Code: CE357**

**Semester: 6**

**Academic Year: 2021-22**

**Student ID: \_\_\_\_\_ Student Name \_\_\_\_\_**

Sr. No.	Aim	CO	Start date	End date	Grade	Assessment date	Sign
1.	<b>Knowledge Representation (Prolog programming)</b>	4,5					
1.1	Write a program in prolog to implement simple facts and Queries						
1.2	Design a Family Tree for Your Family: Write a program, which contains three predicates: male, female, parent. Make rules for following family relations: father, mother, grandfather, grandmother, brother, sister, uncle, aunt, nephew and niece, cousin.						
1.3	Design a Medical Diagnosis Expert System.						
1.4	Write a Prolog program to demonstrate arithmetic operations and find the addition of 1 to N numbers. Also, demonstrate examples of recursion.						
1.5	Write a program to display Fibonacci series in prolog.						
1.6	Write a program to find factorial of a number in prolog using recursion.						
1.7	Write predicates one converts centigrade temperatures to Fahrenheit, the other checks if a temperature is below freezing.						
1.8	Write a program in prolog to implement phone list, which store name, phone number and birthdays of friends and family members. Write a query to get birthday a list of people whose birthdays are in the current month.						
1.9	<b>Implement Water Jug Problem in Prolog</b> <b>Variation1:</b> A Water Jug Problem: You are given two jugs, a 4-gallon one and a 3-gallon one, a pump which has unlimited water which you can use to fill the jug, and the ground on which water may be poured. Neither jug has any measuring markings on it. How can you get exactly 2 gallons of water in the 4-gallon jug? <b>Variation2:</b> You have to defuse a bomb by placing exactly 4 gallons (15 L) of water on a sensor. The problem is, you only have a 5-gallon (18.9 L) jug and a 3 gallons (11 L) jug on hand! Neither jug has any measuring markings on it. <b>Variation3:</b> A milkman carries a full 12-liter container of milk. He needs to deliver exactly liters. However, the customer only has 8 and 5-liter jugs. Neither jug has any measuring markings on it.						

	<b>1.10</b>	Write a program to perform following operations on lists in prolog. Create a List, Write in List, Check Membership, Length of a List, Reverse a List, Concatenation, Add an item, Delete an item, Sub list, Permutations, Append list, Finding nth element						
	<b>1.11</b>	Write a program to demonstrate cut and fail in prolog.						
	<b>1.12</b>	Write a program to solve Monkey Banana problem in Prolog						
	<b>1.13</b>	Implement <b>Missionaries and Cannibals Problem</b> Solution in Prolog Missionaries and Cannibals is a problem in which 3 missionaries and 3 cannibals want to cross from the left bank of a river to the right bank of the river. There is a boat on the left bank, but it only carries at most two people at a time (and can never cross with zero people). If cannibals ever outnumber missionaries on either bank, the cannibals will eat the missionaries.						
<b>2.</b>	<b>Fuzzy Logic and Genetic Algorithm</b>							
	<b>2.1</b>	Design a controller to determine wash time of a domestic washing machine. Assume the input is dirt and grease on cloths. Use three descriptors for input variables and five descriptors for output variables. Derive the set of rules for controller action and defuzzification. The design should be supported by the figure wherever possible. Show that if the cloths are solid to a larger degree the wash time will be more and vice versa.						
<b>3.</b>	<b>Constraint Satisfaction Problem</b>		1,2,3					
	<b>3.1</b>	Constraint Satisfaction Problem –Crypt Arithmetic [SEND + MORE = MONEY]						
<b>4.</b>	<b>Natural Language Processing</b>							
	<b>4.1</b>	<ul style="list-style-type: none"> <li>✓ Regular Expression</li> <li>✓ Perform Natural Language Processing Tasks [Text Reading, Text Analysis, Text Pre-processing, Text Classification, EDA, Stemming, Lemmatization] using NLTK using Python Programming.</li> </ul>						
<b>5.</b>	<b>Chatbot Application</b>		5					
	Chatbot Building with SAP Conversational AI Track							
<b>6.</b>	<b>Various Tools for ML Techniques</b>		4, 5					
	<b>6.1</b>	Perform classification on Iris dataset using neural network tools such as WEKA, ORANGE						
	<b>6.2</b>	Show the uses of NEUROINTELLIGENCE to make prediction for faculty retention ratio.						
<b>7.</b>	<b>Game Playing</b>		2, 4					
	<b>7.1</b>	Apply MINIMAX Algorithm to solve Tic-Tac-Toe game in python. Design your solution using alpha-beta pruning.	`					



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<b>8.</b>	<b>Additional Practical</b>	1-6					
<b>8.1</b>	Presentation on AI Domains, Applications, Problems and its Explanation	1,2,3					
<b>8.2</b>	Implement Solution using BFS of 8-puzzle problem, Water Jug problem and one problem of your own choice using any programming language. Before implementing solution, analyse it with respect to problem characteristics [AI perspective] and solution space.	1,2					
<b>8.3</b>	Implement Solution using DFS of 8-puzzle problem, Water Jug problem and one problem of your own choice using any programming language. Before implementing solution, analyse it with respect to problem characteristics [AI perspective] and solution space.	1,2					
<b>8.4</b>	Analyse, Design and implement Travelling Salesman Problem using Hill climbing, Steepest Ascent Hill climbing and Simulated Annealing Algorithm in Python. Differentiate all three approaches with conclusion.	1,2					
<b>8.5</b>	Analyse, Design and implement problem using A* and AO* approaches in Python.	1,2					

**Course Outcomes**

CO1	Understand the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.
CO2	Apply these techniques in applications, which involve perception, reasoning and learning.
CO3	Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
CO4	Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
CO5	Demonstrate proficiency-developing applications in an 'AI language', expert system shell, or data-mining tool.
CO6	Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications