III B.Tech – I Semester (17CS513) DESIGN OF ALGORITHMS LAB

Int. Marks Ext. Marks Total Marks

60 40 100

L T P C - - 3 2

Pre-Requisites: Discrete Structures, Data Structures

Course Objectives:

The course should enable the students to:

Learn how to analyse a problem and design the solution for the problem.

- Design and implement efficient algorithms for a specified application.
- Strengthen the ability to identify and apply the suitable algorithm for the given real world problem.

List of Experiments:

- 1) Write a program to implement Merge sort algorithm to sort a given set of elements
- 2) Write a program to implement Quick sort algorithm to sort a given set of elements
- 3) Write a program to implement Breadth First Search (BFS).
- 4) Write a program to implement Depth First Search (DFS).
- 5) Write a program to implement Tree Traversal techniques (Inorder, Preorder, Postorder)
- 6) Write a program to find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.
- 7) Write a program to find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm
- 8) Write a program to find shortest paths from a given vertex in a weighted connected graph to other vertices using Dijkstra's algorithm.
- 9) Write a program to implement All-Pairs Shortest Paths Problem using Floyd's algorithm.
- 10) Write a program to implement Warshall's algorithm.
- 11) Write a program to implement N Queen's problem using Back Tracking.
- 12) Write a program to find a subset of a given set $S = \{sl, s2,....,sn\}$ of n positive integers whose sum is equal to a given positive integer d. For ex, if $S = \{1, 2, 5, 6, 8\}$ and d = 9 there are two solutions $\{1, 2, 6\}$ and $\{1,8\}$. A suitable message is to be displayed if the given problem instance doesn't have a solution.

Projects:

- Trapping Rain Water
- Check if a given sequence of moves for a robot is circular or not
- Chocolate distribution problem
- Stock Buy Sell to Maximize Profit
- Word break problem

Course Outcomes:

1	Implement merge sort, quick sort, BFS, DFS	L3
2	Implement minimum cost spanning tree, shortest path algorithms.	L3
3	Implement Warshalls algorithm, back tracking technique.	L3

Correlation of COs with POs & PSOs:

	PO-	PSO-	PSO-	PSO-											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO-1	2	2	2	2	2	-	-	-	-	-	-	-	2	-	-
CO-2	2	2	2	3	2	-	-	-	-	-	-	-	2	-	-
CO-3	2	2	2	3	2	-	-	-	-	-	-	-	2	-	-

Reference Books:

- 1. Introduction to Algorithms 3rd Edition (English, Paperback, Al. Cormen)
- 2. Data Structures, Algorithms, And Applications In C++ by Satraj Sahni
- 3. Levitin A, "Introduction to the Design And Analysis of Algorithms, 2nd edition", Pearson Education, 2007.
- 4. Goodrich M.T., R Tomassia, "Algorithm Design foundations Analysis and Internet Examples", John Wileyn and Sons, 2006.
- 5. Base Sara, Allen Van Gelder ," Computer Algorithms Introduction to Design and Analysis", Pearson, 3rd Edition, 1999.