Instruction Hours / week:L: 0 T: 0 P: 4 Marks: Internal: 40External: 60Total:100 End Semester Exam: 3 Hours

Course Objectives

18CSU411

- To possess intermediate level problem solving and algorithm development skills on the computer
- To able to analyze algorithms using big-Oh notation
- To Understand the fundamental data structures such as lists, trees, and graphs
- To Understand the fundamental algorithms such as searching, and sorting

Course Outcomes(COs)

- 1. Data structures and algorithms are the building blocks in computer programming.
- 2. This course will give students a comprehensive introduction of common data structures, and algorithm design and analysis.
- 3. This course also intends to teach data structures and algorithms for solving real problems that arise frequently in computer applications, and to teach principles and techniques of computational complexity.

1. Implement Insertion Sort (The program should report the number of comparisons) ii. Implement Merge Sort (The program should report the number of comparisons)

2. Implement Heap Sort (The program should report the number of comparisons)

3. Implement Randomized Quick sort (The program should report the number of comparisons)

4. Implement Radix Sort

5. Create a Red-Black Tree and perform following operations on it: i. Insert a node

ii. Delete a node

iii. Search for a number & also report the color of the node containing this number.

6. Write a program to determine the LCS of two given sequences

7. Implement Breadth-First Search in a graph

8. Implement Depth-First Search in a graph

9. Write a program to determine the minimum spanning tree of a graph

For the algorithms at S.No 1 to 3 test run the algorithm on 100 different inputs of sizes varying from 30 to 1000. Count the number of comparisons and draw the graph. Compare it with a graph of nlogn.