MSCS103 DATA STRUCTURES AND ALGORITHMS (3-0-0)

MODULE-I: (10 Periods):
Asymptotic Notations. Analysis of few Non-Recursive and Recursive Algorithms. Recurrences: The Master method, The Iteration method, Recursion Tree.
Linked Lists: Singly linked lists, Doubly linked list, Circular linked list, Representation of Polynomial and Sparse matrix.

MODULE-II: (10 Periods)
Stack and Queues: Prefix, infix and postfix expression, Circular Queue, Priority Queue.
Tree and Graph: Tree Terminologies and memory representation, Binary Tree Traversal, Binary search Tree, AVL Trees, B-Trees. Graph Representation, Graph traversal (BFS, DFS).

MODULE-III: (10 Periods)
Divide and conquer methodology: Binary search, Merge sort, Quick sort, Heap Sort, Multiplication of large Integers.
Greedy Techniques: Single source shortest paths (Bellman-Ford and Dijkstra's algorithm), Minimal spanning tree (Kruskal and Prim's algorithms), Huffman trees.
String matching Algorithm: Naïve, Rabbin-Karp string matching algorithm.

MODULE-IV: (10 Periods)
Dynamic Programming Paradigm: Matrix Chain Multiplication Problem, Longest Common Subsequence Problem, Optimal binary search Tree.
Backtracking: N-Queen's problem, Subset-Sum problem. State Space Search Tree for these problems. Branch and Bound: Assignment problem, Travelling Sales Person problem. State space search tree for these problems.

Books:
1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Publication.
2. Anany V. Levitin, "Introduction to the Design and Analysis of Algorithms", Pearson Education Inc., New Delhi.
3. Data Structures Using C - Aaron M. Tenenbaum