Detailed Syllabus:
MCA202
Data Structure and Algorithms

Unit No.	Topics	No. of Hours	CO No.
I	**UNIT – I Array and Linked Lists** **Algorithm**: Concept of Algorithm, definition, characteristics of algorithm, algorithmic notation, analysis of algorithm, rate of growth, time, Basic time and space analysis of an algorithm, Asymtotic notation. **Data Structure**: Definition, Types of Data Structure, Data Structure operation. **Array**: Linear Array, Representations of Array in Memory, Traversing, Insertion and Deletion in Linear Array, Multidimensional Array. **Linked list**: Representation of linked lists in memory, Traversing a linked list, Searching a linked list, Memory Allocation, Insertion into a linked List, Deletion from a Linked List, Header Linked List, Two- Way Linked Lists, Circular Linked List.	10	1
II	**UNIT – II Stack and Queues** Stacks Definition, concepts, operation and application of Stacks, Recursion and Polish notations, Quick sort, tower of Hanoi, Queue, Priority Queue: definition concepts, operation and application of Queue, circular queue and Dequeue.Linked representation of stack and queue.	10	2
III	**UNIT – III Trees and their Representations:** Terminologies related to trees, Binary Tree, complete binary tree, almost complete binary tree; Tree Traversals-preorder, in order and post order traversals, their recursive and non-recursive implementations, Expression tree-evaluation, Linked representations of binary tree, operations. Header nodes; threads, Binary Search Tree: searching, Inserting and deleting in BST, Heap; Path Lengths; Huffman's Algorithms. Basic idea of AVL Tree.	10	3
IV	**UNIT – IV Graphs:** Related definitions; Graph representations- adjacency matrix, adjacency list, adjacency multi-list; Traversal schemes - depth first search, breadth first search; Minimum spanning tree; Shortest path algorithm; Kruskal and Dijkstra's algorithms.	10	4
V	**UNIT – V Searching, Hashing and Sorting:** Searching : Linear Search, Binary Search, Searching and data modification Hashing-Basics, methods, collision, resolution of collision, chaining; Internal Sorting, External sorting - Bubble Sort, Insertion Sort, Selection Sort, Merge sort, Radix sort, heap sort.	10	5

BOOKS RECOMMENDED:

1. **Data Structures and Program Design in C**, *Kruse R.L*, PHI.
2. **Data Structures using C and C++**, *Tanenbaum*, PHI.
3. **Fundamental of Data Structures**, *Horowitz and Sahani*, Galgotia Publishers.
4. **Data Structures**, Schaum Series.
5. **Data Structures**, *Bhagat Singh*.
6. **Data Structures**,*Trembley and Sorenson*.