CP207: Data and File Structures

Teaching Scheme			Credits	Marks Distribution				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	CE	ESE	CE	
4	0	2	6	70	30	30	20	150

Course Content:

Sr. No.	Topics	Teaching Hrs.
1	**Introduction to Data Structure:** Data types: primitive and non-primitive, Types of Data Structures: Linear & Non Linear Data Structures.	05
2	**Linear Data Structures Stack & Queue:** Representation of arrays; Applications of arrays; Sparse matrix and its representation; Stack: Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Polish Expression, Reverse, Polish Expression, Infix to postfix conversion and evaluation of postfix expression, Recursion, Tower of Hanoi. Queue: Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue.	14
3	**Linear Data Structure Linked List:** Singly; Doubly and Circular linked list; Implementation of Stack and Queue using linked list; Applications of linked list.	06
4	**Performance Analysis and Measurement:** Time and space analysis of algorithms-Average; best and worst case analysis; Asymptotic Notations.	05

5	**Nonlinear Data Structures:** Tree-Definitions and Concepts; Representation of binary tree; Binary tree traversal (IN order, Post order, Preorder); Threaded binary tree; Binary search trees; Conversion of General Trees to Binary Trees; Applications Of Trees; Some balanced tree mechanism; eg. AVL trees; 2-3 trees; Height Balanced; Weight Balance; Red black tree; Multi-way search tree: B and B+ tree; Graph: Adjacency Matrices and List Representations of Graphs; Elementary Graph Operations: Depth First Search & Breadth first Search.	15
6	**Hashing and File Structures:** Hashing: The symbol table, Hashing Functions, Collision Resolution Techniques , File Structure: Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods.	07
7	**Searching & Sorting Algorithms:** Sequential, Indexed Sequential Search & Binary Search; Bubble Sort; Selection Sort; Shell Sort; Quick Sort; Merge sort etc.	08
	Total Hrs.	**60**

Reference Books:

1. Tanenbaum, "*Data Structures using C & C++*", Prentice-Hall International.
2. Jean-Paul Tremblay and Paul G. Sorenson, "*An Introduction to Data Structures with Applications*", Tata McGraw Hill.
3. Sartaj Sahani, "*Fundamentals of Data Structures in C++*", Galgotia.Publishers.
4. Gilberg and Forouzan, "*Data Structures: A Pseudo-code approach with C*", Thomson Learning.
5. Thomas H. Carmen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein , "*Introduction to Algorithms*", PHI.
6. Sanjeev Sofat, "*Data Structures using C & C++*", Khanna Book Publishing Pvt. Ltd.
7. E. Balagurusamy, "*Computer Programming and Data Structure*", Mc-Graw Hill (E-book available on the BVM intranet).