BVM ENGINEERING COLLEGE [AN AUTONOMOUS INSTITUTION]

2IT08: DATA STRUCTURES
CREDITS – 4 (LTP:3,0,1)

Course Objective:
Understand the fundamental concept of data structures and highlight the importance of data structures in developing and implementing efficient algorithms.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per week)			Credits	Assessment Scheme				Total Marks
				Theory		Practical		
L	T	P	C	ESE	CE	ESE	CE	
3	0	2	4	60	40	20	30	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Introduction to Data Structure:** Data, Data types, Abstract Data types (ADT), Types of Data Structure: Linear, Non-linear data Structures, Characteristics of an algorithm, analyzing programs, Performance Analysis and Measurement (Time and space analysis of algorithms -Average, best and worst case analysis).	03
2	**Sorting and Searching:** Introduction to Array, Operation on Array, Searching: Sequential Search and Binary Search, Sorting : Bubble Sort, Selection Sort, Quick Sort, Merge Sort.	06
3	**Stack:** Definitions & Concepts, Operations on Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression and their compilation, Recursion, Application: Factorial, Fibonacci Series, Tower of Hanoi.	06
4	**Queue:** Basic of Queue, Representation of Queue, Operations on Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue.	07
5	**Linked List:** Introduction, Singly Linked List, Doubly Linked list, Circular linked list ,Linked implementation of Stack, Linked implementation of Queue, Applications of linked list.	07
6	**Tree:** Introduction, Tree : Definitions and Concepts, Representation of binary tree, Binary tree traversal: Inorder, postorder, preorder, Conversion of General tree to binary tree, Binary search trees, Operation of Binary Search Tree, AVL Tree (Height Balanced), Threaded binary tree, Weight Balance Tree, Applications Of Trees: B-tree, 2 -3 trees.	08
7	**Graph:** Graph Definition & Terminology, Graph, Matrix Representation of Graphs, Elementary Graph operations, Traversing a Graph: Breadth First	05

Unit No.	Topics	Teaching Hours
	Search, Depth First Search, Applications of Graph: Minimum Spanning Trees, Topological sorting.	
8	**Hashing:** Hashing: Basic of Hashing, The symbol table (Hash Table), Hashing Functions, Collision, and Collision Resolution Techniques: Separate Chaining, Open addressing.	03
	Total	**45**

List of References:

1. Jean -Paul Tremblay & Paul G. Sorenson Publisher, "*An Introduction to Data Structures with Applications*", 2nd Edition,Tata McGraw Hill.
2. Ten Baum Publisher, "*Data Structures using C & C++",* 2nd Edition, Prenctice-Hall International.
3. Sartaj Sahani, "*Fundamentals of Data Structures in C++",* 2nd Edition.
4. Gilberg & Forouzan, "*Data Structures: A Pseudo-code approach with C*", 2nd Edition, Thomson Learning.
5. Rohit Khurana, "*Data & File Structure"*,Second Edition,Vikas Publication, 2nd Edition 2012

Course Outcomes (COs):

At the end of this course students will be able to …

1. Analyze and Implement various sorting and searching algorithms.
2. Examine and Implement various operations in linear data structure.
3. Implement various operations in non-linear data structure.
4. Implement various graph terminology and its representations.
5. Design and implement various hashing functions.
6. Apply appropriate data structure for solving real world problem.