

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM  
III SEMESTER **COMPUTER SCIENCE** Time: 4 Hrs/Week  
**DATA STRUCTURES USING JAVA** Max. Marks: 100  
**SYLLABUS**

**Course Objectives:**

1. To bring out the importance of data structures in a variety of applications.
2. To introduce linear (arrays, linked list, doubly linked list) and non linear data structures (Binary search Tree).
3. To present the advantages and applications of hashing.

**UNIT– I: INTRODUCTION, ARRAYS, SORTING :** Introduction to Data structures– overview of Object oriented programming and Java– Java library data structures– Arrays – Operations on arrays– linear search– binary search– big O notation–Sorting methods: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort.

**UNIT– II: STACKS AND QUEUES:** Stacks – Queues – Circular Queue – Deques - Priority Queue – Parsing Arithmetic Expressions.

**UNIT– III: LINKED LISTS:** Simple Linked List – operations on Linked lists – Types of Lists – Sorted Lists – Doubly Linked Lists – operations – Recursion: characteristics, efficiency, simple recursive methods and merge sort.

**Unit –IV: BINARY SEARCH TREES:** Tree Terminology – Finding a Node – Inserting a Node – Traversing the Tree – Finding Maximum and Minimum values – Deleting a Node – Efficiency & applications of Binary Search Trees – Trees Represented as arrays – Hashing: open addressing, separate chaining, hash functions.

**UNIT–V: GRAPHS :** Introduction to Graphs – Searches – Minimum Spanning Tree – Topological Sorting with Directed Graphs – Connectivity in Directed Graphs–Warshall's algorithm–Shortest path problem (Dijkstra's Algorithm,Floyd's Algorithm)– when to use what: general purpose and special purpose data structures.

**PRESCRIBED BOOKS:** 1. Robert Lafore, Data Structures & Algorithms in Java, Second Edition, Pearson Education (2008) (Chapters: 1, 2, 3, 4, 5, 6, 7(quick sort), 8, 11, 13, 15).

**REFERENCE BOOKS:**

1. Data Structures by Seymour Lipschultz, Schaum's outline Series, International Edition, 1986.
2. John R. Hubbard, Anita Hurry, Data Structures with Java, Pearson Education (2008).

