**A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)**

**KAKINADA**

**DEPARTMENT OF COMPUTER SCIENCE**

**B.Sc – II Year 4th Semester**

**Paper-IV : DATA STRUCTURES**

**UNIT I**

**Concept of Abstract Data Types (ADTs)-** Data Types, Data Structures, Storage Structures, and File Structures, Primitive and Non-primitive Data Structures, Linear and Non-linear Data Structures.

**Linear Lists** – ADT, Array and Linked representations, Pointers.

**Arrays** – ADT, Mappings, Representations, Sparse Matrices, Sets – ADT, Operations

Linked Lists: Single Linked List, Double Linked List, Circular Linked List , applications

**UNIT II**

**Stacks**: Definition, ADT, Array and Linked representations, Implementations and Applications

**Queues**: Definition, ADT, Array and Linked representations, Circular Queues, Dequeues, Priority Queues, Implementations and Applications.

**UNIT III**

**Trees:** Binary Tree, Definition, Properties, ADT, Array and Linked representations, Implementations and Applications. Binary Search Trees (BST) – Definition, ADT, Operations and Implementations, BST Applications. Tree Traversals - Threaded Binary Trees, Heap trees.

**UNIT IV**

**Graphs** – Graph and its Representation, Graph Traversals, Connected Components, Basic Searching Techniques, Minimal Spanning Trees

**UNIT- V**

**Sorting and Searching:** Selection, Insertion, Bubble, Merge, Quick, Heap sort, Sequential and Binary Searching. Time Complexity and Space Complexity.

**REFERENCE BOOKS**

1. D S Malik, Data Structures Using C++, Thomson, India Edition 2006.
2. Sahni S, Data Structures, Algorithms and Applications in C++, McGraw-Hill, 2002.
3. SamantaD, Classic Data Structures, Prentice-Hall of India, 2001.
4. Heilman G I,. Data Structures and Algorithms with Object-Oriented Programming, Tata McGraw-l lill. 2002. (Chapters I and 14).
5. Tremblay P, and Sorenson P G, Introduction to Data Structures with Applications, Tata McGraw-Hill,

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**DATA STRUCTURES USING JAVA LAB**

1. Write a Program to implement the Linked List operations
2. Write a Program to implement the Stack operations using an array.
3. Write Programs to implement the Queue operations using an array.
4. Write Programs to implement the Stack operations using a singly linked list.
5. Write Programs to implement the Queue operations using a singly linked list.
6. Write a program for arithmetic expression evaluation
7. Write a program to implement Double Ended Queue using a doubly linked list.
8. Write a program to search an item in a given list using Linear Search and Binary Search
9. Write a program for Quick Sort
10. Write a program for Merge Sort
11. Write a program on Binary Search Tree operations(insertion, deletion and traversals)
12. Write a program for Graph traversals