

SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES

MCA I - I Semester

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DATA STRUCTURES

COURSE OBJECTIVES:

- To explore the fundamental concepts of Data Structures
- To Explore various data Structures like Stack, Linked List, Queues, Trees and Graphs
- To Understand various Sorting and Searching Techniques

UNIT-1: Introduction and Overview & Linked lists

Definition, Concept of Data Structures, Overview of Data Structures.

Definition , Single linked lists , Doubly linked lists , Circular linked lists , Circular Double linked lists , Applications of Linked list: Sparse Matrix Manipulation , Polynomial Representation.

UNIT-2: Stacks and Queues

Introduction , Definition , Representation of Stacks- Arrays and Linked lists , Operations on stacks, Applications of stacks-Evaluation of Arithmetic Expression , Implementation of Recursion, Factorial Calculations , Towers of Hanoi.

Introduction , Definition , Representation of Queues- Arrays and Linked lists , Various Queue structures, Operations on Queues , Applications.

UNIT-3: Sorting and Searching

Insertion Sort, Bubble Sort, Selection Sort, Merge Sort, Radix Sort, Quick Sort and Heap sort

Linear Search, Binary Search and Fibonacci Search.

UNIT-4: Trees

Basic Terminologies, Definition and Concepts, Representation of Binary Tree , Operations on Binary Tree - Types of Binary Trees

UNIT – 5: Graphs

Introduction, Graph Terminologies, Representation of Graphs, Operations on Graphs, Application of Graph Structures

COURSE OUTCOMES:

- Acquire knowledge on various types of data structures
- Analyze performance of algorithms.
- Acquire Knowledge to choose the appropriate data structure and algorithm design method for a specified application.
- Determine which algorithm or data structure to use in different scenarios.
- Become familiar with writing recursive methods.
- Know to Implement Bubble Sort, selection sort and insertion sort method to sort a given list of integers in descending order.
- Know to Implement Quick Sort method to sort a given list of integers in ascending order:

Text Books:

1. Classic Data Structures, 2/e, 2009, Samanta, Prentice Hall of India Private Limited, New Delhi.
2. “C and Data structures”, Ashok N. Kamthane, 2009, Pearson Education

Reference books:

1. Programming in C, 3/e, 2008, Stephen G. Kochan, Pearson Education, New Delhi.
2. C Programming & Data Structures, 3/e, 2009, B.A.Forouzan and R.F. Gilberg,, Cengage Learning, New Delhi.
3. Data Structures using C and C++ , 2/e, 1999, A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Prentice Hall of India Private Limited, New Delhi.
4. C and Data Structures, 1/e, 2010, Dr. N.B. Venkateswarlu, Dr. E.V. Prasad, S. Chand & Company Limited, New Delhi.
5. Mastering C, 2007, K.R. Venugopal and S.R. Prasad, Tata Mcgraw-Hill, New Delhi.