I Year II Semester

L T P C

Code: 17CS201

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DATA STRUCTURES

Objectives: Comprehensive knowledge of data structures and ability to implement the same in software applications

UNIT I:

Objective: Exposure to algorithmic complexities, recursive algorithms, searching and sortingtechniques.

Preliminaries of algorithm, Algorithm analysis and complexity, Data structure- Definition, types of data structures Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Linear and binary recursion, recursive algorithms for factorial function, GCD computation, Fibonacci sequence, Towers of Hanoi, Tail recursion List Searches using Linear Search, Binary Search, Sorting Techniques: Basic concepts, Sorting by : insertion (Insertion sort), selection (heap sort), exchange (bubble sort, quick sort), distribution (radix sort) and merging (merge sort) Algorithms.

UNIT II:

Objectives: Applying stack techniques for
logical operations

Stacks: Basic Stack Operations, Representation of a Stack using Arrays, Stack Applications: Reversing list, Factorial Calculation, Infix to postfix Transformation, Evaluating Arithmetic Expressions.

UNIT III:

Objectives: Applying queue techniques for logical operations

Queues: Basic Queues Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack, Applications of Queues-Round robin Algorithm, Circular Queues, Priority Queues.

UNIT IV:

Objectives: Exposure to list representation models in various types of applications

Linked Lists: Introduction, single linked list, representation of a linked list in memory, Operations on a single linked list, Reversing a single linked list, applications of single linked list to represent polynomial expressions and sparse matrix manipulation, Advantages and disadvantages of single linked list, Circular linked list, Double linked list

UNIT-V:

Objectives: Implementation of tree implementation in various forms Trees: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, operations on a Binary tree , Binary Tree Traversals (recursive), Creation of binary tree from in, pre and post order traversals. Binary Search Tree – Basic concepts and operations.

UNIT VI:
Objectives: orientation on graphs, representation of graphs, graph traversals, spanning trees
Graphs: Basic concepts, Representations of Graphs: using Linked list and adjacency matrix,
Graph algorithms Graph Traversals (BFS & DFS), applications: Dijkstra's shortest path,
Transitive closure, Minimum Spanning Tree using Prim's Algorithm, warshall's
Algorithm(Algorithemic Concepts Only, No Programs required).

TEXT BOOKS:
Data Structure with C, Seymour Lipschutz, TMH
Data Structures using C,Reema Thareja, Oxford
Data Structures, 2/e, Richard F, Gilberg , Forouzan, Cengage
Data structures and algorithm analysis in C, 2 nd ed, mark allen weissREFERENCE BOOKS:
Data Structures and Algorithms, 2008,G.A.V.Pai, TMH
Classic Data Structures, 2/e, Debasis ,Samanta,PHI,2009
Fundamentals of Data Structure in C, 2/e, Horowitz,Sahni, Anderson Freed,University Prees