

DATA STRUCTURES

Sub code: GR14A1010
I Year IIsem

L T P C
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Prerequisites:

Intermediate programming in a high-level language and introduction to computer science. Topics include program structure and organization, data structures (lists, trees, stacks, queues) C is the principal programming language.

Course Objectives:

- Understanding of the behavior of basic data structures (lists, stacks, queues, trees) .
- Be familiar with writing recursive methods
- Ability to analyze a problem and determine the appropriate data structure for the problem.
- Understand the importance of data modeling and data structures in advanced programming.
- Understand and analyze elementary algorithms: sorting, searching and hashing.

Course Outcomes:

- Student will be able to choose appropriate data structure as applied to specified problem definition.
- Student will be able to handle operations like searching, insertion, deletion, traversing mechanism
- Students will be able to apply concepts learned in various domains like DBMS, compiler construction etc.
- Students will be able to use linear and non-linear data structures like stacks , queues , linked list etc.

UNIT-I : Introduction to data structures:**STACKS** Stack Operations, Representation of a Stack using Arrays, Stack Applications: Recursion, In-fix- to postfix Transformation, Evaluating Arithmetic Expressions.

UNIT-II: QUEUES Basic Queues Operations, Representation of a Queue using array, Implementation of Queue Operations using arrays, Applications of Queues, Enqueue, Dequeue, Circular Queues, Priority Queues.

UNIT-III: LIST Introduction, single linked list, representation of a linked list in memory, Operations- insertion, deletion, display, search, Circular linked list, Double linked list, applications Advantages and disadvantages of single linked list, arrays, Implementation of stack, queue using linked list.

UNIT-IV: 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-order and pre(post)order traversals,

UNIT-V: SORTING & SEARCHING: insertion (Insertion sort), selection (heap sort), exchange (bubble sort, quick sort), distribution (radix sort) and merging (merge sort) *Algorithms. Searching: Linear, binary search , indexed sequential search.*

Teaching Methodologies:

1. White Board
2. Marker
3. LCD Projector
4. OHP Projector

Text Books:

1. Data Structures, 2/e, Richard F, Gilberg , Forouzan, Cengage
2. Data Structures and Algorithms, 2008, G.A.V.Pai, TMH

Reference Books:

1. Data Structure with C, Seymour Lipschutz, TMH
2. Classic Data Structures, 2/e, Debasis , Samanta, PHI, 2009
3. Fundamentals of Data Structure in C, 2/e, Horowitz, Sahni, Anderson Freed, University Press.