## DEPARTMENT OF CSE - DATA SCIENCE

| Programme: CSE-DS | | | | | Semester: III |
|---|---|---|---|---|---|
| Course Code | Course Name | L | T | P | C |
| 20CS3T02 | **DATA STRUCTURES & ALGORITHMS** | 3 | 0 | 0 | 3 |
| Subject Category : | **ESC** | | | | |

**COURSEOUTCOMES:**

At the end of the Course the student shall be able to

**CO 1:** Analyze algorithms and Describe searching, sorting and hashing techniques.

**CO 2:** Describe the concepts of stacks and queues.

**CO 3:** Apply the concepts of linked lists.

**CO 4:** Describe the concepts of trees.

**CO 5:** Explain the concepts of graphs

**UNIT-I** :Analysis of Algorithms: Efficiency of algorithms, Apriori Analysis, Asymptotic notations, TimecomplexityofalgorithmsusingOnotation,PolynomialVsExponentialalgorithms,Average,Best,Worstcase complexities,Analyzing recursive programs.
**Searching:** Introduction, Linear Search, Binary Search, Fibonacci Search.
**Internal Sorting:** Introduction, Bubble Sort, Insertion Sort, Selection Sort.
**Hashing** : Introduction, Hash Table Structure, Hash Functions

**UNIT-II** : Stacks: Introduction, Stack operations, Applications.
**Queues :** Introduction, Operations on queues, circular queues, Priority queues, Applications

**UNIT-III**
**Linked Lists:** Introduction, Singly linked lists, Circular linked lists, Doubly linked lists, Multiple linked lists, Applications.
**Linked Stacks and Linked Queues:** Introduction, Operations on linked stacks and linked queues, Dynamic memory management, Implementation of linked representations, Applications

**UNIT-IV: Trees and Binary Trees:** Introduction, Trees: Definition and Basic Terminologies, Representation of trees. Binary trees: Basic terminologies and types, representation of binary trees, binary tree traversals, applications.
**Binary Search Trees and AVL Trees :** Introduction, Binary search trees: Definition and operations, AVL Trees: Definition and operations, Applications

**UNIT-V**
**Graphs:** Introduction, Definitions and basic terminologies, Representations of graphs, Graph traversals and applications.

**TEXT BOOKS:**

1. Data Struct & Algorithm Analysis in C | Second Edition | Mark Allen Weiss |by Pearson
2. Data Structures using C |Second Edition| by Reema Thareja| Oxford

**REFERENCES:**

1. G.A.V. PAI, *Data Structures and Algorithms, Concepts, Techniques and Applications*,Volume1,1st Edition , TataMcGraw-Hill,2008.
2. Richard F. Gilberg & Behrouz A. Forouzan, *Data Structures, Pseudo code Approach withC*,2nd Edition, CengageLearningIndiaEdition,2007.
3. angsam,M.J.Augenstein,A.M.Tanenbaum,*Data structure susing C and C++*, 2nd Edition, PHIE ducation, 2008.
4. Sartaj Sahni, Ellis Horowitz, *Fundamentals of Data Structures in C*, 2nd Edition, Orient blacks wan, 2010.

**E- REFERENCES:**

1. **https://www.javatpoint.com/data-structure-tutorial**