A3CIT302	**SEMESTER-III**	**L**	**T**	**P**	**C**
	DATA STRUCTURES	**3**	**0**	**-**	**3**
	Total Contact Hours: 48				
	Prerequisites: Nil				

SYLLABUS

UNIT- I: Introduction To Data Structures, Recursion, Sorting, Contiguous And Non-Contiguous Memory Allocation

Introduction: Data Structures- Introduction, Need for a data structure, Types of Data Structures, Introduction big O Notation, **Recursion** – Introduction, Types of recursion, **Contiguous Memory allocation** - Introduction to Arrays, **Sorting** Organizing elements in an array in sorted order – Merge Sort, Quick Sort.

Non- Contiguous Memory allocation –Introduction to Linked Lists, Representation of Linked List in memory, Types of Linked Lists, Single Linked List Operations – Insertion, Deletion, Traversal/ Search, Circular Linked List – Insertion, Deletion, Traversal/ Search.

UNIT –II: Double Linked List, Applications of Linked List

Double Linked List- Insertion, Deletion, Traversal / Search, Reversal of Single Linked List, Merging of 2 Linked List (Ordered / Unordered)
Applications of Linked List –Sparse Matrix, Polynomial Representation, Addition of 2 Polynomials, Contrast implementation of a list of user names using static and dynamic storage, Comparison of Arrays and Linked List.

UNIT- III:

PART 1: STACKS, QUEUES

Stacks: Introduction to stack data structure, Basic Operations, Implementation of Stack using array, Implementation of Stack using Linked List, Applications of Stack - Infix to postfix conversion, Evaluating Arithmetic expressions

Queues: Introduction to Queue, Basic Operations, Implementation of Queue using array, Implementation of Queue using Linked List, Circular Queue, Queue using Stacks, Double ended Queues

PART 2: Trees

Trees: Introduction, Types of Trees, Applications of tree, **Binary Tree** – Introduction, Properties, Various ways of representing Binary Tree in memory, Operations on a Binary Tree, Recursive Binary tree traversals, Construction of Binary tree given tree traversals.

Binary Search Trees: Introduction, Operations on Binary Search trees – Creation, Insertion, Deletion (BST), Traversal /Search.

Balanced Binary trees: Introduction, Operation on AVL Trees –Insertion, Deletion (AVL).

UNIT- IV: Graphs

Graphs – Introduction, Types of Graphs, Graph properties, transpose of a Graph, Various ways of representing Graphs in memory, Operations on Graphs – Insertion, Deletion

Graph Algorithms -Traversals/Search – Breadth First and Depth First, Minimum Spanning tree using Prim's algorithm, Minimum Spanning tree using Kruskal's algorithm, Single Source Shortest Distance (Dijkstra's shortest path)

UNIT- V: Heaps And Hashing

Heaps-Introduction to Heap, Types of Heap, Binary Heap -Creation of Heap, Operations – Insertion, Deletion, Heap Sort, Priority Queue
Hashing – Introduction, Types of Hash Functions, Collision Resolution techniques, double hashing, Rehashing

Text Books:

1. Data Structures, 2/e, Richard F, Gilberg , Forouzan, Cengage.
2. Data structures and algorithm analysis in C, 2nd ed, mark allen Weiss, Pearson.
3. Data Structure with C, Seymour Lipschutz, TMH.

Reference Books:

1. Data Structures and Algorithms, 2008, G. A. V. Pai, TMH.
2. Classic Data Structures, 2/e, Debasis , Sarnanta,PHI,2009.
3. Fundamentals of Data Structure in C, 2le,' Horowitz, Sahni, Anderson Freed, University Press.