DATA STRUCTURES

☐ **Detailed Syllabus**

S.No.	Contents	Contact Hours
1.	**Introduction:** Introduction to Algorithmic, Complexity- Time-Space Trade off. Introduction to abstract data types, design, implementation and applications. Introduction to List data structure. **Arrays and Strings:** Representation of Arrays in Memory: one dimensional, Two dimensional and Multidimensional, Accessing of elements of array, performing operations like Insertion, Deletion and Searching. Sorting elements of arrays. Strings and String Operations. **Stacks and Queues:** Introduction to data structures like Stacks and Queues. Operations on Stacks and Queues, Array representation of Stacks , Applications of Stacks : recursion, Polish expression and their compilation conversion of infix expression to prefix and postfix expression, Operations of Queues, Representations of Queues Applications of Queues, Priority queues.	8
2.	**Linked Lists:** Singly linked lists, Representation of linked list, Operations of Linked list such as Traversing, Insertion and Deletion, Searching, Applications of Linked List. Concepts of Circular linked list and Doubly linked list and their Applications. Stacks and Queues as linked list.	6
3.	**Trees:** Basic Terminology, Binary Trees and their representation, binary search trees, various operations on Binary search trees like traversing, searching , Insertion and Deletion , Applications of Binary search Trees , Complete Binary trees, Extended binary trees. General trees, AVL trees, Threaded trees, B- trees.	8
4.	**Searching and Sorting:** Linear Search, Binary search, Interpolation Search,Insertion Sort, Quick sort, Merge sort, Heap sort, sorting on different keys, External sorting.	7

5.	**Graphs:** Terminology and Representations, Graphs & Multi-graphs, Directed Graphs, Representation of graphs and their Transversal, Spanning trees, shortest path and Transitive Closure, Activity Networks, Topological Sort and Critical Paths.	7
6.	**File Structure:** File Organization, Indexing & Hashing, Hash Functions, Collision Resolution Techniques.	6
TOTAL		**42**

☐ Mid Sem Syllabus*

★ Unit 1
★ Unit 2

- Arrays
- Memory structure and address calculation for m dim arrays in column-major and row-major form.
- Sparse matrix representation using an array of the struct.
- Operations on sparse matrix.. addition transpose and multiplication.
- Stack and queue using arrays.
- Stack applications like checking palindrome, balanced parentheses, infix to postfix, and postfix evaluation.
- Linked list and use as a stack, or queue.

*The Mid Sem syllabus could alter somewhat, but we'll keep you updated. Continue Visiting😍.

☐ Tips

Must Do Topics

- ★ Address calculation in the array
- ★ Sparse Matrix Basic, its additive operation and its representation in arrays and Linked List.
- ★ Basic Function Syntax of Stacks, Linked Lists and Queues.(Ex- Input ,output , deletion functions ,etc)
- ★ Some Programs-
    - checking palindrome
    - balanced parentheses check
    - Infix to postfix and prefix
    - Implementations of LL, Stacks, Queue.
- ★ Some Problems to practice-
    - Postfix Evaluation
    - Checking time and space complexity

#Send Your Suggestion On fresources Whatsapp group if any.

Keep Learning, Best Wishes For Exams (Team Fresources COE)