CS - 07: Data Structure & File Structure using C

Objective : To Learn and understand the concept of Data Structure, sorting, searching and File structure

Unit : 1

INTRODUCTION TO DATA STRUCTURE:

- Data Management concepts
- Foundation terms of a data structure : Interface and Implementation
- Characteristics of a Data Structure : Correctness, Time Complexity & Space Complexity
- Need for Data Structure : Data Search, Processor speed and Multiple requests
- Basic Terminology of data structure : Data, Data Item, Group Items, Elementary Items, Attribute and Entity, Entity Set, Field, Record, File
- Data types – primitive and non-primitive
- Types of Data Structures- Linear & Non Linear Data Structures.

Array :

- o Representation of arrays
- o Applications of arrays

Pointers :

- o Declaring and initializing pointers
- o Pointer arithmetic

Structure :

- o Declaring and using structure

Sorting & Searching:

- o Sorting
  - Bubble Sort
  - Selection Sort
  - Quick Sort
  - Merge Sort
- o Searching
  - Linear Search
  - Binary Search

Unit : 2

Stack and Queue:

- Stack:
  - o Stack-Definitions & Concepts
  - o Operations On Stacks
  - o Applications of Stacks
  - o Polish Expression
  - o Reverse Polish Expression and their Compilation
- Queue:
  - o Representation Of Queue
  - o Operations On Queue
  - o Circular Queue

o Priority Queue
o Array representation of Priority Queue
o Double Ended Queue
o Applications of Queue

Unit : 3

Dynamic Memory allocation:
o What is Dynamic memory allocation?
o malloc( ), calloc( ), realloc( ) and free( ) function

Linked List:
- Singly Linked List:
  o Building a linked list
  o Traversing a linked list
  o Insertion in a linked list
    - As a first node
    - As a last node
    - At specific location
  o Deletion of a node
    - First node
    - Last node
    - Specific node
  o Searching of linked lists
  o Sorting of linked list
  o Merging linked list
- Doubly Linked list (traversing, insertion and deletion)
- Linked list implementation of Stack
- Linked list implementation of Queue
- Applications of linked list.

Unit : 4

NONLINEAR DATA STRUCTURE:
- Tree :
  o Definitions and Concepts
  o Representation of binary tree
  o Binary tree traversal (inorder, postorder, preorder)
  o Complete Binary tree
  o Binary search trees
  o Applications of Trees
- Graph
  o Basic concepts and definitions
  o Elementary Graph operations
    - Breadth First Search
    - Depth First Search
    - Spanning Trees
    - Shortest path

Unit : 5

FILE STRUCTURES and Hasing :

- Basic concepts of File and file systems: File system services, Disk space allocation, MS_DOS FAT file system, File allocation table, tree-structured directory system
- File Organisation :
  - o Concepts of fields, records and files
  - o Indexes
  - o Sequential Files
  - o Index-Sequential files
- Hashing :
  - o Concept
  - o Linear Hashing

	Class Room	Seminar	Expert Talk	Test	Total
No. Of Lecture	**60**	**05**	**05**	**05**	**75**

Reference Books:

No.	Name	Author / Publication
1	Data Structures through C	Yashwant Kanetkar (BPB)
2	Expert Data Structure with C	R B Patel (Khanna Publication)
3	Data Structure through C/C++	Tennaunbuam
4	Pointer in C Author	Yashwant Kanetkar
5	Let us C	Yashwant Kanetkar

Web site References:

- https://www.tutorialspoint.com/data_structures_algorithms/data_structure_overview.htm
- https://www.geeksforgeeks.org/data-structures/
- https://www.includehelp.com/c-programming-data-structure-examples.aspx
- https://www.sitesbay.com/data-structure/c-data-structure