



## C.U.SHAH UNIVERSITY – Wadhwan City

**FACULTY OF:** -Technology and Engineering (Diploma Engineering)

**DEPARTMENT OF:** -Computer Engineering

**SEMESTER:** -IV      **CODE:** -2TE04DFS1

**NAME**–Data and File Structures

### Teaching & Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme				Evaluation Scheme							
		Th	Tu	Pr	Total	Theory				Practical (Marks)			Total
						Sessional Exam		University Exam		Internal		University	
						Marks	Hours	Marks	Hours	Pr/Viva	TW	Pr	
<u>2TE04DFS1</u>	Data and File Structures	03	00	02	05	30	1.5	70	03	30	20	----	150

**Objectives:-**Development of application systems and software that use underlying architecture of machines efficiently and effectively requires the ability to use and manipulate various types of Data Structures and other constructs. This being a fundamental ability which is language neutral.yet requires use of a language for its implementation. This is a basic course which goes along with other programming courses to develop an integrated ability to efficient software development, hence this course is very important for computer and IT diploma engineers.

**Prerequisites:** -Basic knowledge of C Programming.

### Course Outlines:-

Sr. No.	Course Contents	Hours
1	<b>Basics of data structure</b> Introduction, application of data structure, data and information, classification of data structure-primitive and non primitive data structure , basic algorithms	06
2	<b>Array</b> Introduction,characteristics of array , classification of array (one dimensional, two dimensional, multidimensional array) , array operations (insert, delete, traverse, update) , row major and column major array	04
3	<b>Stack and Queues</b> Stack, operations on Stack ( PUSH-POP) , implementation of Stack , Stack applications (Recursion , Postfix ,Prefix ,Infix Notations), Queue , operations on Queue (PUSH-POP), Disadvantage of simple Queue , Circular Queue & Operations (PUSH-POP) , Priority Queue	06
4	<b>Linked List</b> Pointer Fundamentals, Pointer Declaration, Pointers and Linked allocation , Linked lists and Sequential list, Difference between Linked and sequential list, Operations on liner lists using singly linked and doubly linked storage structure, Circular linked list, Application of	06

	linked lists	
5	<b>Searching and Sorting</b> Sorting Techniques ( Selection Sort, Merge Sort , Radix Sort , Quick Sort , Shell Sort) Searching Techniques ( Linear Search , Binary Search ) , Hashing	08
6	<b>Non Linear Data Structure</b> <b>Graph:</b> Definitions and Concepts(Graph, Directed Graph , Undirected Graph, Mixed Graph, Edge , Vertex, Isolated Graph, Null Graph , Weighted Graph) , Graph traversal methods- BFS and DFS , <b>Tree:</b> Definitions and Concepts (Tree, In-Degree and Out-Degree of Tree , Level , Depth and Height of Tree , Siblings , Leaf node, forest of tree, binary tree , complete binary tree) , Operations on Binary Tree , Representation of Binary Tree	08
7	<b>Strings</b> String, string operations (length , copy , concate , compare, reverse) , Application of String	06

### List of Experiments

- Develop a program to insert, delete, edit element in array
- Develop a program for push and pop stack operations
- Develop a program for push and pop simple queue operations
- Develop a program for push and pop circular queue operations
- Develop programs for Linked List Operations.
- Develop Programs for Various Searching Techniques.
- Develop Programs for Various Sorting Techniques.
- Develop Programs for Various String Operations.
- Develop Programs for Various Tree Operations.

### Learning Outcomes:-

The syllabus topics should be taught and implemented with the aim to develop different types of skills Leading to the achievement of the following competencies

- Basic concepts of data structure
- Different types of data structure
- Learning various operations on data structure

### Books Recommended:-

- Introduction to Data structures, by **Ashok N. Kamthane**, Pub. Pearson Ed. in C
- Introduction to Data- Structure with applications ,by **Tremblay & Sorenson**, Pub. : MGH
- Introduction to Data structure, by **Bhagat Singh & Thomas Naps** , Pub. : TMH
- Data Structures and Program Design, by **Robert Kruse**, Pub. : PHI
- Data Structure using PASCAL, by **Aaron M. Tenenbaum & Moshe J. Augenstein**, Pub. : EE, PHI.

### E- References:-

- <http://174.37.163.146-static.reverse.softlayer.com/data-structure/>
- <http://www.cprogramming.com/tutorial/computersciencetheory/stack.html>
- <http://www.cprogramming.com/tutorial/computersciencetheory/stack.html>
- <http://www.youtube.com/watch?v=vfCo5A4HGKc>
- <http://www.slideshare.net/binsalwe/lecture8-data-structuregraph-15453367>

