

**SARDAR PATEL UNIVERSITY**  
**B.Sc (CA & IT) – M.Sc (CA & IT) Dual Degree Semester – 4**  
**US04CIIT21 : Advanced Data & File Structure**  
**(w.e.f June 2020)**

**Credits : 4**  
**Lectures per week : 4**

**Exam Duration : 3hrs**  
**All units carry equal weightage.**

Unit	Description in detail	Weightage
I	<b>Arrays, Stack &amp; Graphs</b> <ul style="list-style-type: none"> <li>➤ Introduction to arrays, one and two-dimensional arrays</li> <li>➤ Representation of arrays in memory : row-major and column-major order</li> <li>➤ Address calculation of elements of one and two-dimensional arrays</li> <li>➤ Sparse array, Applications of arrays</li> <li>➤ Stack - Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another</li> <li>➤ The concept of a graph and basic terminology</li> </ul>	<b>25%</b>
II	<b>Trees and Binary Tree</b> <ul style="list-style-type: none"> <li>➤ Introduction to trees</li> <li>➤ Definitions of basic terms : Tree, Directed Tree, Root, Leaf, Branch, Level, Node, Forest</li> <li>➤ Applications of a tree</li> <li>➤ Binary trees : Introduction, Linear and Linked Representations</li> <li>➤ Traversal of a binary tree: Preorder, Inorder and Postorder</li> <li>➤ Insertions and deletions in a lexically ordered binary tree</li> <li>➤ Types of Binary Tree : Full Binary Tree, Complete Binary Tree, Binary Search Tree, Heap Tree, Height Balanced Tree (AVL Tree), B-Tree</li> </ul>	<b>25%</b>
III	<b>Sorting and Searching techniques</b> <ul style="list-style-type: none"> <li>➤ Sorting – Introduction, Applications of sorting</li> <li>➤ Techniques - Bubble sort, Insertion sort, Selection Sort, Quick sort, Merge sort</li> <li>➤ Searching – Introduction, Applications of searching</li> <li>➤ Techniques - Sequential search and Binary search</li> <li>➤ Sorting vs. Searching</li> </ul>	<b>25%</b>
IV	<b>File Organization</b> <ul style="list-style-type: none"> <li>➤ Terminology, definitions and concepts in file organization</li> <li>➤ The structure of sequential files</li> <li>➤ Processing sequential files</li> <li>➤ Direct files, Processing direct files</li> <li>➤ Hashing Functions: The Division Method, The Midsquare Method, The Folding Method, Digit Analysis, The length-Dependent Method</li> <li>➤ Direct files, Processing direct files</li> <li>➤ The structure of indexed sequential files (IBM Only), Processing indexed sequential files</li> </ul>	<b>25%</b>

**Basic Text & Reference Books :**

1. Tremblay J. & Sorenson P. G.: An Introduction to Data Structures with Applications, 2<sup>nd</sup> Edition, Tata McGraw-Hill Edition, 1991.
2. Singh Bhagat & Naps Thomas: Introduction to Data Structures, Tata McGraw-Hill Publishing Co.Ltd.,1985.
3. R. B. Patel: Data Structure using C – Khanna Publications. ISBN: 81-87522-41-0
4. D. Samanta - Classis Data Structures, 2<sup>nd</sup> Edition – PHI Publication
5. G. S. Baluja - Data Structures through C, 4<sup>th</sup> Edition – Dhanpat Rai & Co.