

Hemchandracharya North Gujarat University, Patan

B.E. SEMESTER – III (IT)

IT303: DATA AND FILE STRUCTURE

Teaching Scheme

Theory	03 Hrs/Week
Tutorial	-
Practical	02 Hrs/Week
Total	05 Hrs/Week

Examination Scheme

Theory	100 Marks
Practical	25 Marks
Term work	25 Marks
Total	150 Marks

1. **INTRODUCTION TO DATA STRUCTURE:**

Data Management concepts, Data types – primitive and nonprimitive, Performance Analysis and Measurement (Time and space analysis of algorithms -Average, best and worst case analysis), Types of Data Structures- Linear & Non Linear Data Structures.

2. **LINEAR DATA STRUCTURE Array:**

Representation of arrays, Applications of arrays, sparse matrix and its representation., Stack: Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression And Their Compilation, Recursion, Tower of Hanoi, Queue: Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue, Linked List: Singly Linked List, Doubly Linked list, Circular linked list ,Linked implementation of Stack, Linked implementation of Queue, Applications of linked list.

3. **NONLINEAR DATA STRUCTURE:**

Tree-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees -Some balanced tree mechanism, e.g. AVL trees, 2-3 trees, Height Balanced, Weight Balance, Graph-Matrix Representation Of Graphs, Elementary Graph operations, (Breadth First Search, Depth First Search, Spanning Trees, Short est path, Minimal spanning tree)

4. **HASHING AND FILE STRUCTURES:**

Hashing: The symbol table, Hashing Functions, Collision-Resolution Techniques, File Structure: Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi -Key file organization and access methods.

5. **PRACTICAL DETAILS:**

At least 10 practical should be performed by students using programming language.

Reference Books:

1. An Introduction to Data Structures with Applications. by Jean -Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill.
2. Data Structures using C & C++ -By Ten Baum Publisher – Prentice-Hall International.
3. Fundamentals of Computer Algorithms by Horowitz, Sahni, Galgotia Pub. 2001 ed.
4. Fundamentals of Data Structures in C++-By Sartaj Sahani.
5. Data Structures: A Pseudo-code approach with C -By Gilberg & Forouzan Publisher-ThomsonLearning.