Part A: Introduction				
Program : Certificate Course		Class: **B.Sc.--IT IV Semester**	**Year 2023**	**Session: 2023-24**
1.	Course Code	**ITDSC-4T**		
2.	Course Title	**Data Structure**		
3.	Course type	**Discipline Specific Course (DSC)**		
4.	Pre-requisite if any	As per Govt. Norms / Institutional Scheme		
5.	Course Learning Outcomes (CLO)	After successfully completing this course, the students will be able to: • Use different types of data structures, operations and algorithms. • Implement appropriate sorting/searching technique for any given problem. • Use stack, Queue, Lists, Trees and Graphs in problem solving. • Find suitable data structure during application development/ Problem Solving. • Understand complex data structure like B+ Tree, Graph and use this structure in problem solving.		
6.	Credit Value	**04 (03Theory + 01 Practical)**		
7.	Marks	**Max. Marks: 100 = 80Theory +20 Internal Assessment**	**Min Passing Marks:40**	

Part B: Content of the Course Total number of Teaching-Learning – Hours-45		
Unit	**Topics (Course Contents)**	**Hours**
I.	**Introduction to Data Structure:** Data types: primitive, non-primitive data types, Linear and Nonlinear data structure. **Linear Data Structures:** Arrays: One dimensional, Multidimensional array, **Linked List:** Singly and Doubly Linear link lists, singly and doubly circular linked list: Definitions, operations (INSERT, DELETE, TRAVERSE) on these lists. (Insertion and deletion operation includes – insertion & deletion before a given element, insertion& deletion after a given element, insertion & deletion at given position).	11
II.	**Stack and Queues**: Introduction to stack and primitive operation on stack, stack as an abstract data type, multiple stack, stack application: Infix, Postfix, and Recursion. Introduction to Queues, primitive, operation on the queues, queues as an abstract data type, Circular queue, Dequeue, Priority Queue.	11
III.	**Tree:** Basic Terminology, Binary Trees, Tree Presentation as Array And Linked List , Binary Tree Representation, Traversal of Binary Tree : In Order, Pre- Order & Post Order, Application of Binary Tree, Threaded Binary Tree. **Graph**: Definition of Graph and their types, adjacency and incident matrices and linked list representation of graphs, Graph Traversal- Breadth first Traversal, Depth first Traversal.	12
IV.	**Searching and Sorting** Sequential Searching, Binary Searching, Insertion Sort, Merge Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, Comparison of Sorting Method.	11