Data Structures and Algorithms [M16CSC201]
Minor Degree – Syllabus

	Unit –I	
	Unit –I	
1	**Introduction to Data Structures** Primitive Data structures in C, Arrays, pointers, functions, structures, Notion of Algorithm, Fundamentals of Algorithmic Problem Solving, Asymptotic Notations and Basic Efficiency Classes, Mathematical Analysis of Non-Recursive Algorithms and Non-Recursive algorithms.	06 hrs
2	**Stacks and Queues** Stack Introduction, Implementation of stack, Applications, Queue introduction, Queue implementations, applications	06 hrs
3	**Lists** Introduction to Lists, Implementation, types of Lists, Applications	04 hrs
	Unit –II	
4	**Tree and Hash Data structures** **Tree:** Introduction to graphs, Trees, Binary Search trees, Tree Traversals, and Applications, **Hashing**: General Idea, Hash Function, Collision Resolution Techniques	06 hrs
5	**Sorting** Sorting, Bubble sort, Insertion Srt, selection sort, Merge Sort, Quick Sort, Heap sort	06 hrs
6	**Graphs and Graph Algorithms** DFS, BFS, Topological sort, Shortest Path Algorithms, Minimum Spanning Tree, implementation and applications.	05 hrs
	Unit –III	
7	**Algorithm Design techniques** Greedy algorithms, Divide and conquer	04 hrs
8	**Algorithm Design techniques (contd..)** Dynamic programming, Randomized algorithms, Backtracking algorithms.	04 hrs

Text Books:
1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 2010.

References:
1. Ellis Horowitz, Sartaj Sahani, and Susan Anderson Freed, "Fundamentals of Data Structures in C", 2nd Edition, Orient Blackswan 2008.
2. Aron M. Tenenbaum, et. al, "Data Structures using C", PHI, 2006.
3. Levitin A., "Introduction to the Design and Analysis of Algorithms", 2nd Edition, Pearson Education, 2008.

Experiments	Lab assignments/experiments
2-Demonstration	Programming Assignments on C language Features, structures time complexity calculations
6–Exercise	Stack, Queue, Linked List, Tree ,Hash, Sorting and Searching Algorithms
1-Structured Enquiry	Graphs and Dynamic Programming
1- Course Project	Develop a real world application by selecting appropriate data structure and algorithms.