Course Type	Course Code	Name of the Course	L	T	P	Credits
DC	NMCC517	Data Structures	3	1	0	4

Course Objective

- Data Structures is the basic course of Computer Science. It is required in every field of Computer Science. Objective of this course is to impart knowledge of Data Structures.

Learning Outcomes

- Students will learn how to represent the data in various forms and use them in various applications.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Basic concepts; Mathematical Background; Arrays: one dimensional, multi-dimensional, Sparse Matrix. Elementary Operations: Stacks: Representation, elementary operations and applications such as infix to postfix, postfix evaluation, parenthesis matching, representation of Stack Using Queues, Representation of Stack using single Array. Queues: Simple queues, circular queue, elementary operations, representation of Queue using Stacks	10L +2T	This unit will help students to understand basic concept of Data Structures, Stacks and Queues.
2	Linked lists: Linear, circular and doubly linked lists, elementary operations and applications such as polynomial manipulation, Searching, Representation of Sparse Matrix and Sparse Matrix manipulations using Linked list.	8L+3T	This unit will help students to understand the concept of Linked List.
3	Trees: Basic definitions, Binary tree representation, tree traversal, binary search tree, height balanced trees like AVL tree and 2 tree, heap, complete binary tree, other operations and applications of trees.	8L+3T	This unit will help students to get the concept of Trees and their implementation.
4	Graphs: Basic definitions, Representation, Adjacency list, graph traversal, path matrix, connected components, DAG, topological sort, Spanning tree, Shortest path algorithms: Single pair and All pair shortest path algorithms.	8L+3T	This unit will help students to get the concept of Graphs and their implementation.
5	Searching: Linear and Binary search; Hashing: hash tables, hash functions, open addressing Sorting Algorithms: Selection sort, bubble sort, quick sort, merge sort, heap sort, radix sort, File structures: Introduction, data file types, file organization, file access methods.	8L+3T	This unit will help students to get the concept of different types of Searching and Sorting Algorithms.
Total		**42L+14T**	

1. Y. Langsam, M.J. Augenstein and A.M. Tenenbaum, Data Structures Using C and C++, PHI, 2007.

Reference Books:

1. S. Lipschuts, Data Structures with C, Schaum's Outline Series, 2017.
2. E. Horowitz and S. Sahni, Fundamentals of Data Structures, University Press, 2008