Course Type	Course Code	Name of the Course	L	Т	Р	Credits
DSC3	NMCC103	Data Structures	3	0	0	3

## **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	10	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.	8	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.	8	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.	8	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.	8	This unit will help students to get the concept of different types of Searching and Sorting Algorithms.

## **Text Books:**

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