Course Type	Course Code	Name of Course	L	Т	Р	Credit
DSC4	NMCC104	Data Structures Lab	0	0	2	1

Course Objective

1. To make students to have the hands on experience/knowledge of implementing different types Data Structures.

Learning Outcomes

Upon successful completion of this course, students will become a good programmer to implement different Data Structures and their related Algorithms.

Unit		Lectu	
No.	Topics to be Covered	re	Learning Outcome
1	Basic concepts; Mathematical Background; Arrays: one dimensional, multi-dimensional, Sparse Matrix. Searching: Linear and Binary search; Hashing: hash tables, hash functions, open addressing Stacks: Representation, elementary operations and applications such as infix to postfix, postfix evaluation, parenthesis matching. Queues: Simple queues, circular queue, elementary operations and applications	7	This unit will help students to learn the implementation of various Data Structures like: Arrays, Sparse Matrix, Stacks, Queues and their related operations.
2	Linked lists: Linear, circular and doubly linked lists, elementary operations and applications such as polynomial manipulation. 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.	7	This unit will make students learn the implementation of Link list, Trees and their applications.
3	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.	6	This unit will make students learn the implementation of Graph and its related algorithms.
4	Sorting Algorithms: Selection sort, bubble sort, quick sort, merge sort, heap sort, radix sort,	6	This unit will make students to learn about the implementation of sorting.
5	Lab Exam	2	

Text Book:

1. S. Lipschuts, Data Structures with C, Schaum's Outline Series, 2017.

Reference Books:

- 1. Y. Langsam, M.J. Augenstein and A.M. Tenenbaum, Data Structures Using C and C++, PHI, 2007
- 2. E. Horowitz and S. Sahni, Fundamentals of Data Structures, University Press, 2008