

Course Type	Course Code	Name of Course	L	T	P	Credit
DSC3	NCSC103	Data Structures	3	0	0	3

Course Objective
The course will provide the basic and fundamental knowledge on various data structures concepts for solving different problems in Computer Science.
Learning Outcomes
Enhance the ability to understand different data structures approaches for organizing data in a computer so that it can be used effectively.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction: Formal definition, Types of Data Structures, Abstract Data Type, Algorithmic notation, Control Structures, Complexity Analysis.	4	Basic overview and understanding about the subject
2	Arrays and Linked Lists: Multidimensional arrays and their memory representation, Sparse matrices, Linked List - linear, circular and double, Elementary operations and applications such as polynomial manipulation.	4	Familiarity with Array, Linked list together with their operations and applications
3	Stack and Queues: Stack and elementary operations, Applications - Evaluation of arithmetic expressions and Implementation of recursion, Queue and elementary operations, Types of queues and applications.	5	Familiarity with Stack, queue and similar terminologies with basic operations
4	Trees: Binary tree representation and basic operations, Binary search tree, more on general tree, Height balanced trees like AVL tree and 2-3 tree, tries and B-tree, Other operations and applications	8	Basic understanding of non-linear data structures and its operations such as various trees
5	Graphs and their Applications: Graph terminology and representation, Traversal, connected components and spanning trees, Shortest path problem.	6	Basic understanding of non-linear data structures and its operations such as graphs
6	Searching and Sorting: Binary search, Fibonacci search, Insertion sort, Quick sort, Merge sort, Counting and radix sort, Heaps and Heap sort.	9	Basic understanding of searching and arranging numbers
7	Others: Hash tables, Augmenting data structures, String matching	6	Basic understanding of advanced types of data structures

Text Books:

1. J. P. Tremblay and P. G. Sorenson, "An Introduction to Data Structures with Application", TMH
2. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structures"
3. Seymour Lipschutz, "Data Structures with C (Schaum's Outline Series)"

Reference Books:

1. Cormen, Leiserson, Rivest and Stein, "Introduction to Algorithms", Prentice Hall of India, 3rd Edition, 2010.