Course Type	Course Code	Name of Course	L	T	P	Credit
SDC (Minor)	**NCSM401**	**COMPUTATIONAL TECHNIQUES LABORATORY**	0	0	3	1.5

Course Objective

The main objective of this course is to introduce students to some of the key techniques used in computing. Representations and operations on various data structures and their applications to efficient computing. Applications of various algorithm design techniques to design algorithms to solve computational problems.

Learning Outcomes

To make familiar with theoretical concept and practical applications of different data structures and algorithm design techniques to solve real-world problems.

Unit No.	Topics to be Covered	Practical Hours	Learning Outcome
1	**Basics of Programming:** Iterative and recursive programming using C/C++. Searching and sorting. Notion of time and space complexity.	6	Recapitulation of basic programming techniques
2	**Basic Data Structures:** Stack, Linked Lists, Queues	6	Familiarity with Stack, linked list, queue and basic operations on those data structures
3	**Trees:** Binary Search Tree, Heap and Priority Queues, AVL Tree,	9	Understanding of different types of trees and operations on those data structures
4	**Graphs:** Graph Traversals, BFS, DFS	3	Familiarity of graph representation and implementation of simple graph algorithms
5	**Greedy Algorithms:** Problems can be solved using greedy method	6	Basic understanding of greedy method
6	**Divide and Conquer:** Problems can be solved using divide and conquer technique	6	Basic understanding of divide and conquer technique
7	**Dynamic Programming:** Problems can be solved using dynamic programming	6	Basic understanding of dynamic programming
			Total: 42

Text Books:

1. M. J. Augenstein, & A. M. Tenenbaum, “Data Structures using C and C++ Y. Langsam”, Prentice Hall Press.
2. T. H. Cormen, C. E. Leiserson, R. L. Rivest, & C. Stein, “Introduction to algorithms, MIT press.

Reference Books:

1. M. T. Goodrich, R. Tamassia, & D. M. Mount, “Data structures and algorithms in C++”, John Wiley & Sons