

Course Type	Course Code	Name	L	T	P	Credits
DP	NCSC505	ADVANCED DATA STRUCTURES AND ALGORITHMS LAB	0	0	2	1

Course Objective

To design and practical implementation of algorithms covering various advanced level topics such as computational geometry, Fast Fourier Transformation, LUP decomposition, string matching and some advanced data structures.

Learning Outcomes

- To impart knowledge of designing algorithms on advanced data structures and algorithms
- To implement the related programs
- To know the application areas of such algorithms and data structures

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Assembly Line Scheduling, Matrix Chain Multiplication.	2	Implementation of some dynamic programming based algorithms.
2	Strongly Connected Component, Single Source Shortest Paths in DAG, Johnson's Algorithm: The Ford-Fulkerson method.	6	Implementation of some graph algorithms.
3	Geometric Searching Algorithms, Segment Intersection Problems.	4	Implementation of some of computational geometric algorithms:
4	Fast Fourier Transformation	2	To impart knowledge of executing programs for DFT and FFT computation.
5	Randomized Quicksort	2	Implementation of randomized quicksort
6	Rabin-Karp And Knuth-Morris-Pratt Algorithm.	4	Execution of some string matching algorithms
7	LUP decomposition and Linear System of Equations Solve	2	Solving Linear System of Equations using LUP decomposition.
8	Advanced Data Structures: kd-Tree, Binomial and Fibonacci Heaps., Range trees and their applications.	6	Creation and basic operation on Binomial and Fibonacci Heaps.
	Total	28	

Text Books:

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

Reference Books:

1. Mark De Berg et al., *Computational geometry: Algorithms and Application*, 3rd edition, Springer, 2008.