1.	Title of the course	Advanced Data Structures and Algorithms
2.	Course number	CS503L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CS5101/4
6.	To be offered by	Department of Computer Science and Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To teach designing, analysing, and implementing various algorithms and data structures for different kinds of computational problems. To expose advanced algorithmic paradigms and analysis to handle intractable problems	
10.	**Course Content:** Review of classical data structures, algorithmic paradigms: Asymptotic analysis of recurrences, algorithm analysis and design techniques: Divide and conquer, dynamic programming, greedy algorithms, graph algorithms, and analysis of hashing algorithms. Advanced algorithmic paradigms and analysis: Backtracking, branch and bound amortized analysis, priority queues and their extensions: Binomial heaps, Fibonacci heaps, splay trees. Network flows-max flow, min-cut theorem, Ford-Fulkerson, Edmonds-Karp algorithm, bipartite matching, NPcompleteness and reductions, randomised algorithms, exact exponential-time algorithms, data-driven algorithms.	
11.	**Textbook(s):** 1. Coreman, Leiserson,Rivest, and Stein, *Introduction to Algorithms*, 3rd Edition, MIT Press (2009).	
12.	**Reference(s):** 1. Dasgupta, Papadimitrou and Vazirani, *Algorithms*, McGraw-Hill Education (2006). 2. Fedor Fomin and Dieter Kratsch, *Exact Exponential Algorithms*, Springer (2010). 3. Kleinberg and Tardos, *Algorithm Design*, Pearson (2005).	