

Course Code	CSE319/CSE519
Course Name	Modern Algorithm Design
Credits	4
Course Offered to	UG+PG
Course Description	The field of algorithm design has matured and grown in scope over the last sixty years - starting with the basic algorithmic questions of sorting and searching, to algorithms for problems from various disciplines; so that nearly every field of human endeavour is being revolutionized by the algorithmic viewpoint. Students of this course will learn to use these modern tools irrespective of their future field of study or specialization.

Pre-requisites

Pre-requisite (Mandatory)	Algorithm Design and Analysis
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Post Conditions*(For suggestions on verbs please refer the second sheet)

CO1	CO2	CO3	CO4
Students are able to use algorithm design techniques in applications where data is imprecise, unavailable or arriving over time.	Students are able to use techniques such as randomization, network flows, etc. to design efficient algorithms and heuristics.	Students are able to use appropriate data structures that help solving algorithmic problems efficiently	Students are able to explain different approaches of dealing with NP-hard optimization problems.

Weekly Lecture Plan

Week Number	Lecture Topic	COs Met	Assignment/Labs/Tutorial
1	Randomization	CO2, CO4	Assignment 1
2	Skip list and hashing	CO3	Assignment 2
3	Amortized Analysis and Disjoint Set	CO3	Assignment 3
4	Suffix tree and suffix array	CO3	Assignment 4
5	Linear programming	CO2	Assignment 5
6	Maximum flow algorithms	CO2	Assignment 6
7	Bipartite matching and stable matching	CO2	Assignment 7
8	Approximation algorithms	CO4	Assignment 8
9	Parallel and external-memory algorithms	CO2	Assignment 9
10	Online Algorithms	CO1	Assignment 10
11	Streaming algorithms	CO1	Assignment 11
12	Data compression algorithms	CO3	Assignment 12
13	Web search algorithms	CO1	Assignment 13

Weekly Lab Plan (N/A)

Week Number	Laboratory Exercise	COs Met	Platform (Hardware/Software)

Assessment Plan		
Quizzes	30.00%	
Mid-sem		
End-sem		
Resource Material		
Type	Title	
Textbook	T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein, Introduction to Algorithms, MIT Press, Third Edition, 2009.	
Textbook		
	J. Kleinberg and E. Tardos, Algorithm Design, Addison Wesley, 2005.	