

Competitive Programming

Course Type: Certificate Course

Course Duration: Two Months

Course Timings: Wed (11:00 - 3:00 pm)

Fri (11:00 - 3:00 pm)

Course Description:

1. To enable the students to participate in Speed Programming Competition around the globe
2. To develop logic, and problem-solving skills so that participants can solve logical or mathematical problems and puzzles
3. To provide a Comprehensive study of Computer Algorithms.
4. To provide in-depth coverage of the Analysis and Design of Algorithms.
5. To become familiar with the solution of classical problems and to study/implement how these solutions can help solve other related problems.

Text Book: Thomas H Corman, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Introduction to Algorithms (2nd edition, 2001 or any other later edition).

Tentative Course Plan:

Week	Contents	Module	Assessments
1	The Role of Algorithms in Computing	1. Running Time Complexity	
2	Growth of Functions		Assignment 1, Quiz 1
	Iterative and Recursive Algorithms		
	Master Theorem		
2, 3	Divide and Conquer Merge Sort, Quick Sort	2. Sorting	Assignment 2, Quiz 2
4	Heap Sort (optional), Sorting in Linear Time		Quiz 3 (Optional)
6	Recursive Backtracking Dynamic Programming Dynamic Programming (Matrix Chain Multiplication	3. Dynamic Programming	Assignment 3, Quiz 4

	Longest Common Sub sequence etc.,)		
7	Dynamic Programming (Matrix Chain Multiplication Longest Common Sub sequence etc.,)		Quiz 5 (optional)
8	Revision		Mid Term
9, 10	Greedy Algorithms	4. Greedy Algorithms	Assignment 4, Quiz 6
11	Elementary Graph Algorithms (BFS, DFS)		Quiz 7 (Optional)
12	Greedy Algorithms Minimum Spanning Tree (Kruskal, Prims)	5. Graph	Assignment 5, Quiz 8
13	Greedy Algorithms Single Source Shortest Paths (Dijkstra)		
14	All-Pairs Shortest Paths, Approximation Algorithms (optional), Amortized Analysis (Optional)		Quiz 9
	Revision		