Syllabus

CS203	Design and Analysis of Algorithms	L	T	P
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Introduction to Algorithms: Time and space complexity, average and worst-case analysis, asymptotic notation, recurrence equations and their solution.

Algorithmic Techniques: Search techniques (backtracking and bounding), Search Trees, Sorting algorithms – heapsort, quick sort, sorting in linear time (counting sort, radix sort, bucket sort), Greedy algorithms (Activity-selection problem, Huffman coding, knapsack, shortest path and minimum spanning tree in graphs), Divide and conquer – Merge Sort, Integer Multiplication, Solving Recurrence-substitution method and recursion-tree, master theorem; Dynamic programming (0/1 knapsack, Traveling salesman problem, matrix multiplication, all-pairs shortest paths, longest common subsequence, optimal binary search trees).

Computational complexity: Problem classes: P, NP, NP-complete, NP-hard. Reduction. Examples of NP-complete problems.

Suggested Readings:

1. T. H. Cormen, C. E. Leiserson, R. L. Rivest , C. Stein, Introduction to Algorithms, PHI.
2. M. A. Weiss, Data Structures and Problem Solving Using Java, Addison Wesley.
3. A. Aho, V. Alfred, J. Hopcroft, J. D. Ullman, The Design and Analysis of Computer Algorithms, Addison Wesley.