CSE 201
Analysis of Algorithms
Outline of Topics

I. Mathematical Preliminaries
- Asymptotic Growth Rates (Handout, CLRS 3.1)
- Common Functions (Handout, CLRS 3.2)
- Induction Proofs (Handout)
- Recurrence Relations (Handout, CLRS 4.1-4.6)

II. Divide and Conquer Algorithms
- Searching, Sorting (CLRS 7)
- Selection (CLRS 9)
- Non-Comparison sorts (CLRS 8)
- Strassen's Algorithm (CLRS 4.2)

III. Dynamic Programming (CLRS 15)
- Coin Changing Problem
- Discrete Knapsack Problem
- Matrix Chain Multiplication (CLRS 15.2)
- All-Pairs Shortest Paths Problem (CLRS 25)

IV. Greedy Algorithms (CLRS 16)
- Continuous Knapsack Problem
- Minimum Weight Spanning Trees (CLRS 23)
- Matroids (CLRS 16.4-16.5)

V. Lower Bounds and Computational Complexity
- Decision Trees (CLRS 8.1)
- Adversary Arguments (Handout)

VI. Ammortized Analysis
- Fibonacci Heaps (CLRS 19)
- Disjoint Sets (CLRS 21)

VII. NP-Completeness (CLRS 34)
- Optimization Problems vs. Decision Problems, Solution vs. Verification (CLRS 34.1)
- Classes P, NP, co-NP (CLRS 34.2)
- Classes NP-Hard, NP-Complete (CLRS 34.3)
- NP-Completeness proofs (CLRS 34.4)