EC 504 - Spring 2021 Tentative Syllabus:

This is a tentative ordered syllabus discussing what we will cover in class. Deviations will occur, depending on class progress

1. Review: Algorithm Analysis (CLRS 2-4)
   a. Asymptotic complexity
   b. Recursions

2. Sorting: Classical and modern approaches (CLRS 4,9, Notes on TimSort)


4. Efficient Search in one-dimension
   a. Balanced Search Trees (Red-Black, Splay, B-Trees, VEB trees) (CLRS 12,13,18,20)
   b. Priority queues (Binary, Binomial, Fibonacci Heaps, VEB trees) (CLRS 6,19,20)
   c. Advanced hash tables (CLRS 9, Notes)
   d. Tries and String Matching (Notes)

5. n-Dimensional search
   a. Quad-trees
   b. K-d trees (Notes)
   c. R-trees (Notes)

6. Graphs and Network Optimization (CLRS 22)
   a. Minimum spanning trees: Greedy algorithms (CLRS 23)
   c. Max-flow: Ford-Fulkerson, Preflow-push (CLRS 26)
   d. Min-cost flow: Assignment problems, auction algorithms, successive shortest path algorithms (Notes)
   e. Applications (Notes)

7. Complexity Theory
   a. NP-Complete Problems - Definition and examples (CLRS 34)
   b. Approximation Algorithms - Knapsack, Traveling Salesperson, ... (CLRS 35)

8. Advanced Topics
   a. Games (Notes)
   b. Other topics...