

EC 504 Spring 2023 – Syllabus

Richard Brower: in LSE B03 Mon and Wed 2:30 - 4:15PM

This is a syllabus discussing what we will cover in class. References [CRLS] identify sections for source material in the required text: Cormen, Leiserson, Rivest, and Stein, Introduction to Algorithms (Third Edition), MIT press, 2009:

1. Fundamentals [CRLS] 1-4
 - Analysis of algorithms
 - Asymptotic notation
 - Recurrences
 - Average Case
 - Amortized analysis [CRLS] 17
 - Overview of C/C++ – Style vs Efficiency
2. Basic 1D data structures and algorithms [CRLS] 6-9
 - Searching and Sorting
 - Worst, best, average case analysis of algorithms
 - Stacks and queues [CRLS] 10
 - Execution of function calls.
3. Basic Trees and Data Structures [CRLS] 12,13,14
 - Balanced search trees
 - Insertion and Deletion in AVL
 - Priority queues [CRLS] 18,19,20,21
 - Heaps, binomial heaps
 - Files systems
 - Huffman Coding.
4. 2D Graphs and Networks [CRLS] 22,23,24,25
 - Representations
 - Traversals
 - Minimum spanning trees
 - Shortest paths – Max Flow [CRLS] 26
 - MinCost flow
5. Optimization and Data Organization [CRLS] 16.2, 16.5
 - Knapsack, Job Scheduling [CRLS] 32
 - String Matching [CRLS] 21
 - Union Find
6. Possible Advanced topics [CRLS] 28, 30,32,35
 - Fast Fourier Transforms
 - Machine Learning
 - Quantum Computing