

EC 504 Fall 2022 – Syllabus

Richard Brower: in PHO 117 Tu and Tr 11:00AM – 12:45PM

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
 - Searching and Sorting [\[CRLS\] 6-9](#)
 - Worst, best, average case analysis of algorithms
 - Stacks and queues [\[CRLS\] 10](#)
3. Basic Trees and Data Structures [\[CRLS\] 12,13,14](#)
 - Balanced search trees
 - AVL, Red–Black
 - Self–adjusting
 - Priority queues [\[CRLS\] 18,19,20,21](#)
 - Heaps, binomial heaps and Fibonacci heaps
 - Leftist heaps, tries, treaps
4. 2D Graphs and Networks [\[CRLS\] 22,23,24,25](#)
 - Representations
 - Traversals
 - Minimum spanning trees
 - Shortest paths – Max Flow [\[CRLS\] 26](#)
 - MinCost flow
5. Possible Advanced topics [\[CRLS\] 28, 30,32,35](#)
 - Fast Fourier Transforms
 - NP Completeness
 - Machine Learning
 - Quantum Computing