EC 504 - Fall 2014

Tentative Syllabus:

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

1. Fundamentals
   o Brief overview of Java
   o Analysis of algorithms
     ▪ Asymptotic notation
     ▪ Recurrences
     ▪ Average Case
     ▪ Amortized analysis
   o Basic data structures and algorithms
     ▪ Sorting
       • Worst, best, average case analysis of algorithms
     ▪ Stacks and queues
     ▪ Hashes
       • Addressing, expected number of probes, Bloom filters

2. Containers and Data Bases
   o Balanced search trees
     ▪ AVL, Red-Black
     ▪ Distributable
     ▪ Self-adjusting
   o Priority queues
     ▪ Heaps, binomial heaps and Fibonacci heaps
     ▪ Leftist heaps, tries, treaps

3. Graphs and Networks
   o Representations
   o Traversals
   o Minimum spanning trees
   o Shortest paths
   o Max Flow
   o Min-Cost flow

4. Advanced topics
   o NP Completeness
     ▪ Reductions, Approximations
     ▪ Higher complexity classes
   o Cryptographic algorithms
     ▪ Rainbow tables
   o Games