

Course Syllabus

EECS 340: Algorithms and Data Structures

Spring 2008

” *Computer Science is no more about computers than astronomy is about telescopes.*” – E. W. Dijkstra

Objectives

This course provides an introduction to the design and analysis of algorithms for solving computational problems. It is expected that, upon completion of this course, the students will be familiar with basic data structures, major algorithmic techniques, and algorithms for common problems, and be able to analyze algorithms in terms of correctness and computational complexity.

Class Meeting

MWF 10:30am-11:20am, ROCK 309

Instructor

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Teaching Assistants

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Textbook

T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein. *Introduction to Algorithms*, 2nd Ed. Cambridge, MA: MIT Press. ISBN: 0262032937.

Prerequisites

EECS 233 and MATH 304.

Course Work & Grading

Participation: The students are expected to review the material to be covered before each class, attend the class meetings, and actively participate in class discussions.

Assignments: (30%) There are six assignments, each consisting of a few problems related to the material that was covered in class after the last assignment. The assignments will be distributed biweekly and the students will have two weeks to return the assignments. Each student is expected to complete the assignments individually and show their work and understanding of the problem thoroughly. The students are encouraged to type their answers using word processors (preferably, LaTeX).

Quizzes: (30%) There are two in-class quizzes, each consisting of a few problems related to the material that was covered in class after the last quiz. The quizzes are roughly scheduled for the 6th and 12th weeks of the semester.

Final Exam: (40%) The final exam covers all of the course material comprehensively.

Calendar (tentative)

Week	Topics	Work	Reading
1	Insertion Sort, Merge Sort, Algorithm Analysis	Assignment 1	1-2
2	Asymptotic Notation, Recurrences, Master Method		3, 4.1-3
3	Divide and Conquer, Fibonacci, Matrix Multiplication	Assignment 2	28.2
4	Quicksort, Randomized Algorithms, Heapsort		5.1-3, 6, 7
5	Linear-time Sorting, Lower Bounds, Order Statistics	Assignment 3	8.1-3, 9
6	Hashing, Hash Tables, Hash Functions	Quiz 1	11.1-3
7	Binary Search Trees, Balanced Search Trees		12.1-4, 13
8	Dynamic Programming, Longest Common Subsequence	Assignment 4	15
9	Greedy Algorithms, Huffman Codes, Minimum Spanning Tree		16.1-3, 22.1, 23
10	Graph Algorithms, Topological Sort, Connected Components	Assignment 5	22.3-4
11	SSSP, Dijkstra's Algorithm, BFS, Bellman-Ford		22.2, 24
12	APSP, Floyd-Warshall, Matrix Multiplication	Assignment 6	25
13	Bipartite Matching, Maximum Flow	Quiz 2	26.1-3
14	NP-Completeness, Reduction		34

Plagiarism Policy

Zero-tolerance policy on plagiarism is enforced. Following the departmental plagiarism policy, cheating on homeworks or tests will result in an F grade for the whole course and appropriate disciplinary action, independently of the extent of plagiarism. In case of doubt, the students are responsible for checking with the TA or the instructor on what is allowed and what is not.