

CS 457: Data Structures and Algorithms I

Fall 2013 - Syllabus

General Information

The course is in University Crossings 153 every Tuesday and Thursday from 12:30 to 13:50.

Homework assignments and lecture slides will be posted on Drexels BBLearn site at <http://learning.drexel.edu>.

Contact

The professor for this course is Yusuf Osmanlioglu, University Crossings, Room 146, yo42@drexel.edu.

Office hours are Tuesdays from 2 to 4 pm in UC Room 146, or by appointment.

Objectives

This course is intended as a broad undergraduate-level introduction to the design and analysis of algorithms for some of the most frequently encountered combinatorial problems.

Prerequisites

No specific prior knowledge is necessary, but some exposure to the data structures and algorithms at undergraduate level and some general mathematical background are assumed. You should already have some basic knowledge of algorithms, growth functions and asymptotic notation, recurrences, probabilistic analysis, sorting, median and order statistics, and elementary data structures.

Outline

The course aims to provide familiarity with general algorithmic techniques, performance measures, analysis and problem areas. Specifically, we will cover the following topics:

- Asymptotic analysis and the Master theorem
- Sorting algorithms
- Selection problem and order statistics
- Introduction to graph algorithms
- Graph traversal
- Minimum spanning trees
- Single-source shortest paths in weighted graphs
- Balanced search trees
- String Matching
- Amortized Analysis

Expected Work

Biweekly written theory homework assignments (4 in total, should be done independently), three programming assignments (should be done independently), one midterm exam, and one final exam.

Grading

- Written Assignments: 30%
- Programming Assignments: 20%
- Midterm: 20%
- Final: 30%

Textbook

T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, *Introduction to Algorithms*, third edition, MIT Press and McGraw-Hill. ISBN0-262-03141-8. <http://mitpress.mit.edu/algorithms/>

Textbook is available online through Drexel Library

Recommended References

- Kozen, *Design and Analysis of Algorithms*, Springer Verlag, 1992.
- Tarjan, *Data Structures and Network Algorithms*, SIAM Series in Applied Mathematics 44, 1983.
- Papadimitriou and Steiglitz, *Combinatorial Optimization: Algorithms and Complexity*, Prentice Hall, 1982.

Academic Honesty

The university's academic honesty policy is in effect for this course. Please read the section Academic Integrity in the Drexel University Student Handbook to make sure you are familiar with this policy (<http://www.drexel.edu/judicial/honesty.html>).

You must be the sole original author of all assignments and examination solutions in their entirety, unless the instructor explicitly instructs you to do otherwise in written directions on an assignment or exam. As the university's policy explains, penalties up to and including a failing grade for the course with no opportunity to withdraw will be given for plagiarism, fabrication, or cheating.

The standards for originality in a program are similar to those of other written works. Programs by different authors show clear and substantial differences as judged by most criteria, including but not limited to: choice of variable and procedure names, line spacing and indentation, choice of program structure, choice of algorithms, ordering of modules, module design, and ordering and choice of instructions. The original author of an assignment can explain each detail and how they came to create it on their own.

It is your responsibility to avoid violating the university's policy. If you are unclear as to what the policy means in a particular situation, ask the instructor for clarification before you hand anything in.