22**C** : 031 (*CS* : 3310 : 0001) **Algorithms**
Spring 2011

Class Schedule

10.55–12.10 pm Tuesday and Thursday at 214 MLH (MacLean Hall)

Instructor

Kasturi Varadarajan: 101D MacLean Hall, 335-0732, kasturi-varadarajan@uiowa.edu
Office hours: To be announced on course webpage shortly.

Course Web Page

`www.cs.uiowa.edu/∼kvaradar/sp2011/algos.html`

Departmental Information

Department of Computer Science, 14 Maclean Hall. The office of the DEO, Prof. Alberto Segre, is located here.

Content

We will study various computational problems using the lens of algorithmic analysis. While the lens itself is motivated by issues of efficiency in terms of running time or space, we will see that the lens leads to some very interesting solutions and general algorithmic techniques. We will also see that computational problems that look very similar to the naked eye appear very different when viewed through the lens.

For our textbook, we will use "Algorithm Design" by Jon Kleinberg and Eva Tardos. We will focus on the following portions corresponding to the text:

- Introduction to algorithm design and analysis (Chapters 1 and 2)
- Greedy Algorithms (Chapter 4)
- Divide and Conquer (Chapter 5)
- Dynamic Programming (Chapter 6)
- Randomized Algorithms (Chapter 13)
- NP and Computational Intractability (Chapter 8)

In addition, if time permits, we will study a (possibly empty) subset of the material in Chapters 10, 11, and 12.

This is just the preliminary plan and it will certainly undergo some modifications. We will also not stick to the order suggested above.

Prerequisites

C- or higher in 22C:021 (CS:2310), and 22M:025 (MATH:1850) or 22M:031 (MATH:1550). The main prerequisite is 22C:21 (Data Structures). In particular we will assume that the students have (to quote our textbook) "written programs that implement basic algorithms, manipulate discrete structures such as trees and graphs, and apply basic data structures such as arrays, lists, queues, and stacks." This experience will allow us to discuss algorithms at the level of pseudo-code while clearly understanding that the pseudo-code is quite readily and reasonably translated to an actual program in some language (like Java).

Grading

The grading will be based on seven homeworks (6 points each), quizzes (a total of 10 points), a midterm (20 points) and a final (28 points). Up to two of the seven homeworks will require programming. I will assume Java as the default choice for the programming language in these two homeworks. (But do contact me if you are not sufficiently familiar with Java.) There will be a short quiz every thursday (except on the midterm day) thats worth one point. The overall contribution of the quizzes to the grade will be the minimum of 10 and the total score on the quizzes.

There will be no make-up quizzes. Make-up exams and late homework submissions will not be entertained either, except in very convincing cases of emergency. The graded quiz will be returned the next class. We will also aim to return the graded homeworks and midterm within one week after they are turned in.

I expect to follow, to the extent possible, the grade distribution recommended by the College of Liberal Arts and Sciences for an advanced course – 22 % A's, 38 % B's, 36 % C's, rest D's and F's. Naturally, the actual performance may force a significant deviation from this distribution. I will use plus/minus grades.

Exam Dates

The midterm will be during class hours on Thursday, March 10. The final exam will be on Monday, May 9, from 12.00–2.00 pm, as scheduled by the registrar's office. Both exams will happen in our classroom.

Collaboration

No collaboration is allowed on the exams and quizzes. For homework problems, collaboration is alright. We even encourage it, assuming each of you has first spent some time (about 45 minutes) thinking about the problem yourself. However, no written transcript (electronic or otherwise) of the collaborative discussion should be taken from the discussion by any participant. It will be assumed that each of you is capable of orally explaining the solution that you turn in, so do not turn in something you don't understand.

Teaching Assistant

Chao Yang. Contact Information and Office Hours to be posted on course webpage shortly.

Course Accounts

You will be assigned an account on the computer science department machines shortly, if you do not already have one. In addition, you will need your HawkId and password to access information about this course on icon and to submit the programming assignments.

Administrative Home

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Student Academic Handbook.

Accomodations for Disabilities

A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements.

Academic Fraud

Plagiarism and any other activities when students present work that is not their own are academic fraud. Academic fraud is a serious matter and is reported to the departmental DEO and to the Associate Dean for Undergraduate Programs and Curriculum. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. See the CLAS Academic Fraud section of the Student Academic Handbook.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook.