

CMPSCI 711 SPRING '09: ADMINISTRIVIA

1. BASIC STUFF

Lectures: Tuesday and Thursday, 1pm to 2.15pm in CMPS 140.

Lecturer: Professor Andrew McGregor

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- (4) Office hours: Tuesday 3:00 - 4:00, or by appointment.

Web-page: Course news and materials will be posted at

www.cs.umass.edu/~mcgregor/courses/CS711/index.html .

2. DESCRIPTION

This offering of CMPSCI 711 will focus on randomization in algorithms. While this topic is addressed in CMPSCI 611, the objective of 711 is to learn more about this increasingly important area of algorithms. Our emphasis will be on broadly applicable techniques for analyzing randomization, as well as the use of randomization in specific problem domains where it is helpful, or, in some cases, essential. Topics will include the probabilistic method; tail inequalities; entropy and information; random walks; derandomization and limited independence. Applications to approximation and combinatorial optimization; online and stream computation; communication theory; and other areas will be discussed as time permits.

In the first part of the course we'll cover material from the first seven chapters of the required textbook (see below). By the end of the course, it is expected that everyone will have read all of these chapters and made an effort to understand the material. However, homeworks and exams will only assume knowledge of material explicitly covered in class. In the second part of the course, we'll cover some material from later chapters of the textbook but will also review pieces of recent research in which randomization plays an important role.

3. TEXTBOOKS

The required textbook for the course is:

- (1) R. Motwani and P. Raghavan, *Randomized Algorithms*. Cambridge University Press, 1995.

The following might also be helpful:

- (1) M. Mitzenmacher and E. Upfal, *Probability and Computing: Randomized Algorithms and Probabilistic Analysis*. Cambridge University Press, 2005.

4. PREREQUISITES

A "B" in CMPSCI 611 is the official pre-requisite for this course but if you have a very strong mathematical background, please email me. For those of you that have taken (or audited) 711 in the past, there have been two types of previous offerings: one that dealt with parallel algorithms and (in Spring '03 and Spring '05) one that dealt with randomization. You can register for this offering for credit as long as you didn't take the Spring '03 or Spring '05 offerings of 711 for credit.

5. ASSESSMENT

- (1) Homeworks: There will be approximately 3 assignments that will contribute 50% to your overall grade. You will have at least 1 week for each assignment. Collaborations is allowed on homework but all collaboration must be acknowledged. i.e., specify who you worked with on each question.
- (2) Exams: There will be a take home mid-term and a take home final exam for this course. You will have at least 1 week for each exam. Both exams must be done individually – no collaboration is permitted. The exams will contribute 25% of your grade.
- (3) Participation: The remaining 25% of the grade will be based on class participation. This will take the form of being actively engaged in class and, in the second part of the class, you may be expected to present a paper.

Anyone is welcome to sit in on the course. However, if you plan to attend many of the lectures (and are a student), please do sign up to audit the course, so that our enrollment numbers reflect course attendance.