

Syllabus – MATH 778P

Prof. Joshua Cooper, Fall 2008

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Main Text: Alon & Spencer, *The Probabilistic Method*

Supplementary Reading: Spencer, *Ten Lectures on the Probabilistic Method*;
Chung, *Spectral Graph Theory*.

Class: Monday, Wednesday, & Friday 12:20PM – 1:10PM, LeConte (LC) 303B

Office Hours: Monday 1:30PM – 3:00PM or by appointment.

Course Material: Probabilistic and spectral methods in combinatorics and graph theory. Topics include spectral (i.e., linear-algebraic) graph theory, probabilistic methods, random graphs, quasirandomness and regularity, power-law (“massive”) graphs, and other areas of interest to attendees. First of two semesters (the second to be taught by Prof. Lu).

Note: The last day to drop classes without incurring a “W” is 8/27, and the last day to drop classes without incurring a “WF” is 10/2.

ADA: If you have special needs as addressed by the Americans with Disabilities Act and need any assistance please notify me immediately.

Attendance: You are expected to attend every class. The bar is stratospheric for exam rescheduling or omission. If you *have* to leave before class is over, the correct procedure is to mention this to me before class. It is impolite and disruptive to leave class during a lecture unless you have followed this procedure. You are also expected to turn off or silence your cell phone (or any other noise-making device) before class.

Grade Breakdown: 60% from Problem Sets, 40% from Final Exam.

Grading scale: $A \in [90, 100]$, $B+ \in [86, 90)$, $B \in [80, 86)$, $C+ \in [76, 80)$, $C \in [70, 76)$, $D+ \in [66, 70)$, $D \in [60, 66)$, $F \in [0, 60)$.

Problem Sets: Problem sets will be assigned periodically (generally at the start of a new chapter), announced, and posted on the website. Problem sets are due by the expiration date on the posted problem set and will not be accepted after that point. You are generally expected to provide complete, rigorous, and *neat* solutions in order to receive credit. Five extra points will be awarded per problem set for submitting your work in \LaTeX . (If you are not familiar with this ubiquitous and elegant typesetting tool, now is a good time to learn. There are endless resources available on the web and elsewhere.) I will select submitted solutions to post as an answer key. You will receive five extra points, fame, and

glory for each of your solutions that I post.

Final Exam: The content of the exams will be drawn from lectures and from the text. Keep in mind that you are responsible for *all* material covered in class, even if it does not appear in Spencer. No electronic devices, including calculators, are permitted in the exams. The final exam will be held on Thursday, December 11 at 9:00 AM.

Learning Outcomes: Students will master concepts and solve problems in combinatorics and graph theory using probabilistic and spectral methods.

Hints for a successful semester:

1. Check the website early and often. Problem sets and announcements will be posted there, and there is a list of useful resources.
2. Ask questions in class, and come by office hours. Get to know your classmates and form study groups.
3. Do *not* assume you comprehend something just because you saw it done. It is all too easy to assume that you know how to do something just from seeing it done once. Always ask yourself, “Could I solve that problem myself, start-to-finish, even if it were slightly different?” If not, do related practice problems from the book or elsewhere.