MATH 3170: Combinatorics **Fall 2013**

General Info

Instructor: Professor David Grant, grant@colorado.edu

Office Hours: M 3:00–3:50, W 11:00–11:50, F 10:00–10:50 (or by appointment), in Math 303 (if I'm not there I'm in Math 266: come get me.).

Class Meetings: MWF 2–2:50 PM in Duane G2B21.

Text: A Walk Through Combinatorics: An Introduction to Enumeration and Graph Theory (Third Edition), Pearson, 2011, by Miklos Bona.

The book is excellent and has been very popular with students. It's exceptionally lively and interesting and has *lots* of solved problems. Fortunately, it also has lots of *unsolved* ones, which you'll enjoy sinking your teeth into.

Prerequisite.

MATH 2001.

About the course.

Combinatorics is sometimes known as "clever counting," and is one of the most beautiful and useful areas of mathematics, having applications throughout mathematics, computer science, and the sciences. We'll cover the basics of enumerative combinatorics (i.e, "counting"), specifically Chapters 1-5 and 7 on the Pidgeonhole Principle, Induction, Permutations and Combinations, Multinomial coefficients, Partitions, and Inclusion-Exclusion (sieving). We'll concentrate on Chapter 8, on the powerful technique of generating functions, before moving on to graph theory, whose basics are in Chapter 9. There are many topics to explore: I'd like to cover Chapter 10 on Trees and Chapter 12 on planar graphs (including Euler's famous "$V - E + F = 2$" formula). If we have time we'll do more – the book is teeming with beautiful topics.

Further reading

There are many good textbooks that cover the material in this course. These include Combinatorics and Graph Theory, by Harris, Hirst, and Mossinghoff, Generatingfunctionology by Herb Wilf, and (for after this course) Richard Stanley's Enumerative Combinatorics.

Course requirements and grading.

This course will meet three days a week. Homework will be assigned weekly, and will typically be due the following Wednesday. There will be two hour exams during our regular class time and in our usual room. The first will be on September 30th and the second will be on November 4th. There will be a final exam in our regular classroom on December 16th, from 7:30 p.m. till 10 p.m. Your final grade in this course will be determined by your total score out of 500 possible points. These points are broken down as follows: Homeworks count for a total of 100 points, the two hour exams will each be worth 100 points, and the final exam will make up the remaining 200 points. The final

will, unlike the hour exams, be cumulative, with an emphasis on the material covered after the second exam. You can work together on homeworks, but, in keeping with standards of academic integrity, you must clearly state from whom you received your ideas.

Et Cetera:

The last day to drop a course without fee or a "W" on your transcript is Sept. 11. Also note that the last day for non A&S students to drop a course without petitioning the dean is Oct. 9 (the deadline is Nov. 1 for A&S students).

Please inform me as soon as possible should you need, due to your observance of a religious holiday, to miss an exam, homework, or class. Provided you notify me well in advance, every effort will be made to reach a reasonable accommodation.

If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. See www.Colorado.EDU/disabilityservices.

The University has an honor code, see http://honorcode.colorado.edu. I will expect each student to affix the pledge of the honor code to each exam.

The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty.

See http://www.colorado.edu/odh.

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. See policies at http://www.colorado.edu/policies/classbehavior.html and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html/♯ student_code