

Course Outline — Spring 2005

MATH 413 (Sections B13 and B14)

INTRODUCTION TO COMBINATORICS

9AM MWF, 441 Altgeld Hall

Textbook Richard A. Brualdi: *Introductory Combinatorics*, Fourth Edition
webpage: <http://www.math.uiuc.edu/~kostochk/math413>

Instructor: Alexandr Kostochka, 234 Illini Hall,
phone: 265-8037, e-mail: kostochk@math.uiuc.edu
office hours: 3–4 MWF (tentatively), or by appointment

The aim of this course is to give an introduction to combinatorial mathematics. The emphasis will be on enumeration and symmetric structures. We will learn how to count combinatorial objects and how to construct and study useful symmetric configurations. We will pay very little attention to graphs (covered by Math 412) and linear programming and combinatorial optimization (covered by Math 482). This course will be helpful to those who plan to study combinatorial courses of higher level. We pay attention to both, computational techniques and proofs of theorems. The main topics are: Examples of combinatorial problems, the Pigeonhole Principle, permutations and combinations, the binomial coefficients, partially ordered sets, the Inclusion–Exclusion Principle, recurrence relations, generating functions, and combinatorial designs.

Essentially, we will cover Chapters 1–3, 5–8, 10 of the book *Introductory Combinatorics* by Richard A. Brualdi, plus some supplementary material from the instructor.

Requirements: Weekly problem sets (the ten highest homework grades count), quizzes (the ten highest quiz grades count), three tests, and a final examination. Weighting: homework $20 \times 10 = 200$ points, quizzes $10 \times 10 = 100$ points, tests $100 \times 3 = 300$ points, final exam 200 points, total 800 points.