

MATH 2441

Combinatorics

Syllabus

Fall 2008

Instructor: Sam Smith

Office: Barbelin 230, email smith@sju.edu, x1559

Office Hours: Mon 11:00-1:00, Tues. 1:00-3:00, or by appointment.

Text: Daniel Cohen, Basic Techniques of Combinatorial and Graph Theory¹, John Wiley & sons

Course Description: Combinatorics is the study of counting or enumeration problems arising with sets, groups, graphs and other discrete objects in mathematics. Combinatorics problems are often the most basic and compelling problems in mathematics. Questions can often be easily understood by non-specialists. While the problem statements may be simple, the solutions usually require exceptional cleverness and skill. Combinatorics is currently one of the most active disciplines in mathematics with subfields focusing on graph theory, algebraic combinatorics and the theory of algorithms. The field has important applications in virtually all areas of mathematics as well as natural sciences and computer science. This course will provide an in-depth introduction to Combinatorics with a focus on problem solving. We will develop some of the basic techniques in the field motivated by the problems we consider.

Course Structure: Your responsibilities for this course are: a midterm exam, a final exam, seven written problem sets. The dates for these are indicated on the attached course calendar except for the final exam which will be scheduled by the registrar.

Learning Goals: Students will be able to apply elementary techniques to simple combinatorial problems. Students will be able to find recurrence relations for some sequences. Students will be able to apply generating-function methods to some combinatorial questions, including (in some cases) the problem of finding a formula for a sequence when given a recurrence relation. Students will understand some elements of graph theory. Students will be able to apply the Principle of Inclusion-Exclusion to a variety of problems. Students will advance his/her facility in learning abstract mathematics. Students will advance his/her facility in reading and constructing proofs.

Problem Sets: I will hand out problem sets essentially every other week. I expect you to write proofs in complete, grammatical sentences (albeit with symbols). You will lose substantial points if your work is not neat, well organized and written in complete, sentences.

Grades: I will determine your final course grades by curving your total scores, out of a possible 650 points, computed as follows: The Midterm exam will be worth 100 points and the final exam 200 points. The written assignments will be worth 50 points each.

Policy on Collaboration: You are encouraged to discuss the ideas of the class with fellow students or with me. However, I expect every student to hand in their own work. If you have gotten considerable help from another student (excluding me) you should indicate this on your paper.

¹ This text is out of print. You can buy a copy at the University Press. They are reserved for our course.

MATH 2441 Combinatorics Calendar

Fall 2008

Tuesday	Thursday
Sept 2	Sept 4
Sept 9	Sept 11
Sept 16 Problem Set 1 Due	Sept 14
Sept 23	Sept 25
Sept 30 Problem Set 2 Due	Oct 2
Oct 7	Oct 9
Oct 14 Problem Set 3 Due	Oct 16
Oct 21 Fall Break -- No Class	Oct 23
Oct 28 Problem Set 4 Due	Oct 30 Midterm Exam
Nov 4	Nov 6
Nov 11 Problem Set 5 Due	Nov 13
Nov 18	Nov 20
Nov 25 Problem Set 6 Due	Nov 27 Thanksgiving -- No Class
Dec 2	Dec 4
Dec 9 Problem Set 7 Due	Dec 11
Dec 16	Final Exams