Math 310: Elementary Combinatorics

Spring 2009
Penn State University
Sections 1 & 2

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Course Description:
An introduction to the fundamental techniques of enumeration (i.e., counting). Topics include the basic counting principles (e.g., addition, subtraction, multiplcation and division principles), the combinatorial structures of permutations and combinations, multisets, binomial and multinomial theorems, recurrence relations, generating functions, and partitions. Additional topics such as derangements, Catalan numbers, Stirling numbers, the principle of inclusion-exclusion and Pólya counting will be covered as time and interest permits.

Textbook:
Brualdi, R., *Introductory Combinatorics*, 4th Edition, 2004, Pearson Prentice Hall.

Course Website:
The course website is located at the following address:

http://www.math.psu.edu/dlittle/m310s09

The following course information can be obtained at this site: syllabus, announcements, daily schedule of class topics, homework, self-quizzes, and solutions to suggested homework, written homework and exams.

Grading Policy:
The overall grade will be based on the following point distribution.

Group Project	15%
Homework	20%
First Midterm (February 26, 6:30-7:45pm)	20%
Second Midterm (April 2, 6:30-7:45pm)	20%
Final Exam (May 4 - May 8)	25%

Homework Policy:
Written homework will be assigned and collected on a regular basis throughout the semester. If you are absent for any reason, then you must submit your work early or have a classmate turn it in for you. **Late homework will not be accepted.** Additionally, suggested problems will be posted on the class website. These suggested problems are not to be turned in, however, students are highly encouraged to make sure they know how to do them.

While students are encouraged to collaborate with each other on the homework assignments, every student is responsible for writing up solutions on their own. Students may not copy complete and/or portions of solutions from *any* source. I reserve the right to question a student about their solution before giving full credit.

Homework should be written neatly and legibly and must include all necessary work. A correct answer will only receive credit if it is properly justified. The reader/grader should not have to fill in any missing steps or struggle to understand your reasoning. Correct answers with no work shown will receive no credit. Each solution should be written on a single separate sheet of paper. Hand-written solutions can make use of both sides of the paper while typed solutions must fit on one side of the paper. **Do not under any circumstances turn in scratch work or paper ripped out of a spiral bound notebook.**

Furthermore, solutions should be well-written. Tips on writing homework solutions will be distributed in class. Remember, writing a mathematical paper is no different from writing any other type of document. You should treat mathematical statements or symbols as if they were written in English. Make sure that when read, your statements involving mathematical formulas and symbols are in fact complete and grammatically correct sentences.

Each homework problem will be graded on the following scale:

0	Little to no progress has been made in solving problem.
5	Significant progress has been made, however solution is still incomplete and/or incorrect.
7	Well-written but significant math errors OR mathematically correct but poorly written (i.e., disorganized, difficult to understand, includes scratchwork, etc.)
9	Well-written, with the exception of one or two minor mathematical errors and/or typos (i.e., a sign error or some other simple calculation error)
10	Excellent, well-written solution! (i.e. mathematically correct, grammatically correct, legible, well-organized, etc.)

Your two lowest problem scores (not homework scores) will be dropped at the end of the semester.

Exam Policy:
Exams will be based primarily on the written and suggested homework problems. The time and location of the exams will be announced well in advance. Makeup exams will only be given in the case of a documented illness or official university business. If you are unable to attend a scheduled exam, please inform me as soon as possible *prior* to the exam.

Our final exam will be held during the final exam period of May 4 through May 8. Do not make plans to leave the university for Summer vacation until after this week. A makeup final exam will not be given to accommodate a student's travel plans.

Group Project:
The group project will be designed to use the methods of this class to analyze one of several different classic games of chance and/or study an advanced topic in combinatorics. Specific details of this project will be made available later in the semester.

Academic Integrity:
Penn State students are expected to adhere to the University's Code of Conduct. For this course, while collaboration on homework is encouraged, each student is responsible for writing up his/her own solutions without help of any kind. Students may not use solutions from *any* source, including publicly available solution manuals and the internet. For additional information regarding academic integrity, please see the Eberly College of Science Academic Integrity homepage.

Students with Disabilities:
Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for modifications or reasonable accommodations in this course, contact the Office for Disability Services, ODS located in room 116 Boucke Building at 814-863-1807(V/TTY). For further information regarding ODS, please visit their web site at

http://www.equity.psu.edu/ods

Instructors should be notified as early in the semester as possible regarding the need for modification or reasonable accommodations.

Suggestions to the student:
Come to class prepared. Before coming to class, read the material that is to be covered. Make a note of any definitions, concepts, and/or examples that you did not understand. During the course of the lecture, these concepts should become more clear. If not, you will have already formulated the exact question you want answered. Also, having read the section ahead of time should eliminate the need to write down everything I put on the board, allowing you to listen more attentively.

Keep up to date with the class. Review your notes on a daily basis. One suggestion would be to spend ten minutes before class to remind yourself what we did last time and ten minutes after class to review what we just covered. Also consider re-reading and rewriting your notes on a daily basis. This should reduce the time and anxiety of studying for exams.

Do your exercises. Homework problems will be assigned, but it is always recommended to attempt as many problems as possible, assigned or not. A list of suggested problems is available on the course website. Make sure that you at least attempt each homework assignment the day it is assigned. Do not wait until the night before the due date to start an assignment.