

COURSE INFORMATION:
MATH 453 Combinatorics
Spring 2010

Time and Place: 3:15pm, Tuesday-Thursday at 124, Engg. 1 Bldg.

Instructor: Hemanshu Kaul

Office: 234B, Engineering 1

Phone: (312) 567-3128

E-mail: kaul@math.iit.edu

Office Hours: 12-1pm Tuesday, 1-2pm Thursday, and by appointment.
Emailed questions are also encouraged.

Course Communications: <http://www.math.iit.edu/~kaul/TeachingSpr10/Math453.html>

Check the course webpage regularly for homework assignments, announcements, and a lecture log (useful when you miss a class and when reviewing for an exam).

I regularly send emails with comments regarding HW problems, Exams, etc. Make sure your IIT email account is active and working.

Prerequisites: Math 230 Intro to Discrete Math, or its equivalent.

Course Description: The primary aim of this proof-based course is to introduce elementary counting techniques in Combinatorics, and develop:

- Proficiency in counting techniques like Permutations and combination, pigeonhole principle, inclusion-exclusion principle, recurrence relations and generating functions, enumeration under group action, and
- Good habits of understanding, communicating, and writing discrete mathematics.

An official description of the lecture topics and the course objectives is available at “http://www.iit.edu/csl/am/programs/course_descriptions.shtml”

Textbook: Roberts and Tesman, *Applied Combinatorics, 2nd Edition*.

Grade Break-down:

Homework and Quizzes are worth 35%; Two mid-term exams are worth 15% each; Final exam is worth 35%. The grading scale will be no more strict than A:85-100, B:75-84, C:65-74, D:55-64.

Class Attendance: You are expected to attend every class. Not everything will be covered in the book and topics may not be covered in the same way. Moreover, the multitude of concepts introduced and developed in each class, as well as the importance of proofs in this course makes it critical to attend lectures and participate in class discussions.

You are also expected to read the text, including examples and applications not covered in class.

Examinations: The exam dates and their precise topics will be announced in class and on the course webpage. The final exam will be on all the topics covered during the semester. Make-up exams will be given only in case of a documented emergency.

Homework Assignment and Quiz: Homework problems will be assigned once a week (typically on Thursday) which will be due one week later. In addition, I will assign reading homework during lectures. It is in your best interest to do this reading before the next lecture.

It is your responsibility to check the webpage for assignments and their due dates. Homework needs to be submitted at the beginning of class on the due date. It should be typed or written legibly. Be sure to staple the pages together and write your name, course number, assignment number, and

the date of submission on the front.

There will be a quiz each Thursday based on the HW due that day.

‘Why and How’ of Homework: Homework serves as an opportunity for students to practice communicating written mathematics with clarity of thought and language. In any course like this, learning good communication skills in mathematics is very important. As significant is the opportunity that a homework provides you to test your understanding of the material covered in class that week. Mathematics cannot be learned by listening or just reading a book - you have to do it. Considering the varying pace of learning of students in class and the lack of class time to explore every detail of every concept/Theorem, working through problems in the HW (both written and reading HWs) is an easy way for you to make sure that you are keeping up with the class. This is why homework is given a lot of importance in this course - dedicate enough time to it every week.

Every homework will contain some straightforward exercises and 1 or 2 slightly more challenging problems. Don't be disheartened if some problems take a while to solve. Such problems help develop your mathematical creativity. Discuss such problems with your classmates, and/ or ask me for help, but only after you have given them sufficient thought. Please remember that **homework is NOT meant to be an examination**, it is meant to assist in your learning and development. If you need help with it, don't hesitate to ask.

To improve your mathematical writing quickly, start by writing draft solutions to homework early. A day or two later after you have had time to forget what you wrote, read it. If it doesn't make sense or convince you, rewrite it. Writing a solution requires saying what you mean and meaning what you say. Be intellectually honest. Intellectual dishonesty includes: 1) stating a "reason" without understanding its relevance. 2) Claiming a conclusion when you know you haven't proved it. 3) Giving an example and claiming you have proved the statement for all instances. Include enough detail in your solutions so that your explanation is convincing to someone who hasn't thought about the problem before. The proofs/ arguments should be presented so that your classmates could read them and follow the logic (step-by-step).

You are allowed to discuss homework problems with your classmates. However, the solutions should be written by you alone. Solutions for homework and exams must be written clearly, legibly, and concisely, and will be graded for both mathematical correctness and presentation. Points will be deducted for sloppiness, incoherent or insufficient explanation, or for lack of supporting rationale.

HELP: You are encouraged to ask questions during class, or in office hours, or through email. If you are having trouble solving a homework problem, I will be glad to direct you in the right direction. The same goes for any reading assignment given during class, or any concept you have difficulty understanding. In past, a lot of my students have regularly communicated with me over email. I encourage you to do the same, if that suits you better.

Don't hesitate to ask for help! I cannot help you if you don't take the initiative.

Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources and make an appointment to speak with me as soon as possible. The Center for Disability Resources is located in the Life Sciences Building, Room 218, 312-567-5744 or disabilities@iit.edu.