COURSE INFORMATION: Fall 2018
MATH 553 Discrete Applied Mathematics I

Time and Place: 1:50pm, Tuesday & Thursday, at 106, Rettaliata Engg Center.

Instructor: Hemanshu Kaul

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Office Hours: 3:05pm-4pm Tuesday, and by appointment (send email).
Emailed questions are also encouraged.

Course Communications: https://www.math.iit.edu/~kaul/TeachingFall18/Math553.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 often send emails with comments regarding HW problems, Exams, etc. Make sure your IIT
email account is active and working.

Prerequisites: Familiarity with proofs using induction and with basic properties of discrete
mathematical structures.

Supplementary Textbook: Diestel, *Graph Theory, 4th edition*, is available at
http://diestel-graph-theory.com/, including a free online version.
You are expected to read the appropriate sections from this textbook corresponding to topics
we discuss in lectures.

Course Description: This proof-based course has a two-fold aim (both equally important):
− Develop proficiency in modern graph theory through existential and algorithmic problems,
and the corresponding structural and extremal results from matchings, connectivity, planarity,
coloring, Turan-type problems, and Ramsey theory;
− Development of good habits of understanding, communicating, and writing proof-based math-
ematics.
An official description of the lecture topics and the course objectives is available at
https://science.iit.edu/courses/math553

Grade Break-down: Homework and participation is worth 35%; Two mid-term exams are
worth 30% total; Final exam is worth 35%. The grading scale will be no more strict than
A:85-100, B:75-84, C:65-74.

Class Attendance and Participation: You are expected to attend the lectures and partic-
ipate in class discussions. You are expected to read appropriate sections from the supplemen-
tary textbook corresponding to topics we discuss in lectures. **Multiple absences from class
without permission from instructor will result in deductions from your 'HW and
Participation' score at the discretion of the instructor.**

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: A total of 7-8 homework will be assigned over the semester. Each homework will be announced on the course webpage (and/or by email).

You are allowed to discuss homework problems with your classmates (and no one else). However, the solutions should be written by you alone. Any use of external help/ solutions, etc. will be considered a violation of IIT code of Academic Honesty and prosecuted accordingly. 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.

'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.

To improve your mathematical writing quickly, start by writing draft solutions to the 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).

Some of the HW problems will be straightforward applications of the definitions or theorems studied in class, however every homework will also contain some challenging problems. Don't be disheartened if some problems take some time 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.**

HELP: You are encouraged to ask questions during class, or in office hours, or through email, or in the discussion forum at Piazza. 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 concept/ proof you have difficulty understanding. **Don't hesitate to ask for help! I cannot help you if you don't take the initiative.**

In the 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.

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.