COURSE INFORMATION: Fall 2012
MATH 430 Applied Algebra

Time and Place: 11:25am, Tuesday and Thursday, at 106, Stuart Bldg.
Instructor: Hemanshu Kaul, Associate Professor of Applied Mathematics
Phone: (312) 567-3128
E-mail: kaul@iit.edu

Office Hours: 3:15-4:15pm Tuesday and Thursday, and by appointment.
Emailed questions are also encouraged. You are encouraged to request group appointments, if possible.

Graduate Teaching Assistant: Hansen Ha, hha3@hawk.iit.edu.

TA Office Hours: 1pm-3pm Tuesday, 129, E1 Building.

Course Communications: http://www.math.iit.edu/~kaul/TeachingFall12/Math430.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: Math 230 Introduction to Discrete Mathematics or Math 332 Elementary Linear Algebra. In particular, familiarity with proofs and mathematical structures.

Textbook supplements are posted at http://www.d.umn.edu/~jgallian/.
The text is excellent, and each section covered must be fully read

Course Description: This proof-based course has a two-fold aim (both equally important):
– Introduction to the rigorous study of the structure, properties, and relationships of groups, rings, and fields; this leads to further study in cryptography, (algebraic) number theory, topology, and differential geometry, etc., and is required for most good graduate schools.
– Development of good habits of understanding, communicating, and writing proof-based mathematics.
Also see the separate document “My Aim for this Course”.
An official description of the lecture topics and the course objectives is available at “http://www.iit.edu/csl/am/programs/course_descriptions.shtml”

Grade Break-down: Group Homework is worth 15%, In-class Quizzes/Groupwork/Discussion is worth 10%; Two mid-term exams are worth 20% 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 and Participation: Although the textbook is excellent, it is not intended to be used for self-study at the undergraduate level. Moreover, the importance of proofs in this course makes it critical to practice and be exposed to good proof techniques in lectures. Hence, you are expected to attend the lectures and participate in class discussions. You are also expected to read the text, including reviewing the proofs done in class, and doing the examples not covered in class.

Examinations: The exam dates and their precise topics will be announced in class and on the
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:** Homework problems will be assigned once a week (typically on Thursday) which will be due one week later. 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.

**Homework will be done in groups of 3-4 students each.** One paper will be turned in per group. The paper must be accompanied by a signed statement from each group member that he/she participated fully and that each other group member participated fully in the assignment. Full participation means:

1. To play a major role in solving the problem and communicating the problem to the person writing down the solution,
2. To write down the solution after hearing the explanation from another group member—not just to copy another group member’s written solution, or
3. To fully discuss the solution with your group members until understanding all steps of the solution.

A written explanation must be attached to the assignment whenever a group member does not fully participate in it. Solutions **may not be sought** from solution manuals or any other pre-written solution (whether printed, web-based, or otherwise). The only persons that may be consulted are your own group members, the instructor, and the course TA.

**In-class Quizzes/Groupwork:** There will be occasional groupwork/group discussion assigned in class. On certain Thursdays, there will be a short quiz (to be done individually) based on last two HWs.

**‘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 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.

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 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).

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 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.