

NUMBER THEORY
MATH 261
SPRING 2012

Classroom: FB 213

Meeting Times: MWF 2:00pm – 2:50pm

Instructor: Dr. Katharine Ott

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Office Location: 733 POT

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Office Hours: MWF 1:00 – 2:00pm, and by appointment

Course webpage: http://www.math.uky.edu/~kott/index/MA261_S12

Course Philosophy and Objectives: This course will cover the fundamentals of number theory, which include many simple and deep results about integers. The main topics will be: Divisibility, Prime Numbers, Modular Arithmetic, and Public Key Cryptography, with additional topics if time permits. The course will be taught with the method of *Inquiry Based Learning*, which is also known as the *Discovery Learning*. Your textbook contains a series of Exercises, Questions, Lemmas and Theorems, but no proofs. You, the students, will be responsible for proving these statements on your own and in small groups. In class, you will present these proofs at the board and explain your reasoning to your peers. As a class we will work together to determine whether or not a proof is correct. Our progress will be slow, but that is okay. The goal is for each student to gain a complete understanding of the material that we cover by *actively doing mathematics* rather than passively listening to lectures. In this course you will learn how to manipulate definitions, construct rigorous mathematical arguments, learn various methods of proof, and develop mathematical writing and presentation skills.

Text: *Number Theory Through Inquiry*, by David C. Marshall, Edward Odell and Michael Starbird, The Mathematical Association of America, 2007. A PDF version is available for \$30 at <http://www.maa.org/ebooks/textbooks/NTI.html>.

Office Hours: I hold office hours for your benefit and I encourage you to take advantage of them. You do not need an appointment if you plan to attend regularly scheduled office hours. If you cannot make my posted hours I will be happy to set a meeting time that is convenient for the both of us.

Course Web Page: The course web page will be updated regularly with class announcements and homework assignments. You will also find the syllabus and my contact information on the page, as well as a Google Calendar for our class. This calendar includes homework due dates, exam dates, office hours, and extra-curricular math events.

Grading:

Participation and Homework	30%	A	90-100%
Quizzes	20%	B	80-89%
Exam 1	15%	C	70-79%
Exam 2	15%	D	60-69%
Final Exam	20%	E	Below 60%

Participation: You are expected to participate in class discussions and present solutions on the board when called upon in class. I will keep track of how many times you present at the board, and also note your participation in class discussions. Due to the nature of this course, *it is absolutely essential that you attend class*. You will be allowed 3 absences with no penalty. After this point, I reserve the right to drop your Homework and Participation grade by 10 points for each additional absence.

Homework: I will assign 1 – 3 problems or proofs per week to be handed in by each individual. I expect all proofs to be written in full sentences and grammatically correct. Each proof or problem will be graded on the following scale:

5	Correct mathematical proof and very well written
4	Small mathematical and/or grammatical errors
3	Contains good ideas, but overall an incorrect mathematical proof
2	Significant mathematical errors
1	Come and see me for help!

If you receive a grade of 3, 2, or 1 on any proof, you may turn that proof in again for an entirely new grade. I will keep only the highest score. Rewrites are due exactly one week from when I return homework. You may work with your peers to prepare problems but you must write up solutions individually. **No late homework will be accepted.**

Quizzes: Each week, there will be a quiz consisting of one proof. This will either be a proof already discussed in class or a proof similar to what has been covered in class. Each quiz will be graded on the following scale:

5	Correct mathematical proof and well written
4	Small mathematical errors, but overall a correct proof
3	Contains some good ideas, but overall an incorrect proof
2	Significant mathematical errors
1	Present for the quiz, but no worthwhile mathematics turned in

The quiz grades will be cumulative up to each exam, and graded out of 15 points. If you earn 15 points before the next exam, you do not have to take the remaining quizzes.

Exams: Two mid-term exams and a final exam are scheduled for this course. The mid-term exams will be given in class on Friday, February 10 and Friday, March 23. Each mid-term will focus primarily on the material covered since the last examination, however you will be responsible for all of the course material up to that point. The final exam is scheduled for Friday, May 4, 8:00am – 10:00am. The final exam will be comprehensive. **The final exam cannot be rescheduled unless you meet the University requirements.** Absolutely no collaboration on exams is allowed.

Class Conduct and Special Accommodations:

- Please be respectful of your classmates and me while in class or office hours. This includes turning off your cell phones and putting away your laptops.
- Cheating on homework or exams will not be tolerated. You are expected to follow the academic integrity standards stated in the University Senate Rules (see Chapter 6, <http://www.uky.edu/USC/New/SenateRules.htm>).
- Please refrain from searching for proofs on the Internet or using someone's notebook from a previous semester. It is very obvious to me when you have a proof that you did not write yourself, and this will not help you succeed in the course.
- If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a **Letter of Accommodation** from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

"I hear, I forget. I see, I remember. I do, I understand."

–*Chinese Proverb*