INSTRUCTOR
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COURSE
name: Codes, Lattices & Groups (section 1-code 9529)
meeting time: MW at 4:00-5:15 p.m.
meeting place: LA5-245
text: Notes
materials: Access to a computer

prerequisites: The official prerequisite is Math 444. Not only will that course be needed, but so will its prerequisites. We will use number theory (Math 341) and matrices (Math 247) abundantly. Auxiliary notes on these topics are available upon request.
description: The course is an introduction to three interconnected topics: Codes, Lattices and Groups. As we introduce these we will visit a large assortment of combinatorial structures: graphs, directed graphs, designs, projective planes and others.
The course is concentrated on the particular—namely three (or four) extraordinary creatures in the mathematical world: the Golay code, the Leech lattice and their automorphisms groups including the Mathieu group.
tentative syllabus: We will aim to cover the notes.
bibliography: The notes are based on two books and many on-line sources. The books are Conway & Sloane, Sphere Packings, Lattices and Groups, and Thompson, From Error-Correcting Codes through Sphere Packings to Simple Groups.
goals & objectives: The structures we will be discussing are concrete enough that I would expect you to become totally familiar with some of them. That is the goal of the course—complete mastery of a piece of sophisticated yet concrete mathematics.
Mathematical Practices
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Administrative

Timeliness
Everything should be on time when assigned unless compelling reasons exist.

Make-up Policies:
A make-up exam will be considered when you inform me ahead of time and have a reasonable excuse, or other very special circumstances.

Last Day to Drop:
Friday, November 13, 2015 is the last day to drop the course without the Dean’s signature. If you intend to drop, please secure my signature in plenty of time. Additionally, since this course has high enrollment, and some students have not been able to register, if you do not make a serious effort to succeed in the course, you will not be allowed to drop.

Disability
Please inform me as soon as possible, but certainly within two weeks from the start of the course, of any assistance you may need to deal with any university-verified disability/special need.

Assessment
The main method of assessment will be three tests:

Tests
- First Midterm Exam: Monday September 28 - 15%
- Second Midterm: Monday November 2 - 15%
- Final Exam: Monday December 14, 5:00-7:00 - 20%

Homework
Every week, homework will be posted on the web with its due date. Homework should not be late. It will be picked up at the beginning of the class. Team work for the homework is acceptable (if not preferred). Usually, as in most of the courses I teach, a student who has done her/his homework performs adequately in the exams.

Quizzes
Every Monday the class will start with a short quiz. No preparation is needed. There will be no make-ups for the quizzes, but the three lowest scores (including 0’s) will be dropped.

Research Project
You will be a member of a team (of 2-4 students) and will choose to do research on a topic approved by me. Due December 7

Class Participation
Class participation is mainly up to my discretion. The final grades will be assigned (approximately) traditionally.