

MATH 429/529 – INTRODUCTION TO THE THEORY OF NUMBERS, FALL SEMESTER 2015

1. GENERAL INFORMATION

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Office Hours: Tuesday and Wednesday, 2PM to 4PM.

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Textbook: The official textbook is K.H. Rosen, *Elementary number theory and its applications*, 6th edition.

Calculators and other electronic devices: No calculator is required for this course. Use of calculators and other electronic devices on exams is not permitted. On the homework, you may, of course, use whatever you like. My recommendation is to do computations by hand using pencil and paper whenever feasible, in order to develop your familiarity with and feel for the techniques, algorithms, and ideas.

2. COURSE DESCRIPTION

Number theory is the branch of mathematics concerned with the theory of the integers. Typical applications include cryptography and coding theory. At UB, the number theory elective for advanced undergraduates and the first introduction to number theory for graduate students are run as a single cross-listed course. However, the expectations for the graduate course are a bit higher. Topics covered include the Euclidean algorithm and unique factorization, arithmetical functions, congruences, reduced residue systems, primitive roots, magic squares, and certain diophantine equations. Students in 529 should learn the topics in a bit more breadth and depth, and learn about the connections between them and algebraic concepts from math 419. I plan to accomplish this objective by having different weekly problem sets for math 429 and math 529, with the 529 problem set being, in general, a bit harder. There may also be some additional readings for the 529 students. Undergraduate students who have completed math 419 and are interested in attempting the more challenging version of the course are welcome and encouraged to do so.

2.1. Learning Outcomes. Upon completion of the course, the student will have mastered the material covered in the first eight chapters of Rosen's book. The first chapter (which is mostly review) will be covered in the first week and the remaining material will be covered at a rate of roughly 1.5 sections per day. A detailed, section-by-section list of learning objectives, with an indication of when each will be covered will be posted to UBLearn for your reference. Each objective will be evaluated on the first problem set after it is covered, and again on the final. Objectives covered before the first midterm will also be evaluated on the first midterm. Objectives covered between the first and second midterm will be evaluated on the second midterm as well.

2.2. Prerequisites.

Math 429: Math 311 is recommended.

Math 529: Math 419 is required.

3. GRADING

3.1. **Problem sets.** Problem sets will be assigned each Tuesday and will be collected in class on Thursday the following week. The 529 problem set will, in general, be a bit more challenging than the 429 problem set, and may depend on topics from Math 419. Only selected problems will be graded. Each student's three lowest scores will be dropped before computing the average. No late work will be accepted.

3.2. **Exams.** I plan to have two in-class examinations, one in week 5 and another in week 10. If you miss an exam without an official excuse (such as illness or official university business), then you will be allowed to take a makeup exam, but with an automatic 25% deduction from the grade. If you have an official excuse, it must be documented (e.g., with a doctor's note, which I will verify). In addition, you must make arrangements before the date of the exam in case of a foreseeable circumstance (e.g., the state track meet) or as soon as possible in the case of an unforeseeable one. If make up arrangements are not made in a timely fashion you will receive a zero.

3.3. **Final Exam.** A comprehensive final exam will be given on Thursday 12/17/2015, from 11:45AM to 2:45PM in Math 250. All topics covered in the course may be tested on the final, but topics covered after the second midterm will be emphasized. Note that travel plans do not constitute an official university excuse for missing an examination or for obtaining a conflict or makeup examination. Hence, the above note regarding a 25% deduction will be enforced in the event that a student's travel plans conflict with the university's designated final examination period for this course.

3.4. **Attendance.** Good attendance is required for good performance in courses like this one. If you miss a class, it's **your responsibility** to find out whether any announcements were made, what was covered, etc., and to learn the material that was covered that day on your own. (You can of course come to Office Hours for help.)

3.5. **Grade Assignment.** Your Course Average will be computed with the following breakdown:
Math 429:

- Homework 20%,
- Midterms 25% each,
- Final 30%

Math 529:

- Homework 30%,
- Midterms 20% each,
- Final 30%

The grade you receive will be the one corresponding to your course average as follows

		92-100	A	90-92	A-
88-90	B+	82-88	B	80-82	B-
78-80	C+	72-78	C	70-72	C-
68-70	D+	60-68	D		
		0-60	F		

In the case of a course average which falls right on one of the boundary values, (92, 90, 88, etc.) the higher grade will be given.

4. OTHER

4.1. **Disabilities.** If you require classroom or testing accommodations due to a disability, please contact Accessibility Resources, located at 25 Capen Hall. AR can be reached by phone at (716)

645-2608 or by email at stu-accessibility@buffalo.edu. Please inform me as soon as possible about your needs so that we can coordinate your accommodations.

4.2. **Electronic Devices.** Electronic devices are permitted in regular lectures as long as they are **silent** and **not a distraction** to you or others. For example, if you want to take a quick picture of the board, go ahead, but if you can't do so without obstructing the view of the person behind you, that's a problem. Electronic devices are **strictly forbidden during exams**.

4.3. **Tardiness.** You should try to be on time. If you're late, you should try to enter and take your seat without disrupting the class. If people arriving late are regularly a disruption, I will adopt a more formal tardiness policy.

4.4. **Academic Honesty.** The student conduct rules at

<http://www.ub-judiciary.buffalo.edu/rulereg.shtml/>

will be enforced. Examination papers may be scanned, photographed or photocopied. Any cheating on exams will be given the maximum punishment possible. If you are having difficulties please talk to me about it rather than attempting to cheat!

4.5. **Inclusion.** My goal is to welcome you all to number theory and foster a classroom environment that is inclusive, equitable, and inspiring. If you have feedback (preferably constructive) on how I am doing, or ideas that might help me accomplish that goal more effectively, please feel free to share them with me.

4.6. **Dropping and Resigning.** The final day to drop a course (no record on your transcript) is September 8. The final day to resign from a course (R on your transcript) is November 13. If you are making up an incomplete from a previous instructor please see me to be sure you are following the proper procedures. For information see the Repeat Policy in the UB Undergraduate catalog at:

<http://undergrad-catalog.buffalo.edu/policies/grading/repeat.shtml>