

Instructor: Anna Haensch
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Meeting times: MWF 1:00 – 1:50, 304 Rockwell Hall
Office Hours: M 3:30 - 5:30, W 3:00 - 5:00. and by appt.
Course Website: www.mathcs.duq.edu/~haensch/Math311_18.html

Course Objectives

The goal of *Math 311: Number Theory*, is to gain an understanding of the general principles of elementary number theory and to see these in the context of the big problems in current number theoretic research. More specifically, this course will cover: divisibility theory of integers, distribution of primes, theory of congruences, Fermat's theorems, special number theoretic functions, primitive roots, and the quadratic reciprocity law. By the end of the semester you will be able to apply the basic notions of number theory to write clear, concise, mathematical proofs.

Course Structure

The format will be very different from a typical math course; it will be taught using inquiry based learning (IBL). There will be very few lectures, minimal assigned reading, in fact there won't even be a textbook! Rather than being presented with theorems and proofs, it will be up to you to discover them on your own. A typical class period in Math 311 will consist of working on problems in small groups or presenting solutions at the blackboard in front of your classmates. I'll be tracking our progress and documenting the course on the Course Log, available through the course website.

• Grading

Participation	20%	90-100%	A
Homework	20%	80-89%	B
Research Project	20%	70-79%	C
Midterm	20%	60-69%	D
Final Exam	20%	below 60%	F

Note: I will give \pm grades accordingly. If in doubt, please come and ask me.

- **Participation:** Each week you will be given a worksheet with a list of exercises and conjectures. You will be expected to work in groups during class time (and sometimes out of class), preparing to present work at the board. This is an essential part of your progress in the class, and since there are no lectures or textbook, you can expect that this is where a great deal of the learning happens. Your participation grade will count towards 20% of your grade and will be computed out of 100 points, determined by the following:
 - * Attendance (88 pts): Our class meets 42 times, for each class you miss, you will lose 2 points. This allows you to miss two times without consequence (but of course you shouldn't do this, for other obvious reasons). On certain days I will ask to you to come to class prepared with an exercise or proof which I may collect, this will count towards your participation as follows:
 - *2 points* - you are in attendance and have submitted a satisfactory exercise or proof.
 - *1 point* - you are in attendance and have submitted an unsatisfactory exercise or proof.
 - *0 points* - you are not in attendance.

- * **Board Work (12 pts):** You are encouraged to be an active and participating member in the class. As part of this, you will be asked throughout the semester to share your group work at the board. Each time you do this (whether or not your work is correct!) you will earn 3 points.
- **Homework:** Written homework will be due on alternating Fridays. Homework problems can be done in groups, but without using the internet. If you copy an answer off of the internet, this is considered cheating. Homework will account for 20% of your final grade.
- **Research Project:** Since number theory is so rich in topics outside the scope of what we cover, we will dedicate the last two weeks of class to individual research presentations. Each of you will pick a topic in number theory and you will be expected to give a 20 minute presentation. A list of possible topics is on our course website. A grading rubric will be distributed prior to the presentations, and the project will count towards 20% of your semester grade.
- **Midterm and Final Exam:** There will be an in-class midterm and final. These will be composed of terminology, computational exercises, and proofs. The final exam will be Tuesday Dec. 18th, 1:30-3:30.

Course Policies

- **Academic Integrity:** You are encouraged (indeed, required!) to work together on most components of this course, but any work you submit should be your own. The discovery based nature of this course is integral to its structure, so it is essential that your brain, and the brains of your classmates are the only places you turn for assistance. Looking for proofs on the internet or in other textbooks is not allowed and **is considered cheating**. This, or any other cheating in the form of copying, plagiarizing, or allowing others to do so, will be grounds for receiving an F in the course.
- **Disabilities:** It is the policy of Duquesne University to provide reasonable accommodations to students with documented disabilities. If you require accommodations in this class, please contact the Office of Freshman Development and Special Student Services in 309 Duquesne Union (412-396-6657) as soon as possible.