

SYLLABUS:
MATH 4573, ELEMENTARY NUMBER THEORY
(SPRING 2024)

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1. INSTRUCTOR DETAILS

1. **Instructor:** Tyler Genao
2. **Office:** MW 746 (Mathematics Tower)
3. **Email:** genao.5@osu.edu
4. **Office Hours:** Posted on Carmen.
5. **Classroom and times:**
 - Smith Lab 2150
 - Monday, Wednesday and Friday, 11:30 AM - 12:25 PM

2. COURSE DESCRIPTION

Number theory is often called the “Queen of Mathematics” since it champions many connections to other areas of mathematics. It has a history which goes back several

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thousand years across the world. In this class, we will learn the foundations of this subject. This includes studying integer divisibility and prime numbers, modular arithmetic, diophantine equations, and elements of abstract algebra.

2.1. Textbook. *An Introduction to the Theory of Numbers, 5th edition*, by Niven, Zuckerman and Montgomery.

2.2. Prerequisite. A grade of C- or above in 3345 or 4181H, or credit for 264H or 345. Not open to students with credit for 5576H or 573.

3. CLASS CALENDAR

The following is a calendar for the semester (subject to change).

Week	Sections	Major Assignments/Deadlines
January 10 – 12	1.1, 1.2	Syllabus Quiz, Survey (Fri)
January 17 – 19	1.2, 1.3	
January 22 – 26	1.3, 1.4 and 2.1	HW 1 due (Fri)
January 29 – February 2	2.1, 2.2 and 2.3	HW 2 due (Fri)
February 5 – 9	2.3, 2.6	HW 3 due (Fri)
February 12 – 16	2.6, 2.7, 2.10 and 2.11	HW 4 due (Fri)
February 19 – 23	2.11, 2.8	HW 5 due (Fri)
February 26 – 28	Midterm Review	Midterm (Wed)
March 4 – 8	4.1, 4.2 and 4.3 (pre-recorded, no class)	
March 11 – 15	No class (Spring break)	
March 18 – 22	3.1, 3.2 and 3.3	HW 6 due (Fri)
March 25 – 29	5.1, 5.3	HW 7 due (Fri)
April 1 – 5	5.6, 5.7	HW 8 due (Fri)
April 8 – 12	5.7	HW 9 due (Fri)
April 15 – 19	Additional topics	Project due (Fri)
April 22	Final Review	
April 26		Final Exam

4. ASSESSMENTS

The following table is a breakdown of the grading categories for this class.

Assessment	Percentage
Homework	40%
Midterm Exam	20%
Final Exam	20%
Project	15%
Class Participation	5%

We will follow the standard university grading scheme:

$\geq 93-100$	$\geq 90-93$	$\geq 87-90$	$\geq 83-87$	$\geq 80-83$	$\geq 77-80$	$\geq 73-77$	$\geq 70-73$	$\geq 67-70$	$\geq 60-67$	< 60
A	A-	B+	B	B-	C+	C	C-	D+	D	E

Once a homework or exam grade is posted, **you have exactly 1 week from the posting date** to contact me about errors or irregularities with grades in Carmen. The same also applies to recently graded HW or exams, so please make sure to review them as soon as you get them back.

4.1. Homework. There will be 9 homework assignments in this class, due roughly at the end of each in-class week. Your average HW score is worth 40% of your final grade. **Late assignments will not be accepted.** However, I will drop your lowest HW grade before calculating your final HW average.

Here are some things you should know about the homework assignments:

1. Homework must be submitted through Gradescope. Each assignment will be accompanied by Gradescope formatting guidelines that you must follow. If your HW isn't submitted properly, parts of it might not be graded.
2. You will have roughly one week to work on your homework. When a HW is assigned, there will be a Carmen post about it.
3. Homework submissions must be individual. You are encouraged to talk to me or other students about the HW, but your final write-up must be your own.
4. Each homework will have a 'consulted with' section, worth a few points. If you consulted with me, classmates or other sources while doing your HW, you are required to write it down.
5. Mathematics is not just about getting the correct answers, but also about convincing others that your answer is correct. Writing good proofs is emphasized in this class. In particular, **insufficiently supported answers or proofs may receive little or no credit on homework and exams.**

The goal of each homework is to help you understand the class material and to prepare you for the tests. Thus, it is imperative that you start working on the HW as soon as we learn the material in class. You should take some time to understand the problems before seeking help from others.

4.1.1. LaTeX. LaTeX is a high-quality typesetting system used by mathematicians and scientists to write articles and papers. It is available free to download at <https://www.latex-project.org/get/>, or can also be used online for free at <https://www.overleaf.com/>. It is **strongly recommended** that you typeset your homework on LaTeX.

4.2. Exams. There will be one midterm and one final exam, both of which will be cumulative up to the sections before them. Each are worth 20% of your final grade.

The midterm exam will be 50 minutes long, closed book, closed notes and proctored in class. It will be on **Wednesday, February 28.**

The final exam will be 100 minutes long, closed book, closed notes and proctored in-person. It will be on **Friday, April 26** (subject to change).

4.3. Project. There will be a project worth 15% of your final grade, due **April 19.** At some point in the semester, I will give you a list of topics to choose from for your final project, each of which is related to material that we cover in the class. **This project must be submitted in LaTeX.**

4.4. Class Participation. The contribution of class participation to your grade breaks down as follows.

Part	Percentage
Online Syllabus Quiz	1%
Initial Survey	1%
General class engagement	3%

4.4.1. Syllabus Quiz. This is a 20 minute quiz available on Carmen which is due by **Friday, January 12**. The quiz asks you general questions about this syllabus, to make sure you are acquainted with class policies.

4.4.2. Initial Survey. This is an assignment available on Carmen which is due by **Friday, January 12**. The goal of the survey is for me to get to know you better, so it is only graded on completion.

4.4.3. General Class Engagement. In this class, you are expected to engage with your classmates, participate in lecture, ask me questions, come to office hours, and possibly present your answers.

4.5. Make-Up Policy. Makeup exams will be available for students with a proper excuse (illness, death in the family, etc.). In this case, it is necessary to contact me as soon as possible to obtain permission to receive a make-up exam (in particular, before the start of the exam).

Homework will not be accepted late; instead, **your lowest HW grade will be dropped** to allow for emergencies.

5. EXPECTATIONS

5.1. Academic Expectations. According to the university, each credit hour for a class equates to 3 hours of your time each week (including class hours). As such, you are expected to spend time outside of class reading and reflecting on class material. The homework is supposed to help you with this. You are also expected to read the textbook carefully.

While attending office hours are not mandatory, **I strongly encourage it**. Additional resources include other textbooks, additional problems from our textbook, and so on.

5.2. Academic Honesty. Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute Academic Misconduct.

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: Any activity that tends to compromise the academic integrity

of the University or subvert the educational process. Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an excuse for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me. For more information, see the Code of Student Contact: <https://studentconduct.osu.edu/>.

6. ADDITIONAL RESOURCES

6.1. Disabilities. The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu.

6.2. Mental Health. As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing.

If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th floor of the Younkin Success Center and 10th floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at 614-292-5766 and 24-hour emergency help is also available through the 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.