

Math 4400-001 – Intro to Number Theory, Spring 2022
Tu/Th, 9:10-10:30 in M LI 1725

Instructor: Sean Howe

Learning Assistant (LA): Summer Soller

Website: math.utah.edu/~howe/2022-spring/4400

Course content will be posted on the course website, and homeworks/quizzes will be accessed through Gradescope. For the most part, we will not use the Canvas page.

Email: Questions and concerns can be communicated via email to the instructor at sean.howe@utah.edu. Please include “4400” in the subject line of your email (e.g. “4400 – question about hw1”). I will usually, but not always, respond to email before 11:59pm the next business day.

Format: *This is a flipped classroom!*

- Class time will be used for guided problem sessions.
- Each week there will be a problem sheet distributed online and in class. We will work off this problem sheet during the class time, individually or in groups. There may also be supplemental discussion and short lecture interludes during the class time.
- Each week two problems on the problem sheet will be marked as required. Your solutions can be discussed in groups but are to be written up individually and turned in via Gradescope. They are due on Monday of the following week at 11:59pm.
- An approximately 30-minute video lecture will be posted on the course website at least 36 hours before each class session. You are required to watch this video and take a short quiz on Gradescope before each class session (the quiz will be due half an hour before class starts).
- There will be one midterm and a final exam.

Office hours: The instructor and learning assistant will schedule regular office hours. Half of office hours will be offered online, half in-person. Times and locations will be posted on the course website.

Expectations:

- In a flipped classroom, much of the learning occurs during the individual and group work in class sessions. **Attendance is highly encouraged**, but, because of COVID, is not required this semester. However, **fully prepared attendance will help you make the best use of your time**; that means you should watch the short video and take the online quiz before each class!
- Math 2250 or 2270 is a pre-requisite (thus implicitly so also is first year calculus). In particular, students in this class are expected to have the following skills:
 - computational fluency with matrix operations and systems of linear equations.
 - computational fluency with differentiation and integration techniques.
 - theoretical familiarity with linear independence / dependence.
 - theoretical familiarity with limits, sequences, and series.
- The course will contain a mix of computational and theoretical aspects. On homework and exams, students will be expected to exhibit mastery of the computational techniques as well as the ability to give logical justifications for some theoretical statements (elementary proofs). Both skills will be developed in the homework and in the class.
- This is a 3-credit course. By University Policy 6-100 (<https://regulations.utah.edu/academics/6-100.php>), this means that **you are expected to spend roughly 9 hours a week (including class time) on this course**. If you find that you need to spend significantly more time than this to succeed in the class, please contact me as soon as possible so that we can discuss!

Text: Savin – Numbers, Groups, and Cryptography (free online pdf – see course website for link). Each week the problem sheet will indicate sections for suggested reading, if applicable.

Exams:

- **Midterm: Thursday, March 3, 9:10 – 10:30 am (in class).**
 - *There will be no recorded lectures or online quizzes during the week of the midterm. The class session on Tuesday, March 1, will be a review for the midterm.*
- **Final Exam: Thursday, April 28, 8:00 – 10:00 am.**
 - *The final class of the semester is on Tuesday 4/26; on that day there will be no recorded lecture or online quiz, and we will review for the final in class.*
 - *The final exam will be cumulative.*
 - **If your grade on the final exam is higher than your grade on the midterm, then your midterm grade will be replaced with your grade on the final.**

Homework:

Each week two of the problems on the problem sheet will be marked as required. You may work on these in groups inside or outside of class, but your final solutions should be written up individually. The problems are to be turned in on Gradescope by 11:59pm of the following Monday. That means that there is an assignment due at 11:59pm every Monday of the semester with the following two exceptions:

- The first week (Monday 1/10)
- The week after spring break (Monday 3/15) [the midterm is the week before Spring Break].

Quizzes:

- There will be a short quiz on each video lecture, due 30 minutes before the start of the corresponding class and to be completed on Gradescope. If you watch the lecture, then the quiz should take less than 30 minutes to complete (often considerably less).
- 85% of your quiz grade will be based on completion alone; correctness will account for the remaining 15%. The pedagogical purpose of the quizzes is to incentivize you to prepare for class by engaging fully with the video lecture so that you can get the most out of your class time!

Grading:

- Your final percentage grade will be determined according to the following weights:
 - Quizzes - 30%
 - Homework - 40%
 - Midterm - 15%
 - Final - 15%
 - As indicated above, if your grade on the final is higher than your grade on the midterm then it will also replace your grade on the midterm.
- Your final letter grade will be determined by the final percentage grade as follows:
A: 90%-100%, A-: 88%-90%, B+: 85%-88%, B: 80%-85%, C: 70%-80%, D: 60%-70%, E: <60%

Important non-course specific, standardized syllabus text:

Academic Integrity: All university policies regarding ethics and honorable behavior apply to this course. Students are encouraged to review the Student Code for the University of Utah:

<https://regulations.utah.edu/academics/6-400.php>

The Americans with Disabilities Act: The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 801-581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Addressing Sexual Misconduct: Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other

protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted on the basis of your sex, including sexual orientation or gender identity/expression, you are encouraged to report it to the University's Title IX Coordinator; Director, Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or to the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to police, contact the Department of Public Safety, 801-585-2677(COPS).

Campus Safety: The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu

COVID-19:

University leadership has urged all faculty, students, and staff to model the vaccination, testing, and masking behaviors we want to see in our campus community. These include:

- Vaccination
- Masking indoors
- If unvaccinated, getting weekly asymptomatic coronavirus testing • Quarantining after exposure Vaccination
- Get a COVID-19 vaccination and the booster shot recommended for pairing with your vaccine if you have not already done so.

Vaccination is proving highly effective in preventing severe COVID-19 symptoms, hospitalization and death from coronavirus. Vaccination is the single best way to stop this COVID resurgence in its tracks. University of Utah students are required (as of August 27, 2021) to complete a cycle of COVID-19 vaccination and booster shot with an approved vaccine, or complete an exemption form. The university provides three convenient vaccination options: Attend one of the regularly scheduled vaccine events at the Student Union on campus. Schedule an appointment with Student Health here. Visit <http://my-chart.med.utah.edu/>, <https://alert.utah.edu/covid/vaccine/>, or <http://vaccines.gov/> to schedule your vaccination.

Masking

- While masks are not required outside of Health Sciences facilities, on UTA buses or campus shuttles, CDC guidelines now call for everyone to wear face masks indoors.
- Check the CDC website periodically for masking updates— <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinatedguidance.html>. With high transmission rates in Salt Lake County, the CDC recommends: “Everyone should wear a mask in public indoor settings.”
- Treat masks like seasonal clothing (i.e., during community surges in COVID transmission, they should be worn indoors and in close groups outside).
- In cases of classroom exposure, masks should be worn for the quarantine period (see details below).

Testing

- If you are not yet vaccinated, get weekly asymptomatic coronavirus tests. This is a helpful way to protect yourself and those around you because asymptomatic individuals can unknowingly spread the coronavirus to others.
- Asymptomatic testing centers are open and convenient: Online scheduling Saliva test (no nasal swabs) Free to all students returning to campus (required for students in University housing) Results often within 24 hours Visit alert.utah.edu/covid/testing
- Remember: Students, faculty and staff must self-report if they test positive for COVID-19 via this website: <https://coronavirus.utah.edu/>