Math 310 Introduction to Modern Algebra

Fall 2021 Syllabus

Instructor: Eloísa Grifo **email:** grifo@unl.edu **Office:** 339 Avery Hall

Class time and location: Tuesdays and Thursdays 12:30 – 1:45 pm in 112 Avery Hall

Office Hours: Tuesdays 3:30 – 4:30 pm, Thursdays 2 – 3 pm, and by appointment **OH zoom:** 97297545735
What are office hours? During the scheduled office hours, I'll be in my office and available to you, so you can either come in person to my office or attend on zoom, and you do not need an appointment — just show up! If the scheduled times are not compatible with your schedule, please email me to schedule an alternative time. Office hours are an excellent opportunity to discuss any questions you may have, including homework problems.

Face coverings: Per CDC guidelines, everyone is strongly encouraged to wear masks indoors, though for now masks are not required in our class. If you have vulnerable individuals in your household and would like to request that everyone in our class wears a mask, please contact me immediately.

Prerequisite: A grade of P, C, or better in Math 107 or Math 107H

Course Description: One central goal of this course is to teach you to read, write, and understand mathematical proofs. The only way to learn to write good proofs is by doing so, and thus there will be a heavy emphasis on problem sets in this course. Many of the assigned problems will require you to develop original, rigorous proofs of mathematical statements. This is a difficult skill to master and success in this course will require a sustained effort on your part.

Another goal is to learn about modern algebra, specifically focusing on the mathematical concept of a *ring*. The collection of integers (both positive and negative) along with the usual rules for addition and multiplication are an example of a ring; the collection of polynomials also forms a ring. In this course, we will explore the features that these two examples have in common, and we will meet other examples of rings.

Attendance: This is an in person class. I expect everyone to attend class every day; however, you should **definitely not** come to class if you are feeling ill or have the need to quarantine. I will forgive all absences for which *you notify me by e-mail in advance of your need to miss class.* Depending on the circumstances, I might require you to do something to make up for your absence.

Textbook: *Abstract Algebra — an introduction*, by Thomas W. Hungerford, 3rd Edition.
The textbook is recommended but **not required**; it provides many examples of well written proofs.

Class format: Rather than a more traditional lecture format, this class will employ the methodology of Inquiry Based Learning (IBL). This means that the vast majority of class time will be spent with you working together in small groups, on activities I have carefully designed. You will formulate conjectures, propose definitions, develop examples, and construct proofs of mathematical statements together with your peers. Sometimes I will have you share your work with the class as a whole, and throughout the process you will receive feedback from your peers and from me. On occasion, I will give short mini-lectures to clarify matters, as appropriate. Let me quote from the Conference Board of the Mathematical Sciences (CBMS) position statement:

> Classroom environments in which students are provided opportunities to engage in mathematical investigation, communication, and group problem-solving, while also receiving feedback on their work from both experts and peers, have a positive effect on learning. (...) A wealth of research has provided clear evidence that active learning results in better student performance and retention than more traditional, passive forms of instruction alone.

Grade Breakdown: We will have homeworks, quizzes, 2 midterms, a final exam, and iClicker questions.

Component	Value
Quizzes	10%
Problem Sets	40%
Midterms (two)	30% (15% each)
Final Exam	20%

We will have problem sets, two midterm exams, quizzes, and a final exam.

- We will have a short **quiz** (almost) every Tuesday. In every quiz, you will be asked to write down a definition or cite a theorem from the previous week. Some quizzes might also contain short proofs.
- The **problem sets** will be assigned and collected approximately once per week. You are strongly encouraged to work together on the problem sets, but each of you will hand in your own solutions, written in your own words, and your work must demonstrate a true understanding of the material. Never hand in something that you do not completely understand. I ask that at the top of each assignment you list the students with whom you collaborated. Please hand in all assignments on time.
- There will be two **midterm exams** and a **final exam**.
  - Midterm 1: September 28.
  - Midterm 2: November 2.
  - The final exam will be on Tuesday, December 14, 4–6 pm, in Avery 117.

Academic Dishonesty: Academic dishonesty includes cheating on any test, plagiarism, fabricating an otherwise justifiable excuse to avoid or delay timely submission of academic work, and helping or attempting to help another student commit academic dishonesty. For a comprehensive list, see Section 4.2 of the Student Code of Conduct. A student observed cheating in any manner during an exam or quiz will earn a score of 0 for that assignment and will be referred to the Vice Chair for academic sanction. A second ofense will earn the student an F in the course.

Departmental Grading Appeals Policy: Students who believe their academic evaluation has been prejudiced or capricious have recourse for appeals to (in order) the instructor, the departmental chair, the departmental appeals committee, and the college appeals committee.

Accommodations: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can discuss options privately. To establish reasonable accommodations, please register with the Services for Students with Disabilities (SSD) office. If you are eligible for services and register with their office, make arrangements with me as soon as possible to discuss your accommodations so they can be implemented in a timely manner.

Resources: Here are some resources available to you:

Counseling and Psychological Services (CAPS) is a multidisciplinary team of psychologists and counselors that works collaboratively with Nebraska students to help them explore their feelings and thoughts and learn helpful ways to improve their mental, psychological, and emotional well-being.
Big Red Resilience and Well-Being provides one-on-one well-being coaching to any student who wants to enhance their well-being. Trained well-being coaches help students create positive experiences, practice resilience and self-compassion, and find support as they need it.
Husker Pantry: Provides food and hygiene items for free to students who might need them.
Equipment checkout: Free 7 day laptop and iPad loans.
First Gen Nebraska.: For first generation college students.

You'll find many other useful resources on the Student Affairs website.