Math 310 Intro to Modern Algebra   Fall 2020

Instructor: Dr. Xavier Pérez-Giménez

> **Office:** 328 Avery Hall, office hours (via Zoom) TR 8:30 am – 9:30 am or by appointment.

> **Email:**   xperez@unl.edu

Class Times and Location: TR 2:00 pm – 3:15 pm, Brace Laboratory – Room 105.

Text book: *Abstract Algebra An Introduction, 3rd edition* by Thomas W. Hungerford.

Course Description: There are two primary goals we'll work to achieve in this course:

- understand properties of the integers and of polynomials from a conceptual standpoint
- learn to write clear, logical proofs & improve your ability to communicate mathematics rigorously.

ACE Outcome 3:   This course satisfies ACE Outcome 3: "Use mathematical, computational, statistical, or formal reasoning (including reasoning based on principles of logic) to solve problems, draw inferences, and determine reasonableness." Your instructor will provide examples, you will discuss them in class, and you will practice with numerous homework problems. The final exam will be the primary means of assessing your achievement of ACE Outcome 3 in this course.

Covid-19 adjustments: This course will be primarily delivered in-person. However, reasonable accommodations will be provided to students who choose to follow the course remotely (synchronously or asynchronously). Students in class are required to follow the face-covering and social-distancing policies mandated by UNL (see Face Coverings Syllabus Statement). The unpredictable evolution of the Covid-19 pandemic during the term may require further adjustments.

Grades: Grades for the course will be computed as follows:

Homework	25%	
Quizzes/Worksheets/Participation	10%	
Midterms	40%	(2×20%)
Final	25%	

Homework: There will be weekly homework assignments. The purpose of the homework is to practice writing proofs and receive constructive feedback. The homework will be graded for logic, ability to reason abstractly and the rigorous presentation of your arguments, but also for clarity and appropriate use of language, including full sentences. Collaboration on every homework is not only allowed, but encouraged, as the best way to come up with a solution and to understand it is to explain it to your peers and get their feedback. Some homework sets will be turned in solo – each student should write their own solutions and some will be "team homeworks" – you will be able to turn in collaborative solutions in a group of 2–3.

Quizzes/Worksheets/Participation: There will be occasional in-class quizzes (solo) or worksheets (collaboration allowed) that will be collected. They will give you targeted practice with the most important concepts studied.

Midterm Exams: There will be two take-home midterm exams. Makeup midterms are only allowed for reasons limited to serious illness or travel to university approved events. Proof of these circumstances will be required. The *tentative* dates for the midterm exams are

<p align="center">Exam 1: week of September 28 and Exam 2: week of November 9.</p>

Final Exam: The final exam is cumulative. Students are expected to arrange their personal and work schedules to allow them to take the final exam at the scheduled time. Our final exam is on

<p align="center">Tuesday, November 24, 1:00–3:00 pm in class.</p>

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

Course Evaluation The Department of Mathematics course evaluation form will be available through Canvas during the last two weeks of class. Evaluations are anonymous and instructors do not see the responses until after final grades have been submitted. Evaluations are important – the department uses them to improve instruction. Please complete the evaluation and take the time to do so thoughtfully.

Students with Disabilities: Students with disabilities are encouraged to contact me for a confidential discussion of their individual needs for academic accommodation. It is the policy of UNL to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 402-472-3787 voice or TTY.

Important dates The following table shows the material expected to be covered and the important academic schedule events. Note that what is shown here is *tentative*; please be alert for changes.

Date	Sections covered
Week of August 17	Appendix A (Logic and Proof), 1.1 The Division Algorithm
Week of August 24	1.2 Divisibility
Friday, August 28 is the last day to remove a course from a student's record.	
Week of August 31	1.3 Primes and unique factorization
Week of September 7	2.1 Congruence and Congruence Class, 2.2 Modular Arithmetic
Week of September 14	2.3 The structure of $\mathbb{Z}_p$ (p prime) and $\mathbb{Z}_n$
Week of September 21	Appendix C (Well Ordering and Induction)
Week of September 28	Catch-up/Review, Appendix D (Equivalence relations),
	Exam 1 (from home)
Friday, October 2 is the last day to change the grading option to Pass/NoPass.	
Week of October 5	3.1 Definition and Examples of Rings, 3.2 Basic Properties of Rings
Week of October 12	Appendix B (Sets and Functions), 3.3 Isomorphisms and Homomorphisms
Week of October 19	4.1 Polynomial arithmetic and the Division Algorithm, 4.2 Divisibility in $F[x]$
Week of October 26	4.3 Irreducibles and Unique Factorization
Wednesday, October 28 is the last day to withdraw from the course.	
Week of November 2	4.4 Polynomial functions, Roots and Reducibility
Week of November 9	13. Public Key Criptography
	Exam 2 (from home)
Week of December 16	14. The Chinese Remainder Theorem
The Final Exam is 1:00–3:00 p.m. on Tuesday, November 24.	