MATH 366: Introduction to Abstract Algebra
Fall 2023 Course Information

INSTRUCTOR	Dr. Alex Elchesen `alex.elchesen@colostate.edu` Department of Mathematics Weber 129
TIME AND SPACE	Monday/Wednesday/Friday 9:00 - 9:50 in Engineering 203 Office Hours: Monday/Wednesday 10:00-10:50 (immediately after class) in Weber 129
PREREQUISITES	MATH 156 or MATH 161 or MATH 271.
COURSE TOPICS	The following topics will be covered.

- Prerequisites and introduction to proofs (basic set theory, functions, equivalence relations, theorems, proofs, logic, quantifiers).
- Integers (mathematical induction, the division algorithm, prime numbers, greatest common divisors, modular arithmetic).
- Groups (abstract groups, subgroups, cyclic groups, permutation groups, symmetry groups, homomorphisms/isomorphisms, cosets, Lagrange's Theorem, quotient groups).
- Rings (introduction to rings, polynomial rings, integral domain, ideals, quotient rings).
- Fields (introduction to fields, field extensions, splitting fields, geometric constructions).
- Public key cryptography.

LEARNING OBJECTIVES	The objective of this course is twofold. The first objective is to introduce you to the modern perspective on algebra. Modern algebra approaches algebraic subjects not by studying specific examples (e.g., the real numbers or functions), but by studying abstract algebraic objects, of which these examples are special cases. In this course, we will learn to treat many algebraic objects previously encountered in other math courses *abstractly*, allowing us to study many examples all at once and prove results for every example simultaneously.
	The second goal is to expose you to proofs and to introduce you to the foundations of higher mathematics. For more than a century, modern mathematics has been mostly built upon the foundations of set theory. In this course, you will be introduced to proof techniques and to the modern language of mathematics based on set theory through the lens of abstract algebra. The objective is to give you the tools, reasoning skills, and mathematical maturity necessary to study any mathematical subject rigorously.
TEXTBOOK	*Abstract Algebra: Theory and Applications* (2022 Edition) by Thomas Judson. This textbook is freely available as a .pdf at `http://abstract.ups.edu/download.html`.

CLASS STRUCTURE Class time will be a combination of lecture and working through problems. You will be expected to prepare for class by completing the assigned readings. All course announcements, homework assignments, and grades will be posted on Canvas.

ASSESSMENT ▶ **Homework** (60%) There will be roughly 8 homework assignments. All solutions should be written clearly and legibly. Late homework is not accepted without prior permission.

▶ **Midterm Exam** (20%) There will be one in class midterm on Friday, October 13.

▶ **Final Exam** (20%) There will be a cumulative final exam given during finals week at the CSU scheduled time.

▶ **Bonus Problems** I will occasionally pose bonus problems during lecture that are either more challenging than a typical homework problem or are slightly off-topic (or that I don't have time to do in class). These problems can be submitted anytime throughout the semester for a small bonus. The grading standard will be higher for these problems, and I may ask you to resubmit if ideas are missing.

COVID GUIDLINES All students are expected and required to report any COVID-19 symptoms to the university immediately, as well as exposures or positive tests (even home tests).

- If you suspect you have symptoms, or if you know you have been exposed to a positive person or have tested positive for COVID (even with a home test), you are required to fill out the COVID Reporter (https://covid.colostate.edu/reporter/).

- If you know or believe you have been exposed, including living with someone known to be COVID positive, or are symptomatic, it is important for the health of yourself and others that you complete the online COVID Reporter. Do not ask your instructor to report for you.

- If you do not have internet access to fill out the online COVID-19 Reporter, please call (970) 491-4600.

- You may also report concerns in your academic or living spaces regarding COVID exposures through the COVID Reporter. You will not be penalized in any way for reporting.

- When you complete the COVID Reporter for any reason, the CSU Public Health Office is notified. Students who report symptoms or a positive antigen test through the COVID Reporter may be directed to get a PCR test through the CSU Health Network's medical services for students.

For the latest information about the University's COVID resources and information, please visit the CSU COVID-19 site: https://covid.colostate.edu/.

POLICY ON ACADEMIC INTEGRITY This course will adhere to the CSU Academic Integrity Policy as found on the Student Responsibilities page of the CSU General Catalog and in the Student

Conduct Code. Any student found to have engaged in academic dishonesty may receive a grade penalty (possibly a failing grade for the class) and be subject to further University disciplinary action. Examples of academic dishonesty include, but are not limited to, collaborating on an exam, using a cell phone or other technologies on an exam, using reference material (writing on hands, shoes, etc.) during an exam, and representing someone else's work as your own. More information can be found at http://tilt.colostate.edu/integrity.

DISABILITIES   Colorado State University is committed to providing reasonable accommodations for all persons with disabilities. Students with disabilities who need accommodations must first contact Student Disability Center (SDC) before requesting accommodations for this class.