

MATH 332: ABSTRACT ALGEBRA

SPRING 2015

Place:	Library 389
Time:	MTWF, 10–10:50A.M.
Instructor:	Kyle Ormsby (ormsbyk@reed.edu)
Office Hours:	TW 11A.M.–noon & θ 2:30–3:30P.M. in Library 313 Also by appointment and chance encounter
Textbook:	<i>Abstract Algebra</i> , 3rd ed., by Dummit and Foote
Website:	people.reed.edu/~ormsbyk/332/

Summary. In this course, we will study algebraic structures such as groups, rings, modules, and fields. Each of these structures consists of a set equipped with one or more operations: ways to combine elements into new elements. The axioms imposed on these operations are inspired by diverse applications, so that groups encode symmetries, rings and fields capture the basic methods of arithmetic, and modules generalize vector spaces. Abstract algebra's conceptual framework is particularly well-organized by the notions of category theory, and we will frame our study in those terms whenever possible.

We will use Dummit and Foote's *Abstract Algebra* as a textbook; it is available at the bookstore for purchase and copies are on reserve in the library. Many readings and exercises will be assigned from the book.

Participation. All of our meetings will place an emphasis on active engagement with mathematics, proofs, and problem solving. Students are expected to do assigned readings in advance of class, and to participate actively in discussions.

Homework. Homework is due at the start of class each Monday (excluding holidays). In addition to written comments, each problem will be evaluated on a five-point scale:

- 5 – Perfect, well-communicated solution.
- 4 – Right idea with minor errors in mathematics or exposition.
- 3 – Right idea with major problems in execution.
- 2 – Incorrect solution with significant idea.
- 1 – Incorrect solution with relevant idea.
- 0 – None of the above.

Late assignments *will not be accepted*. Please turn in clean solutions (not scratch work)¹ and provide explanations or proofs except when explicitly noted otherwise.

This term we will experiment with student production of solution sets. I will select well-presented solutions, scan and anonymize them, and then post them to the course website. *If you do not want your solutions published, please email me expressing your desire to opt out.*

Date: 26.I.15.

¹Interested students are encouraged to prepare solutions in the \LaTeX document preparation system. A guide to \LaTeX resources is available on the course website.

Collaboration. Collaboration on homework is encouraged. Feel free to work with a friend, group, or tutor as you work out solutions to the problems. Your collaboration rights, though, come with two responsibilities:

1. Write up your final solution independently from your collaborators. Copied work is unacceptable.
2. Acknowledge all collaborators and tutors by listing their names at the start of your solution.

Failure to shoulder these responsibilities constitutes an Honor Principle violation and will be dealt with accordingly.

Technology. The use of electronic devices (cell phones, computers, tablets, calculators, &c) is strictly prohibited in the classroom without prior authorization from the instructor. That said, legitimate uses of technology (*e.g.*, note-taking) will be accommodated — just talk to me first.

A number of computing resources are available for free online or through Reed. These include the open-source software Sage² and proprietary Mathematica.³ These can be useful tools for visualization and computation, but should be used responsibly. Feel free to check your answers with a computer, but avoid going to the computer first.

Tests and grades. We will have two midterms and a final exam. Your exams, homework, and class participation will be taken into account in the determination of your final grade.

Notes.

- Take the date of our final exam into account before making end-of-term travel plans. Accommodations for alternate final exam times will not be made.
- Please contact me as soon as is reasonably possible if you will miss an assignment due to illness or emergency.
- Math is hard amazing, but and we're going to get through enjoy this together.

² <http://www.sagemath.org>

³ <http://www.reed.edu/cis/help/software/mathematica.html>