MATH 7110 – ALGEBRA 1

DANIEL IRVING BERNSTEIN

This course is the first in a two-semester sequence that will cover the fundamental theory of groups, rings, modules, and fields. The primary intended audience is first-year math graduate students. By the end of the course, I hope that you have:

- learned a lot of new algebra
- sharpened your algebraic intuition through many attempts (both successful and unsuccessful) to prove theorems, find counterexamples to false statements, and determine whether a given true-seeming statement is actually true
- improved your mathematical writing skills by submitting typed solutions to weekly problem sets
- engaged in frequent mathematical discussions with your classmates, e.g. while working together on problem sets or preparing for exams.

Textbook

The textbook for this class will be *Abstract Algebra* by Dummit and Foote (third edition). Copies should be available in the math library. If you want to buy your own copy, I recommend that you buy an "international edition," as it has the exact same content for *much* cheaper. My intent is to cover most of parts I, II, III, and IV over the course of both semesters. I *highly* recommend that you read the textbook to reinforce what you learn in class for three reasons:

(1) the more different ways you take in the same information, the better you will learn,
(2) reading math is a skill that gets better with practice, and
(3) reading *well-written* math will improve your mathematical writing.

Resources and accommodations for student needs

I will make every reasonable effort to accommodate your needs including, but not limited to, religious observances, disabilities, and health (physical and mental). If you require accommodations of any kind, including deadline extensions, please let me know as soon as you are aware of a need. For disability accommodations, I may ask you to register with the Goldman Center for Student Accessibility (URL below).

You may find some of the following Tulane-wide resources useful:

- Goldman Center for Student Accessibility: `https://accessibility.tulane.edu`
- Center for Academic Equity: `https://academic-equity.tulane.edu/`
- Counseling Center: `https://campushealth.tulane.edu/counseling-center`
- Title IX Office: `https://allin.tulane.edu/titleix`

What to call me

In increasing order of formality, the names you can call me are: "Dan," "Daniel," "Dr. Bernstein," and "Professor Bernstein." I use he/him pronouns.

Logistics

When: MWF 10:00AM
Where: Norman Mayer Building 102
Office hours: Thursday 1:30-3:30, also by appointment
Office: Gibson Hall 401A
Contact: dbernstein1@tulane.edu
Course website: `https://dibernstein.github.io/teaching/MA7110.html`

Assessment

Problem sets. There will be roughly one problem set assigned each week and you will be responsible for turning in solutions to a subset of them. They will be posted on the course website. Solutions should be typed in LaTeX and written in a way that your classmates would be able to follow. Late homework will not be accepted, barring exceptional circumstances. Collaboration with your classmates is encouraged, but you must type up you own solutions in your own words. You must also clearly indicate who you collaborated with and on which problems. You are permitted, and moreover encouraged, to use computational algebra software such as Gap, Macaulay2, Maple, Mathematica, and Sage. You are prohibited from using resources beyond the textbook, computational algebra software, each other, and me, to find solutions to homework problems.

Exams. Each time we complete a part in the textbook (so four times over the course of both semesters), we will have a timed in-class exam meant to simulate the graduate qualifying exam in algebra. Like the qualifying exams, these will be graded on a pass/fail basis.

Grades. First, it probably goes without saying that the point of taking a class is to learn, not to get a particular grade. Moreover, almost nobody will care about the grades you get in graduate school. That said, the academic system as it currently functions requires me to assign grades. Your final numerical grade will be computed according to the following formula:

- If you pass both exams, then your grade will be the average of your problem set grades
- If you pass one exam, then your grade will be 0.9 times the average of your problem set grades
- If you don't pass either exam, then your grade will be 0.8 times the average of your problem set grades.

A conversion from numerical grades into letter grades will be established at the end of the semester.