INSTRUCTOR: Janice Sklensky OFFICE: SC 109
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OFFICE HOURS: M 11:30-12:30, Tu 3:30-4:20, W 1:45-2:35 (tentatively), and F 1:15-2:00. Additional meetings, of course, are available by appointment.

TEXT: *Contemporary Abstract Algebra, Fifth Edition* by Joseph Gallian

OVERVIEW

This course is an introduction to Abstract Algebra. Abstract Algebra arose from the attempt to find a method that would always produce solutions to a quintic (or higher order) polynomial, but it has grown into much more. Abstract algebra has applications both outside of mathematics and particularly within it; these applications however are not the reason why it is so important a branch of mathematics. The universality of the ideas–the abstraction (which allows them to be applied to so many areas within mathematics)– as well as the elegance of the structures, the logical progression of ideas, and the ability to deduce much from little account for the prominant role abstract algebra plays in mathematics.

In Abstract Algebra, we define different types of algebraic systems, (groups, rings, and fields, for instance), classify various specific systems as falling into one or the other of these categories, and learn as much as we can about the properties exhibited by all groups, or by all rings, etc. Our course will focus on group theory: we'll begin by introducing and developing groups; later in the semester, we will investigate how groups are used to classify patterns in art and crystallography. In addition to getting an introduction to what Abstract Algebra is all about, the progress of this development will also give you further insight into what pure mathematics is all about: creating an entire complex structure from a few (relatively) simple definitions. You may begin to understand (if you haven't already) why philosophers and mathematicians have struggled for centuries with the question: Is math created, or is it discovered?

The goal of this Abstract Algebra course is to introduce you to concepts of group theory, provide you with some concrete examples of many different types of groups, and to provide you with plenty of opportunities to hone your ability to write both expository mathematics and mathematical proofs. This class will be challenging for most of you, and should help you develop mathematically. The abstract nature of the material may prove to be intimidating to some of you at first, but over time, I hope you come to find it elegant, absorbing, and even fun.

Plan to spend an average of 9-12 hours a week outside of class working on this course. As usual, some weeks you will spend more time on this class, while others will be less frenetic (relatively speaking).

Class Participation

As with any class, you will get more out of it if you actively participate. To encourage you, I am including class participation in your overall grade. This includes asking questions in **and out** of class, answering questions that I pose, listening respectfully to your classmates, really working with classmates to investigate problems when I ask you to, giving helpful feedback to classmates when that is required, and other similar aspects of good academic citizenship. (Attendance is only a part of class participation in the most basic sense–poor attendance will count against you.)

Problem Sets

As with all math courses, you do not really learn Abstract Algebra without doing problems. This class is different from some other math courses in some ways, however–one of the purposes of this class is that you learn to write mathematically. To help you with both the content and the writing, you will (of course) have weekly problem sets, due Wednesdays. You will also have the opportunity to rewrite once any problem you tried to do but didn't do to your satisfaction. See the attached handout for more information on when problem sets are due, how I will grade them, and how they should look.

Paper and Poster Session

In my experience, some students have a hard time getting a grip on what is really going on in Abstract Algebra, because it is, after all, abstract. I have learned over time that one key to getting a firm grasp on the material is to see it applied to specific examples. To help you with this, you will each adopt a different group this semester, and investigate it thoroughly. You will then write a paper explaining all you have learned about your group, and subsequently make a poster illustrating what youv'e learned. See the attached handout for more information on the Adopted Group Writing and Poster Assignments, and the syllabus for the various due dates associated with this assignment.

Exams

You will have two open book, open note takehome exams during the semester. I will give you four days (Monday to Friday) to work on each exam. See the syllabus for the due dates.

The final will consist of a take-home exam, and possibly also an in-class portion. The take-home portion will be due by 5pm on Wednesday, December 18.

Evaluation

I expect to use the weights below, although I reserve the right to change my mind if the semester does not go as expected.

Class Participation	7%
Problem Sets	35%
Adopted Group Paper and Poster	18%
Two Takehome Exams	24% (12% each)
Comprehensive Takehome Final Exam	16%