

INSTRUCTOR: Janice Sklensky

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OFFICE HOURS: M 1:30-2:20, Tu 3:30-4:20, W 11:30-12:20, and Th 1:30-2:20. Additional meetings, of course, are available by appointment.

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

OVERVIEW

Abstract Algebra arose from the attempt to expand the quadratic formula to higher order polynomials, and has become one of the most important branches of math, with applications both outside and within mathematics. The universality of the ideas as well as the elegance of the structures, the logical progression of ideas, and the ability to deduce much from little account for the prominent role abstract algebra plays in mathematics.

Abstract Algebra is the study of different types of algebraic systems, (groups, rings, and fields, for instance). This introductory course will focus on group theory. We'll begin by introducing and developing groups—we'll decide whether various specific systems are groups or not, and learn as much as we can about the properties exhibited by all groups. Later in the semester, we'll 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, you will gain further insight into what pure mathematics is all about: creating an entire complex structure from a few (relatively) simple definitions.

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

Plan to spend at least 9-12 hours a week outside of class working on this course. As usual, some weeks you will spend more time on this class than others.

CLASS PARTICIPATION

As with any class, you will get more out of it if you actively participate. I am therefore 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, and other similar aspects of good academic citizenship. It's usually not an issue in a class of this sort, but be aware that poor attendance or repeated tardiness do count against you.

PROBLEM SETS

You will (of course) have weekly problem sets, due Wednesdays. You will also have the opportunity to rewrite once any problem you truly tried to do but didn't do to your satisfaction – this should help you improve your proof-writing as well as helping you understand the material. See the attached handout for further details.

ADOPTED GROUP PROJECT

One key to really getting a grip on both the basics and on the subtleties of Abstract Algebra 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. During the course of the semester, you will turn in several short papers on your progress, and you will also occasionally give an informal talk on your progress, so that everyone has some familiarity with each group. The culmination of this assignment will be a paper you each will write, explaining all you have learned about your group. See the attached handout for more information on the Adopted Group Writing Assignments, and the syllabus for the various due dates associated with this assignment.

QUIZZES

You will have several short quizzes– I'm currently planning on five, but that is flexible. These quizzes may cover definitions, theorem statements, or applying basic techniques. The currently scheduled dates are on the syllabus; depending on how the semester goes, we may add in more or remove some (either of which could result in changing the scheduled dates, of course).

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 2:30pm on Friday, December 17.

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.

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| Class Participation | 3% |
| Problem Sets | 34% |
| Adopted Group Project | 18% |
| Quizzes | 10% (2% each) |
| Two Takehome Exams | 20% (10% each) |
| Comprehensive Takehome Final Exam | 15% |

HONOR CODE

I expect you to abide by the Honor Code. *Remember: If you see a violation of the Honor Code occurring, you are bound by the Honor Code to report it.* As part of the honor code, you are required to write *I have abided by the Wheaton College Honor Code in this work*, followed by your signature, on all written assignments. Every time you do, ponder the question "how exactly does the honor code apply to *this* assignment, and did I *really* abide by it?" If, upon consideration, you do not feel you can truthfully write and sign the pledge, please come speak to me immediately! So, specifically, how does the Honor Code apply in this class?

For all assignments: You may discuss the work with classmates, and you may use references that help you figure out how to do a problem on your own, but you may not use any references (people, other people's projects or assignments, books, the web) which either give you the answer or lead you directly to the solution. When you do use references (as described above), you *must* cite them.

For all group work: You must make every effort to meet with your group at all meetings. You may not purposely exclude any member from a meeting.

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| You may not divide the work! |
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You must make every effort to participate and aid in finding the solutions. If you don't understand what someone else is saying, you must ask them to explain it. If someone asks you to explain your ideas, you must take the time to explain it. In the end, you must understand all the work that is being submitted under your name.

When dividing the points, do not give or take credit that is not due.

Homework: For the individual problem sets, you must write the results on your own, in your own words. For the group problem sets, after your group has jointly figured out every problem, one person will be responsible for recopying your work. This primary author must change from week to week.

Adopt-a-Group Project: As with the homework, you may use references, but you must not plagiarize (copy work, or only re-phrase in a simplistic manner).

Quizzes: It goes without saying that the work you turn in must be your own, with no help from either other people or from any sort of notes you might have brought in with you.

Midterm and Final Exams: You may use *your* book and *your* notes. If you are sharing a textbook with someone else (which I strongly discourage), please come to my office to discuss how you can share the book in a way which does not corrupt the fairness of the exam. You may *not* borrow anybody's notes during the exam, and of course you may not discuss the exam in any way with anybody but me.