Mathematics MAT 334 : Abstract Algebra
Spring 2006
MF 12:30 pm - 1:45 pm, Room 210

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Course Materials

Contemporary Abstract Algebra, Sixth Edition, *Joseph A. Gallian* (required)

Introduction

Abstract Algebra, as its name implies, allows us to generalize (abstract) many of the characteristics of the familiar integer, rational, and real number arithmetic to other number systems. You may have noticed that we can factor integers, and we can also factor polynomials. So in some sense these two systems are very similar. We will attempt to classify systems according to what properties they have. Warning: Remember how happy you were when you found out that $6 \times 8 = 8 \times 6$? It turns out that this commutivity does not always hold in all systems! One reason that we classify systems by the properties of their operations is that once we have proved (yes, we will be proving things) something about one system, we will not have to reprove it for another system with the same properties.

One of the major goals of a class in abstract algebra is for each student to become comfortable with proofs, examples, and counterexamples. These are vital skills in thinking mathematically. You cannot hope to achieve this without doing mathematics. For this reason we will become colleagues this semester. Throughout the semester I may ask you to come to the board and show the rest of the class your work from a homework assignment. One ground rule is that we are allowed to argue or disagree about the best way to attack a problem, but it must be done with respect.

We will start out by exploring certain properties of functions and sets before heading on to the main topics of the course, which are groups, rings, and fields. In most Abstract Algebra courses groups are treated as objects with a couple of properties. But they do have a very nice visual representation, which we will explore as well.

Exams

There will be two in-class exams as well as a final cumulative exam. The exams will test your ability to work through some of the computations, as well as your ability to apply the techniques to certain applications. The first exam is scheduled for Friday, February 17 and will count for 20 percent of your final grade. The second exam is scheduled for Friday, March 31 and will count for 20 percent of your final grade. The final exam will be held on Monday, May 8th from 9:00 am to 11:30 am. The final will count for 20 percent of your final grade. There will be NO make-ups for missed exams. Please look over your schedule as soon as possible. If you see a potential conflict, inform me immediately.

Homework

The best way to learn Mathematics is to solve problems. In addition to assignments to be turned in, there will also be problems to solve which we will consider "moral assignments". The problems on the moral assignments will not be turned in for a grade; however, you are responsible for the material on these assignments. You will always be given at least a week to work on the assignments to be turned in. But I will expect you to work on the problems before the next class period. You should be comfortable enough with the problems to work on them and discuss them in front of the class. Homework will count for 20% of your final grade.

Quizzes

Every other Friday, starting with January 27th, we will have an in-class quiz. There will be a total of 6 quizzes throughout the semester. You should treat the quizzes as mini-exams, covering material from approximately 6 days worth of course work. The quizzes will consists of 4 or 5 problems similar to problems from your graded homework, and they are to make sure that you are keeping up with the concepts presented in class, and to identify where you are having problems before you take the exams. The quizzes will count for 20% of your final grade.

Attendance

While there is no official attendance policy for MAT 334, I strongly suggest you come to class prepared every day.

Grading

Your grade in this course will be based on three main factors: homework, quizzes, exams. The homework will be worth 20% of your final grade, the quizzes 20%, and the exams 60%. In addition to these factors, minor ethereal factors such attendance, attitude, and improvement over the course of the semester can also affect your grade. To determine your final grade, 90–100% = A, 80–89% = B, 70–79% = C, 60–69% = D, 59 and below = F, with the top two percents receiving a + and the bottom two percents receiving a −.

Calculators

The use of calculators will not be allowed on any quizzes or exams. None of the work will require any sophisticated computations. You may use a calculator when working on your homework to check your work. However, since will not be allowed to use it on the exam, I suggest you do as much work without your calculator as possible.

Important Dates

Tuesday, January 24 – Last Day to Drop/Add
Friday, February 17 – Exam I
Monday, March 13 - Friday, March 17 – Spring Break (no class)
Friday, March 31 – Exam II
Friday, March 31 – Deadline for WD or P/F
Monday, May 1 – Last Day of Classes
Wednesday, May 4, Sunday, May 8 – Study Days
Monday, May 8, 9:00 a.m. - 11:30 a.m. – Final Exam

Suggestions

Come to class with your homework assignment completed every day
Study for at least 30 minutes each day in addition to completing your homework assignment
Read the section we will be covering *before* we cover it in class
Do not fall behind!
Come to office hours to discuss homework and concepts. I am here to help!

Syllabus
MAT 334 : Abstract Algebra
Term : Spring 2006

Week 1	January 20	Course Policies, Syllabus, Introduction, Chapter 1
Week 2	January 23	Chapter 2 - Groups
	January 27	Chapter 2 - (continued) - **Quiz I**
Week 3	January 30	Chapter 3 - Finite Groups; Subgroups
	February 3	Chapter 3 - (continued)
Week 4	February 6	Chapter 4 - Cyclic Groups
	February 10	Chapter 4 (continued) - **Quiz II**
Week 5	February 13	Review
	February 17	**Exam I**
Week 6	February 20	Chapter 5 - Permutations Groups
	February 24	Chapter 5 - (continued)
Week 7	February 27	Chapter 6 - Isomorphisms
	March 3	Chapter 6 - (continued) - **Quiz III**
Week 8	March 6	Chapter 7 - Cosets and Lagranges Theorem
	March 10	Chapter 7 - (continued)
Week 9	March 13	NO CLASS
	March 17	NO CLASS
Week 10	March 20	Chapter 8 - External Direct Products
	March 24	Chapter 8 - (continued) - **Quiz IV**
Week 11	March 27	Review
	March 31	**Exam II**
Week 12	April 3	Chapter 9 - Normal Subgroups and Factor Groups
	April 7	Chapter 9 - (continued)
Week 13	April 10	Chapter 10 - Group Homomorphisms
	April 14	Chapter 10 - (continued) - **Quiz V**
Week 14	April 17	Chapter 11 - Fundamental Theorem of Finite Abelian Groups
	April 21	Chapter 11 - (continued)
Week 15	April 24	Topic : Elliptic Curves
	April 28	Topic : Elliptic Curves - **Quiz VI**
Week 16	May 1	Topic : Elliptic Curves