

Course Outline: Math 3320, Fall 05

The web page for this course can be found at <http://livetoad.org/>. Please check there frequently for announcements, changes, due dates, solutions, scores, and other goodies.

Introduction

Welcome to Abstract Algebra! Algebra is one of the oldest mathematical subjects. Every major ancient culture developed the rudiments of the algebra that is now taught in Middle and High Schools. This algebra was *algorithmic*, meaning concerned with step-by-step procedures — for example, the manipulation of numerical expressions, and the solutions for linear and quadratic equations. This algebra was purely *rhetorical*, meaning it was written without any symbols except the numerals — and sometimes not even these. There were no symbols for addition or multiplication, for equality or for variables. Some of this was written in verse form. Through 2000 years of history, every algebra problem was a “word problem”!

Relatively recently some cultures developed a *syncopated* style of writing algebra, meaning they used abbreviations for the variables and some of the operations and relations. This was particularly true in Renaissance Europe, where at the same time mathematicians began to ponder the structure underlying the problems and their solutions. This culminated in the development of a purely symbolic algebra, in the 17th century. It also led to the first abstract algebraic structures (“groups”), in the 18th century.

After this period mathematical discoveries accumulated quickly. The field of algebra increasingly turned from study of algorithms to the study of structure. In the 20th century the wide-ranging algebraic results and methods were shaped into a coherent theory, called abstract algebra. This is now one of the three pillars on which almost all of modern mathematics is built. (The others are topology and real analysis.)

Very recently algebra has returned more and more to its roots, using abstract structures along with electronic computers to develop and study new algorithms.

In this course there are three major goals:

- To introduce algebraic structures and some of their applications.
- To survey the history of algebra.
- Above all, to develop the skill of writing clear mathematical proofs.

To succeed in this course you must be able write clear mathematical proofs. Since Math 3190 is a prerequisite for this course, I know that you have already been exposed to proof techniques. We will further hone these skills.

Our text is *A First Course in Abstract Algebra*, 7th edition, by John B Fraleigh. This is one of the most successful abstract algebra texts of all time. Students have always found Fraleigh’s book to be among the clearest expositions of this very abstract material.

We will cover 31 sections of the text, which means we will cover 2 or 3 sections per week. This is a fast pace. You should try always to read a bit ahead of where we are currently. You can always get a map of where we are headed next by looking at the Assignments page of the course web site.

Quizzes

There will be at least 15 short, 10-point quizzes this semester. I will not announce the dates of the quizzes ahead of time. On each quiz you will be asked to write out, verbatim, definitions and theorems from the text. On some of the quizzes you will be asked questions based on the historical notes. Once we have covered a section in the book all definitions, theorems, and historical notes up to and including that section are fair game for any subsequent quiz.

Your 10 best quiz scores will count towards your final grade. I will not give make-up quizzes under any circumstances. If you miss a quiz then that will be one of the scores you drop.

Assignments

There will be 14 assignments, with exercises taken from the text. Altho there may be many problems assigned, I will randomly choose 10 to grade. Each exercise set will be worth 10 points.

I will not accept assignments past the due date, under any circumstances. Your 10 best scores will count towards your final grade. If you do not submit an assignment by the due date then that will be one of the scores you drop. Your homework must be neat and show all work. When you turn in your homework fold the papers lengthwise and write on the outside

your name, Math 3320, Fall 05, assignment number, due date

Plagiarism

I encourage you to work together. Studies show that students who work together consistently out-perform those who do not. However, your own work must be written in your own words. Do not “divide up the labor”. Do not turn in work that is not your own. Copying is cheating. This includes copying from another student or copying from another textbook or a solutions manual. If you turn in work that is not your own then you will get a 0 on that assignment. If it happens a second time you will get an F in the course.

Exams

There will be 4 exams, worth 100 points each. The exam dates are listed on the calendar below, and are posted on the web, along with their syllabus. The exam questions will be similar to those found on the quizzes and homework assignments. Note that exam 4 is *not* a cumulative final exam.

I will give make-up exams only in case of a documented exigency, such as illness or a funeral. If you are sick the day of the exam then you must call or email that same day if you expect to be able to make up the exam. Otherwise you must arrange for a make-up exam ahead of time. If I am not in my office then you can leave a voice mail message. If you fail to show up for an exam and do not contact me about it until afterwards then you will not be able to make up that exam — you will get a 0 for that exam.

<i>Labor Day</i>	Mon	5 Sep	<i>Veterans Day</i>	Fri	11 Nov
Exam 1	Fri	16 Sep	Exam 3	Mon	21 Sep
Exam 2	Fri	14 Oct	<i>Thanksgiving Break</i>	Wed–Fri	23–25 Nov
<i>Last Day to Withdraw</i>	Fri	14 Oct	Exam 4	Wed	14 Dec 12:30–2:30
<i>Fall Break</i>	Mon–Tue	17–18 Oct			

Grades

Your final grade will be determined from the distribution of total points earned, on the following scale:

90% earns an A; 80–89% earns a B; 70–79% earns a C; 60–69% earns a D.

If you want me to post your scores under a nickname then bring me a 3×5 card with your name, an email address, and the nickname you want to use — preferably something not obvious! I will not accept email requests to email or post your scores or final grade. If you want me to post your scores then you must bring me a 3×5 card.

If you stop attending class then I will give you an IW grade. There are two points during the semester for submitting IW grades: the 4th and 10th weeks. After the 10th week an IW grade is impossible, so if you stop attending after this point then you will get an F.

Office hours

My office is UH 4080e. The phone number is 419 530 2975. My email address is simply paul.hewitt, at utoledo.edu. My office hours during the hour before each class, in the Palmer Hall lounge, on the lower level. At these times you can call or stop by without an appointment and I am sure to be there. I am also available at other times, but for these you must make an appointment. Feel free to ask for appointments at other times if you cannot make it to my regular office hours. If you call me when I am not in my office then you can leave a voice mail message and I will get back to you as soon as I can.