

General Information for Math 49: Introduction to Modern Algebra

Instructor:

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Office Hours:

Wednesdays 3:30–4:30 pm, Friday 12:30–1:30 pm, and by generous appointment. The two stated slots are times you can be sure to find me in my office and willing to talk. Other times are fine, but to be sure that I am available, you should make an appointment with me. Of course you should feel free to stop by anytime and see whether I am available.

Text:

Our main text will be *Hungerford's Abstract Algebra, an Introduction* (second edition). It is available in the bookstore. Supplementary texts are be available in the library.

General Game plan:

Our primary goal is to learn everything in the first eleven chapters of the text. We *must* master the first seven. Covering more than the first eleven—either from the Applications in Part 3, or from other sources—is a definite and enticing possibility.

Meetings:

We will have regular lecture meetings every Monday, Wednesday, and Friday at 10:30 am in Dupont 142A. (This room is on the verge of being too small, so depending on enrollment, we may have to switch rooms.) There will also be mandatory problem sessions. The class will be split into three or four smaller units which will meet once a week. *If you are not already signed up for a problem session, do so **immediately**.*

Homework:

I will assign homework in every lecture, collect each week's worth on Monday, grade as much of it as possible and hand it back to be discussed in problem sessions. Problems will range in difficulty from tediously routine to impossible and in length from one-liners to several pages. (Of course, I will try to make the mix a sane one.) I will work all the problems out myself, but I hope to be able to use student solutions to build a folder of solutions in the library. *Do your homework at least three times a week!* See my general advice for more on this.

Exams:

There will be a mid-term and a final exam. The final will be scheduled by the registrar. Right now I expect the midterm to be Wednesday, October 20. I may choose a different date for it and I may choose to make it a take home exam. I will announce the official date at least a week before the actual date of the test.

Grades:

At the end of the course I will compute a number by the formula $2H + 2F + M - D$. Here H is the fraction of the total possible homework points, F is the fraction of the total possible points on a final exam, M is the fraction of the total possible points on a midterm exam and D is the smallest element of the set $\{H, F, M\}$. Grades will be monotonically based on this number. I'll determine cut-offs at the time, but give you feedback on how you are doing as the course progresses, so that the process is not a complete mystery. In many mathematics courses, the median grade is on the line between B's and C's.

Late work:

Generally speaking late work will never be accepted and exams may never be taken late. In the case of irreconcilable conflicts you may schedule an exam earlier than the official time, but make up exams will not be given after the regularly scheduled exam except for the most extraordinary circumstances. (For example, global invasion by extraterrestrials.)

Advice:

Here is some advice I give to students in my mathematics classes at all levels.

- The most efficient way to master mathematics is to go over the lecture notes after every lecture and work problems related to that lecture. This means in particular that you should set aside time at least 3 days a week to work on this class. Studying this way works. Trying to cram it all on one night does not. (You may as well sleep without studying—it is just about as effective and gets you more sleep.)
- Don't be afraid to be confused—just get even! Learning mathematics is a process which often involves first developing and refining a confusion and then resolving it. This process is a struggle. But if you aren't struggling you probably aren't learning, so endeavor to struggle well. By developing and refining a confusion and then resolving it, I mean:

Develop: Read the text, go to class, work the problems, and get confused. A course which offers you something to learn should offer you good confusions.

Refine: Don't be lazy in your confusion. When you have developed a good one try to understand exactly what you are confused about. Relevant things to ask are: “What is the most concise and precise way I can describe my confusion?” (The answer, “I can't do problem 17,” is not useful. Can you read problem 17? Do you understand all of the terms? If not which ones? If so, then you understand quite a bit about problem 17; what *exactly* is your confusion?) “Is there anything like this—perhaps something more general or something more specific—which I have already come to understand?”, “How does this relate to what I have seen before?”, “Can I change the confusion at hand in some way to make it tractable?”, “What is given?”, “What is desired?”, “Can I make a good guess? Why is it good? And how can I check it?”

Resolve: Don't expect to solve every problem right away. If you are stuck on a problem, leave it for a while and then go back to it. If you are still stuck, do something about it: Go to the text for the answer. Try the problem again. Work related problems which you do know how to do with an eye toward discovering what you are missing. Try the problem again. Ask in class. Try the problem again. Then read the text again. Ask your classmates.

(Study together at a regular time. Share your confusions!) Read the text again. Ask your professor outside of class. (But be prepared!)

- Seek lots of different kinds of help. Talk to your classmates. Go to the clinic. (Some of the clinicians will be algebra experts and others will not. Find out the schedule of those who are and go on those nights.) Talk to me. Speak up in class. Work together with your classmates, but do not copy from them.
- Be organized. Get a daily planner. Schedule your work-time a week in advance if you can. Evaluate your effectiveness regularly. Schedule more work-time (or different hours) if you are not getting enough done. There is no one correct prescription for how much time you should spend outside of class. However, if you don't come to class with a refined confusion and if you don't resolve your new confusions when you leave class, then you will probably learn very little. So time outside of class is of great importance. For many students, spending twice as much concentrated time outside of class as is spent in class is too little.
- The farther you proceed into mathematics, the more important your reasoning is and less emphasis is placed on getting the right answer quickly. On both exams and problem sets we usually want to see how deeply you understand the material, not how well you do routine problems. Explaining a line of reasoning is often more important than the answer itself. Often problems will require that you have synthesized the material, not just digested discrete chunks of it. You must understand the ideas behind what you are computing.
- Buy Strunk and White's, *The Elements of Style*. Read it (again) now. Apply it to everything you write—especially to mathematics. Everything you write for others to read should be well written and grammatically correct. Everything you write should be in well punctuated sentences. Here is an example: $1 + 1 = 2$. In that sentence the verb is $=$. There are two main nouns: $1 + 1$ (a compound noun) and 2 . Without the period at the end " $1 + 1 = 2$ " is an un-punctuated sentence, and as such is wrong. *If you don't write in properly punctuated sentences on problem sets, you won't get full credit.* (Exams and live talks are sometimes exceptions. Verbal and written expression in these situations is often less formal. Whenever you can speak or write in sentences, paragraphs, and so on, do so. It will make you look better because you will be better.)