



MTH 561S & 661S: Survey of Modern Algebra

Zoom policy: Office hours will be either in person, in Ungar 533, or on Zoom, with camera on. The zoom link is not public and will be shared in a separate email.

Textbook: My lecture notes *Introduction to Algebra: Rings First* are freely available on my website, at the address <https://www.math.miami.edu/~bruno/algebra2.pdf>. These free notes completely cover what I plan to teach in MTH561, what I plan to teach in MTH562, and even some extra stuff, so don't be scared by the amount of material. A textbook I recommend for further reading is Shafarevich, *Discourses on Algebra*, Springer. If you want a book with plenty of exercises, I suggest Cooperstein *Introduction to Groups, Rings, and Fields*. Caution: Cooperstein does "groups first", so we start from the second half of his book, and then in the next semester we're going to do the first half. (I taught it both ways: usually students prefer rings first, but of course the order doesn't really matter.)

Content: This is Part I of a yearly course, although attending part II is not compulsory. The tentative outline is:

- Preliminaries: 2 weeks
- Rings: 4-5 weeks
- Fields and field extensions: 3 weeks
- Groups, permutations, and modules, will be mostly covered in Part II (MTH 562).

Grading policy:

- Two midterms and a final; the final weighs double. I grade in single blind.
- Makeups will be given only in case of documented medical excuse. Please inform me via email.
- Homework will be assigned in class, also in the form of completing proofs. (You are supposed to keep track of the exercises, I do not keep a list.) We will use one of the following two options: (a) the homework will be submitted as PDF via Blackboard, annotated by a grader, and returned to you via Blackboard, or (2) in case we do not have a grader, I will do a collective solution in class in some extra hour. Either way, handing in the solution is not compulsory: I view homework as a preparation for the midterms.
- Class participation and homework do not influence your grade directly, but they play an important role in determining final grades, especially in borderline cases.
- Cooperation in homework is allowed, as long as you indicate it clearly on top. (e.g. "Solved exercise 2 together with Luigi and discussed the solution of exercise 4 with Mario".) It is not allowed in tests, where the usual UM honor code applies. If you do not know an exercise in a take-home exam, leave it blank!, you still have a chance to get an A. Copying the solution from a website results instead in an F, so it's never convenient - and the department nowadays finds out.
- My goals/duties are (i) to help you learn by explaining the best way I can, and (ii) to certify to UM and to society that you master this topic. Instead "(iii) to pass you all with an A" is not in my list of goals. So for example, it's pointless if you ask me to tell you the test questions in advance: I am aware that it would be great for goal (iii), but it would spoil goal (ii). Explaining math gives me joy, but you'll have to do the learning part yourselves. For example, the book has exercises: Consider them 'free game' for training. (Don't write later in the evaluations "bruno does not give us enough exercises" ...)

- Cell phones and ipads are allowed in class, but must be on silent mode. Same policy for pets, kids, and lovers.
- I would prefer if you do not use the computer in class, even if the textbook is online. It tends to distract both you and the students sitting behind you.

General rules:

- Questions and feedback during class are always welcome. You are also welcome to send me emails, though remember that for your math questions I have office hours in which I am available. You don't want to send me emails like "hey, is there any homework due today?", unless you want to let me know that you have no clue. What you want to do on day 1, is to take the contact of a couple of classmates, so you can ask these questions to them.
- Attendance to office hours is not compulsory, but recommended. I have seen tremendous progress in people who come to office hours every week (and I grade in single blind, so I didn't intentionally raise their grades). Showing up by the dozen with plenty of questions the day before the test is not efficient; please consider the office hours when you have the first doubts. Plan ahead!
- Tests are designed to cover the material explained in class; you are expected to keep track of the topics presented. If I never mentioned it in class, it's not going to be on the test (even if it's in the book.) In contrast, what I covered in class but is not in the book, can appear in the test. This second case is rare though, because for this particular course, the book is written by me, and taken off my UM lectures; so usually if I explain something new, I update the book. Please refresh the book webpage from time to time.
- Any material sent to me should be in PDF format. If you start off your emails with a "Dear Bruno", or your questions with "Bruno", it is completely fine by me, and I actually prefer it. Let me know how you would like to be called, if this differs from your first name: it will take me some weeks to remember, because I am forgetful, but at some point I will learn.

With this, I wish you a lovely Spring semester here at The U!



Bruno Benedetti
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