



MTH 461R: Survey of Modern Algebra

Zoom policy: Every lecture will be broadcast on Zoom. When in Zoom, students are encouraged to keep their webcam on, but I am not going to make this compulsory. Per university policy, students are not allowed to record the zoom lectures. The zoom link is not public; it will be shared with the students 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 cover an entire year of material, so do not be scared by the amount of stuff present, I will cover about a third of it. 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. (I taught it both ways: usually students prefer rings first, but of course the order doesn’t really matter.) Buying Cooperstein’s book is not compulsory.

Content: Tentative outline is:

- Preliminaries: 2 weeks
- Rings: 4-5 weeks
- Fields and field extensions: 3 weeks

Grading policy:

- Two midterms and a final; the final weighs double. The test will be take home, so virtual-only. Do not ask me when the final is because the date is not decided by me, but by the university, which puts it online at some point in the semester.
- Makeups will be given only in case of documented medical excuse. Please inform me via email.
- Homework will be assigned in class. 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 the grader thing does not work in these extraordinary times, I will use my time (in office hours or some extra hour in the evening) to show you the correct solution, give you feedback, and answer doubts. 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. Bonus points if you help me correct mistakes in the book I am writing!
- 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.
- 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 often finds out.
- This is a university, not an elementary school, and I am a professor, not your personal trainer. What’s the difference? If children don’t want to study, it is up to the teacher to push them; and if I hire a personal trainer to run a marathon but I don’t make it, this is a failure both for me *and* for the trainer. Instead, if a student doesn’t put an effort into a university course and end up failing the tests, the student will get an F, but the

professor is not at all blamed for it. Here students are treated as grown-ups, and we respect their choices. My goals/duties are (i) to help you learn by explaining the best way I can to those who are willing to listen to me, and (ii) to certify to society (on behalf of UM) that you master the topic. Instead “(iii) to pass you all with an A” is not in my list of goals. So don’t 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 will have to do the learning part yourselves. For example, both my book and Cooperstein’s book have many exercises: Consider them ‘free game’ for training, as learning is an **active** process. It is all up to you!, we presume you are here because you want to learn, and because you want to work hard to deserve a University of Miami degree: your life is in your hands.

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. If you send me an email in the middle of the night, perhaps you won’t get an answer by early morning. Also, you don’t want to send me emails like “hey, is there any homework due today?”. What you want to do is take the contact of a classmate on the first day, and then ask them.
- Virtual 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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