UNIVERSITY
OF MIAMI

Dr. Bruno Benedetti
Office hours: Tue 10:30–12:30, via Zoom
(or by appointment: bruno@math.miami.edu)
Class: TuTh 4:20–5:35, Dooly 200

MTH 562S & 662S: 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 completely cover what I teach in the whole year, 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.) For graduate students, I recommend also the more advanced book by David Eisenbud, *Commutative Algebra with a View Towards Algebraic Geometry*, Springer; and if you wish to know more about Galois theory, John and Margaret Maxfield, *Abstract Algebra and Solutions by Radicals*, Dover, New York, 1992.

Content: This is Part II of a yearly course, as you know. The tentative outline is:
- Field extensions: 3 weeks
- Groups and permutations: 3 weeks
- Sketch of Galois theory and time permitting, module theory: remaining weeks.

Grading policy:

- Two midterms and a final; the final weighs double. The test will be take home, so virtual-only.
- 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) if they give me a grader, 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 prefer to 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 live. 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.
- 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.
- 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 don't

ask me to tell you the test questions in advance: I am aware that it would be great for (iii), but it would spoil goal (ii). Explaining math gives me joy, but you will have to do the learning part yourselves.

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
Assistant Professor