

Math 200a Fall 2021: Graduate Algebra I.

MWF 12-12:50pm, B402 AP&M

Professor D. Rogalski

1. CONTACT INFORMATION

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2. BASIC COURSE INFORMATION

• **Course description** This is a first course in graduate level abstract algebra. Experience with a course at the undergraduate level in abstract algebra covering some group and ring theory is a prerequisite.

The main aim of the course is to give PhD and masters students in mathematics sufficient background for their further studies. Consequently the pace of the course is quite fast, and homework assignments are designed to be challenging. Graduate students from other departments who have a particular interest in pure mathematics sometimes find this course to be a good fit for them, but I stress again that this course is not designed as a first course in abstract algebra. Students with minimal prior background should consider taking the undergraduate algebra course Math 100a instead. If you are not sure if you should take this course, please discuss it with me.

• **Lectures** We will have lectures in person this quarter, as long as the health situation permits. Remember to wear your mask in class, and fill out the campus health screening app each day. If you feel sick, do not come to campus. Every lecture will be recorded using a system called EVT.ai and should be available on the EVT website within a few hours of the end of the lecture. You may find the lecture recording useful even if you attended a given lecture, since it automatically transcribes the board work. In addition to the lecture recording there will also be course notes (see below) which will typically have more detail than what is possible to cover in the lectures.

• **EVT.ai** In order to use the EVT.ai system, you should first create an EVT account with your Mathematics email, click on the activation link sent to your email, login to EVT, and use the PIN #0652859 to access Math 200A - Algebra content.

Signup: <https://learn.evt.ai/n/signup>

Login: <https://learn.evt.ai/n/login>

Term: 2021_fall

Math 200A - Algebra PIN # : 0652859

Please use the Support button on the EVT Platform or email hello@evt.ai for any support related questions or feedback.

- **Office hours** Professor Rogalski and the TA will have several scheduled office hours where you can ask questions about the course material or get advice on how to approach the homework problems. The times are listed above. If you cannot make either Professor Rogalski's or your TA's scheduled office hours, feel free to make an occasional appointment to talk to one of us at a different time.

- **Qualifying exam** The three quarter sequence 200a-c is preparation for the qualifying exam in algebra which will be given in May 2022, and again in September 2022. These exams will be tailored to the topics covered in the course this year.

Copies of some relatively recent qualifying exams in algebra can be found on the math department's website as part of the mathematics department graduate student handbook, see

<https://www.math.ucsd.edu/handbook/graduate/academics/qualifying-exams/>

- **Textbook** I will not strictly follow any textbook. Most of what we will cover is in *Abstract Algebra* by Dummit and Foote, 3rd edition. That is the book I recommend as a reference as students tend to like its level of detail and many examples; it will be available at the bookstore. Another book I like is *Algebra* by Isaacs, though its quirky use of left to right composition takes some getting used to. For the group theory part of the course, I also like *An introduction to the theory of groups* by Rotman.

- **Course notes** I will produce course notes since we are not following a textbook. I will try to post the notes related to a given lecture sometime later that day, if not earlier. I did write notes for the ring, module, and field theory portions of 200AB last year, so once we get to those topics I will just be posting revisions of last year's notes. The group theory notes will be new this year though.

- **Homework** Homework will be assigned weekly and due on Fridays in class. Note that we have decided to collect paper homework rather than online scans. If for some reason you cannot get your homework in to me by Friday's class, for example if you are ill and not attending lecture, please contact your TA to talk about how to get your work to him.

Only selected problems will be scored, but you are responsible for completing and understanding all problems, and exam problems are often modeled on homework problems. You are free to discuss the homework problems with the professor, the TA, or each other, but your final write-up of the problems must be your

work alone. Submitting solutions that are not your own work, for example copying from an online solution you happen to find, is academically dishonest.

- **Exams** There will be one in-class midterm, scheduled for Monday November 1 (week 6). No homework will be due the week of the midterm. The final exam will be Thursday, December 9, 2021 from 11:30am-2:30pm in our usual classroom. No notes, books, or other aids can be used during exams. Unless something changes and classes generally move online, I do not intend to offer remote exams. Please talk to me if you do not think you will be able to take exams in person.

- **Grading** Your final averages will be based roughly on the following percentages: Homework 25%, Midterm 25%, Final Exam 50%. There is no standard scale used to match averages with grades. Since C is a failing grade for a graduate student, students whose performance is considered passing generally get a B or above.

- **Topics** We will cover group and ring theory in 200A, and module and field theory in 200B. Usually commutative algebra is covered in 200C. Last year some category theory was added at the beginning of 200C. I plan to see if I can introduce a bit of category theory earlier in the course this year so that we can use that language when it is appropriate.