

Undergraduate Seminar in Algebra
Course 18.704, Fall 2022
Professor Kent Vashaw
SYLLABUS

Class Schedule: TTh 1-2:30 PM (Room 2-147)

Office hours: MT 4-5 PM or by appointment (Room 2-238A or on zoom)

E-mail: kentv@mit.edu

Course website: <https://web.mit.edu/kentv/www/18.704.html>

There is no final exam

Course Goals and Description In a seminar, mathematicians help each other to learn a body of material. The main object of this undergraduate seminar is for you to help each other learn the content presented in **Finite Groups: An Introduction** by Serre, while simultaneously helping each other to better **present, discuss, write, and read mathematics**. To this end, you will take turns collaboratively presenting sections of the book to each other. Your final (20-minute) presentation will be on a topic of your choice, about which you will also write a 10-page paper.

1. You will present to your classmates five times during the course of the semester:
 - A very brief (<5 min) presentation on a favorite mathematical definition/example/theorem, to help your classmates get to know you.
 - Three 30-minute presentations given collaboratively with a classmate, each on an assigned section from the book (since we have an odd number of people in the class, one group will instead consist of three students, and consequently be 45 minutes). These talks will be given as “chalk talks”, i.e. you will do the writing on a blackboard live, rather than prepare slides ahead of time.
 - One 20-minute presentation given by yourself on the topic of your paper. This will be a “slide talk”, i.e. you will prepare slides ahead of time.

Collaborative presentations For the collaborative presentations, you and your classmate(s) must present approximately equally. It’s fine for one of you to give the first half of the talk and the other to give the second half, but you should work closely together to ensure that both parts of the talk are presented clearly and work well together. You and your collaborator will **practice** the first presentation with me. You are expected to practice all subsequent presentations with each other.

Each 30-minute presentation will be based on a section of the book. You should assume that classmates have read and thought about the text: design the talk to help your classmates with the most challenging aspects of the text.

2. **Problem sessions** After each presentation, you will give your classmates one homework problem per presenter, designed to solidify their understanding of the material—you may take this problem from the book or write it yourself (consult with me). You should be prepared to help classmates with these problems. At the end of each round of presentations, we will spend a single class day on a problem session, where students will take turns volunteering to work the assigned homework problems at the board. **You must present at least two homework problems on the board during the semester.**
3. You will write a **paper** on a topic of your choice, to be completed in stages. You will propose a topic, write a partial draft for feedback from me, complete the paper, submit it for feedback from peers, critique the drafts of two of your classmates, and submit the final draft of the paper by the end of the last class.

The paper need not contain original results, but the writing must be your own and all sources must be properly acknowledged (ask if you have questions). The paper must be successfully written in the style of a research or expository journal article and must be about 10 pages long (in a standard format).

Schedule and important dates. Below is a tentative schedule for the course, including major due dates related to the final project. These dates may be subject to change; any changes will be announced on the course website and in class.

- Sep 8 Introduction and 5 minute presentations
- Sep 13 Remainder of 5 minute presentations, how to present (with Michael Maune)
- Sep 15 First 30 min presentations
- Sep 20 First 30 min presentations
- Sep 22 First 30 min presentations
- Sep 27 First 30 min presentations
- Sep 29 How to present, redux (with Michael Maune)
- Oct 4 Problem session, final paper topic due (topics are on a first come first served basis)
- Oct 6 Second 30 min presentations
- Oct 11 HOLIDAY
- Oct 13 Second 30 min presentations
- Oct 18 Second 30 min presentations
- Oct 20 Second 30 min presentations
- Oct 25 Problem session, partial draft of final paper due
- Oct 27 Third 30 min presentations
- Nov 1 Third 30 min presentations
- Nov 3 Writing strategies (with Michael Maune)
- Nov 8 Third 30 min presentations
- Nov 10 Third 30 min presentations
- Nov 15 Problem session
- Nov 17 How to give peer feedback (with Michael Maune), complete draft of paper for peer review due
- Nov 22 How to give presentations online (with Michael Maune)
- Nov 24 HOLIDAY
- Nov 29 20 min final presentations
- Dec 1 20 min final presentations, peer feedback due
- Dec 6 20 min final presentations
- Dec 8 20 min final presentations
- Dec 13 20 min final presentations, final paper due

Grading The final grade is based on 40% for the talks; 10% for participation (including attendance); 20% for the homework problems; and 30% for the paper, including drafts and peer critique. Grading rubrics are available on the course website.

Resources In addition to the assistance you will receive from your peers and from me, help with presenting and writing is available from the department's mathematical communication specialist, Michael Maune. You can e-mail either of him to arrange a time to meet at mmaune@mit.edu. General help with writing and presenting (not specific to mathematics) is available from MIT's Writing Center: <http://cmsw.mit.edu/writing-and-communication-center>.