

# Math 455 – Topology – Syllabus

Spring 2023

**Instructor:** Chris Elliott (pronouns: he/him)

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**Office Hours:** Monday 2:30–4:30, Wednesday 10:30–11:30, Friday 9:30–10:30 in Science Center E206.

## What We'll Cover

Our main goal in the course will be to study the notion of a *topological space*, a very powerful abstract notion for studying ideas about shape, space and distance, with applications in every branch of mathematics. Some topics we will cover include:

- Studying shapes by abstracting “distance” and “closeness”: metric spaces and topological spaces.
- Continuous functions between topological spaces.
- The key geometric notions of compactness and connectedness.
- Studying topological spaces using the fundamental group.

## Schedule

We will meet three times a week for classes:

Monday, Wednesday and Friday at 1pm in **Seeley Mudd 207**.

There will be two midterm exams and a final. The exams will be held on the following days.

- **Midterm 1:** Friday March 3rd (during class)
- **Midterm 2:** Friday April 7th (during class)
- **Final:** TBD (During the period May 15th to 19th)

The midterm exams will be in person, and will be closed book. Calculators will not be allowed. The final exam will be take-home, and open book / open note (but *not* open internet, you may only use the textbook and your own notes).

## Makeup Exams

If you cannot make one of the exam times, please let me know as long as possible in advance and **at least two weeks beforehand**. I can arrange make-up exams for legitimate conflicts (e.g. for academic commitments, religious observances) but two weeks advance notice is necessary.

## Textbook

We will use the textbook *Basic Topology* by M. A. Armstrong. An ebook edition is available through the publisher, Springer, for \$55, and secondhand print editions are available for around \$35. Our main focus will be the material in chapters 1–5, with some topics from chapters 6–8 covered at the end, depending on how much time we have.

Another reference that I recommend is the book *Counterexamples in Topology* by Steen and Seebach. A copy of the book has been reserved in the library. You won't need to refer to this book for the course, but it is a great reference for lots of fun examples, some of which you will see on the homeworks.

## Homework

Homework will be assigned each week and due on **Fridays at 5pm**. There will not be homework due during weeks with a midterm exam. The first homework will be due on Friday February 10th.

Homeworks will consist of 5-10 problems on the material we learned in the past week. Some problems that are particularly challenging may be marked with a (\*). These problems are **optional**; you can earn 100% on the homework without attempting these, but good solutions will be worth extra credit!

You are encouraged to work on the homework in groups; this is often one of the best ways of learning. However, your final solution **must** be your own work; you should write up your answers on your own, without anyone else's work present (in other words, do not copy!). On the first page of your homework submission, please list the people that you worked with.

You will submit your homework online through **Gradescope** (<https://www.gradescope.com>). You should sign up for a free account using your Amherst College email address. Once you've created an account you should join the section using the following course code:

Gradescope course code: **DJD5YD**.

## Homework Extensions

I know that sometimes things come up that make it difficult to complete homework on time. As such, I will grant up to two homework extensions per person during the semester (you don't need to give a reason, just ask). If you want an extension on one of the homeworks, please e-mail me no later than the **day before** the homework is due.

## Assessment Structure

Your grade will be calculated as follows.

- Homeworks: 35% (lowest score dropped)
- Midterm exams:
  - Higher midterm score: 20 %
  - Lower midterm score: 15 %
- Final exam: 30%

## Accessibility

As the instructor of this course, I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, let's connect to discuss ways to best support your access. If you have disability-related circumstances and are seeking academic accommodations (e.g. extra-time testing, reduced distraction test area, short breaks as needed, note taking assistance, etc.), Accessibility Services is eager to assist with identifying reasonable accommodations for the course. They can be contacted at [accessibility@amherst.edu](mailto:accessibility@amherst.edu).

## Honor Code

The Amherst College honor code applies to this course. All the work you submit, both for the exams and the homework, must be entirely your own. In particular, although discussing the homework in groups is encouraged, when you write down your solutions you should not be looking at anyone else's work. Copying somebody else's work is a violation of the honor code.

If you feel stuck or lost in the course, please get in touch with me or one of the Math Fellows assigned to Math 455 either by e-mail or in office hours as early as possible. We will be happy to help you!