Topology I, Fall 2025

Course: this is a year-long sequence, Topology I and II, Fall 2025 and Spring 2026, followed by the qualifying exam. We will discuss general topology (topological spaces, continuous functions, connectedness, compactness, countability and separation axioms, metric spaces), basics of algebraic topology (homotopy, fundamental group, Van Kampen Theorem, covering spaces, homology, cohomology), and the very basics of topology of 2 and 3-manifolds, if the time allows (classification of surfaces, geometrization for 3-manifolds).

Textbook: In Fall 2025, we will start with Topology by Munkres. It is freely available online, but I recommend having a paper copy. Eventually (likely towards the end of Fall 2025 or in Spring 2026), we will additionally use Algebraic Topology by Hatcher (also freely available online), and possibly some other sources.

Class meets: Tuesday Thursday, 10:00 AM - 11:20 am, Hill Hall 215, Newark

Instructor: Anastasiia Tsvietkova, office: Smith Hall 317; email: a.tsviet@rutgers.edu, website: https://sites.rutgers.edu/anastasiia-tsvietkova/contact/
Please check your Rutgers email as I might send some study materials**.**

Website: course documents and grades will be at Canvas website.

Office hours: Thursday 12:55 -1:30 pm or by appointment, Smith Hall 317. For appointments, please email me in advance.

Grades: Grades will be based on in-class participation (possibly including some proof presentations and other in-class work), attendance, midterm and final. Qualifying exam is held separately from the final and is not included into the course grade.

Attendance: as with any mathematics course, live lectures and discussions offer unique opportunities for firsthand learning. Attendance is therefore important. Additionally, the field of topology and even the set of topics usually chosen for qualifying exam is very broad. At the same time, our pace in class, as well as the facts, proofs and problems that we discuss in class partially depend on student level, progress, and interests. The class content then directly influences the qualifying exam problems. Therefore, coming to classes regularly helps you to be ready for the qualifying exam, and might give you a scoop on what to expect.

Learning at home: for any math course, much learning takes place outside the classroom by reading the book and thinking about homework problems. Please plan at least 4 hours of home practice per every hour spent in class. Doing homework regularly and in a timely fashion is the key to keeping up with the class and getting ready for the qualifying exam. The homework will not be graded, but you are welcome to ask questions about it in class (after you tried hard at home), and ask me to look at your work during office hours.

Homework assignments are given in class. While homework is not collected, it is important to do all of the problems, since later they appear on exams. Discussing homework problems with fellow students is allowed, but copying or allowing to copy the exact solution is not. Thus the recommendation is to write everything down individually after any discussions took place.

Final exam: All students need to take final exam. It will take place 9:30–11:30 am on December 16, in our usual classroom (Hill Hall 215).

Midterm: midterm date will be announced. Midterm will be a short in-class written exam.

Make-up policy: There are no make-ups. In very special circumstances and with the explaining documentation, final may be counted twice instead of a midterm. For the documentation, please contact Dean of Students. Examples: illness with a doctor's note, a covid test confirmation, or other unexpected events that can be verified by the Dean of Students or the Office of Academic Services (OAS), with a verification letter from them, sent to me directly. There are no make-ups for the final. Rutgers has grade Incomplete which can be discussed in very special situations, when someone could not attend the final. Travel is **not** considered a special situation.

Classroom etiquette: Please come to class on time and stay the entire period. Turn off cell phones and refrain from working on other coursework during class. No taping, filming, or photography in class without a prior permission. Cheating and plagiarism are not tolerated. You are welcome to come in full Halloween costume to class right before the holiday.

AI use: the current models of AI are language rather than logic processors and generators. They can at times do better or worse than you with a simple math problem (but hopefully, mostly worse). We therefore strongly discourage using AI for any attempts at proofs or solutions. Your textbook and my office hours are much better resources. Discussions with classmates might also be better. Your own brain is there to try, practice, and learn. There will be no devices (and hence AI) allowed on exams, and the use of AI for any graded assignments is considered cheating.