

Lectures: MWF 12:30–1:20
Ballmer 411

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Course Web site: <http://www.math.washington.edu/~lee/Courses/441-2002>
(or from the Math Department home page,
Selected Course Web Pages → Math 441)

Textbook: C. Wayne Patty, *Foundations of Topology*, Waveland Press, 1997.

General description:

Topology is the study of “space” in its most abstract form, in which all the inessential ideas like distances, lengths, angles, areas, and volumes have been stripped away, and only a notion of “nearness” remains (and a very abstract one, at that). Topological ideas provide a foundation for many other branches of mathematics, as well as for many of its applications such as those in physics, computer graphics, biology, and engineering. In this course, you will learn to use the most important tools that are needed for asking and answering topological questions. Since the course will focus on understanding and writing proofs, it will also help you develop your skill at mathematical reasoning and writing.

Specifically, this course will cover the following topics: Metric spaces, topological spaces, open and closed sets, continuity, convergence, subspaces, product spaces, quotient spaces, connectedness, compactness. This is (most of) Chapters 1–4 of the textbook.

Prerequisites: At least 2.0 in either 328 or 335. This means you must also have successfully completed either 327 and 300 (prerequisites for 328) or 334 (prerequisite for 335). Grades of 3.0 or higher in all of these courses would be more realistic. In addition, the most important prerequisite is a genuine interest in abstract mathematics, or at least a mind open to the possibility. Intellectual curiosity and an ability to express mathematics clearly in writing are also important. Of course, one purpose of the course is to improve such skills.

Homework:

A homework assignment will be given out each Monday, due the following Monday. Plan to spend a lot of time on homework—six hours or more outside of class during most weeks. A typical homework assignment will consist of the following:

- I. Reading:** Typically, you will be given approximately one chapter to read each week. This will usually correspond to the material that is being discussed in lecture that week. I will expect you to read through the chapter quickly before the relevant lectures, and then to reread it carefully after the lecture.
- II. Practice Problems:** Most assignments will include a number of “practice problems.” These are not to be handed in for a grade, but I expect you to do (or at least figure out how to do) all of them for your own good. Understanding these problems will be important for solidifying your understanding of the text and lectures, and for preparing to do the required problems.
- III. Required Problems:** The problems listed as “Required Problems” are for you to write up and hand in for a grade. These problems, consisting almost entirely of proofs, are the heart of the course, and they will constitute a significant part of your course grade.

Notice that the first homework assignment covers material that is prerequisite to this course, and which you should already have mastered in previous courses. Most of you will have to brush up on some of these concepts before you’re able to do the homework; but if you find that you really can’t handle the first assignment at all, then you might not have sufficient preparation for this course.

I encourage you to form study groups and work together on the homework problems (it’s usually the best and fastest way to learn). However, when you write up your solutions to hand in, *you must write your own solutions in your own words.*

Exams:

- **Midterm: Monday, October 28, in class.**
- **Final: Wednesday, Decemeber 18, 8:30-10:20 am.**

Grading:

Your grade will be based on homework (30%), the midterm (30%), and the final exam (40%). Also, doing the homework is a prerequisite for passing the class, regardless of how well you do on the exams.