

Lectures: MWF 12:30-1:20
Winkenwerder 201

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Course Web site: www.math.washington.edu/~lee/Courses/441-2012
(or from the Math Department home page,
Current Course Web Pages → Math 441A)

Textbook: James R. Munkres, *Topology*, Second Edition, Prentice Hall, 2000.

General description:

Topology is the study of “shape” and “space” in their most abstract forms, 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 science, graphics, biology, optimization, 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: Review of set theory, metric spaces, topological spaces, continuity, convergence, subspaces, product spaces, quotient spaces, connectedness, compactness, simple connectedness. This is (most of) Chapters 1–3 of the textbook, together with some supplementary material that I will hand out.

Prerequisites:

The *official* prerequisite is a grade of at least 2.0 in either Math 328 or Math 335. This means that you must also have successfully completed either Math 300 and 327 (prerequisites for 328) or Math 334 (prerequisite for 335). Grades of 3.0 or higher in all 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 help you improve such skills.)

Classes:

Although I won't officially take attendance, I expect you to attend all classes. In addition to lectures and discussions designed to clarify the reading and prepare you for the homework, I will also be introducing new concepts that are not covered in either the textbook or the handouts. Even though our textbook is masterfully written and generally very complete, it still is no substitute for the interaction that a classroom setting can provide. If you must miss a class for some unavoidable reason, you should find someone who takes careful and complete notes, and arrange to get a copy of them.

Homework:

I will post homework assignments on the web once a week, due in class a week later. Plan to spend a lot of time on homework—perhaps as much as six hours a week on average, more during some weeks. A typical homework assignment will consist of the following:

- **Reading:** Typically, you will be given several sections of the textbook to read each week. These will usually correspond to the material that will be discussed in the upcoming lectures. You should at least skim the assigned sections quickly before the relevant lectures, and then reread them carefully after the lectures.
- **Practice Problems:** Some assignments may include problems designated as “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. Some of the practice problems may show up on exams.
- **Required Problems:** The problems listed as “Required Problems” are for you to write up and hand in for a grade. These problems, consisting mostly of proofs, are the heart of the course, and they will constitute a significant part of your course grade.

I strongly encourage you to form study groups with other students in the class, and work together on the homework problems. You’ll be amazed how often someone else has struggled with the same issues you’re working on, and a few words from a slightly different point of view might be just what’s needed to get you unstuck. Also, trying to explain what you do understand to someone else who’s stuck will help you organize and solidify your knowledge far more than you might imagine.

You will also find lots of discussions of topology on the Internet. But I don’t encourage using that as a resource, partly because some of the stuff you find there will be wrong, but more importantly because it’s all too easy to find someone else’s polished answer to the question you’re struggling with, look it over, and think “ah, now I understand,” when in fact you don’t understand it nearly as well as you would have if you had struggled through it on your own or with your classmates. You’ll actually do yourself a favor in the long run, both in terms of preparing for exams in this course and in terms of preparing for later courses that use this material, if you rely instead on me, the TA, and your classmates for help instead of the Internet.

In any case, whatever resources you use to help you figure out how to do the homework problems, when you write up your solutions to hand in, *you must write your own solutions in your own words*. If you got significant help from other students, or from books other than Munkres, or from the Internet, write a brief note to that effect and acknowledge the source. Any written homework that is a verbatim or near-verbatim copy of anything written by someone else (whether you got it from a classmate, a book, or a web site) will be considered as evidence of academic dishonesty.

Topology Blog:

On the class website, you’ll find a link to the “Topology Blog,” which is a Go-Post discussion board for discussing anything having to do with this course. You can ask questions about such issues as why something is defined the way it is, how a given concept might be of use, something you’d like to learn more about, or something that made you feel “stuck,” or just general questions about the lectures, reading, homework, or exams. If you wish to write about specific homework problems, please confine your comments to general questions and suggestions about how to get started.

Exams:

- **Midterm: approximately halfway through the quarter; date to be announced.**
- **Final: Thursday, December 13, 8:30am–10:20am**

Grading:

Your grade will be based on homework problems (30%), the midterm exam (30%), and the final exam (40%).