

**Lectures:** MWF 12:30–1:20  
Mary Gates Hall 271

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**Course Web site:** [www.math.washington.edu/~lee/Courses/441-2004](http://www.math.washington.edu/~lee/Courses/441-2004)  
(or from the Math Department home page,  
**Selected Course Web Pages → Math 441**)

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

### 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: Review of logic and set theory, topological spaces, metric spaces, open and closed sets, continuity, convergence, subspaces, product spaces, quotient spaces, connectedness, compactness. This is (most of) Chapters 1–3 of the textbook.

**Prerequisites:** The *official* prerequisite is a grade of 2.0 or higher in either Math 328 or Math 335. This means you must also have successfully completed either Math 327 and 310 (prerequisites for 328) or Math 334 (prerequisite for 335). In fact, 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.

### Homework:

To save paper, I plan to post homework assignments on the web instead of handing them out in class. A new homework assignment will be posted each Wednesday, due in class the following Wednesday. Plan to spend a lot of time on homework—perhaps as much as six hours a week on

average, perhaps more during some weeks. A typical homework assignment will consist of the following:

- I. Reading:** Typically, you will be given two or three sections of the textbook to read each week. These will usually correspond to the material that will be discussed in the upcoming lectures. 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. Some of the practice problems may show up on exams.
- 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.

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.*

### **Writing:**

In cooperation with Professor John Palmieri (who is teaching Math 402, Algebra) and the College of Arts and Sciences Writing Committee, I will be experimenting with some supplementary writing assignments this quarter. These will probably take the form of problems that you have already solved, whose solutions you will be asked to rewrite in a more careful and readable way, with attention to both mathematical and general writing conventions, appropriateness for your intended audience, and effective exposition. I’ll explain more about this during the first two weeks of class.

### **On-line Discussion Group:**

There is an email-based discussion group for this course, to which everyone registered for the course will be automatically subscribed. I will use it for posting important announcements (such as schedule changes or corrections to the homework), and you are invited to use it to ask questions or discuss ideas related to the course. To read archived messages or to post a message to the list, click the appropriate link on the course web page and follow the instructions you find there.

### **Exams:**

- **Midterm: Wednesday, November 3, in class.**
- **Final: Thursday, Decemeber 16, 8:30-10:20 am.**

### **Grading:**

Your grade will be based on homework problems (30%), supplementary writing assignments (10%), the midterm exam (25%), and the final exam (35%). Individual homework scores will be recorded as percentages, and the lowest score will be dropped before averaging the rest.