

**Lectures:** MWF 10:50–11:50  
Balmer 415

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**Course Web site:** [www.math.washington.edu/~lee/Courses/441-2007](http://www.math.washington.edu/~lee/Courses/441-2007)  
(or from the Math Department home page,  
**Class 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, homotopy, and the fundamental group. This is (most of) Chapters 1–3 and 9 of the textbook.

### 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 310 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:

- I. 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 read through the assigned sections quickly before the relevant lectures, and then reread them carefully after the lectures. (See also “Weekly Reports,” below.)
- II. 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.
- III. 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 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*. If you collaborated with a group, you must also *list the names of everyone you worked with*.

### Writing Portfolio:

Two or three times in the course, certain homework problems will be designated as “portfolio problems.” After receiving initial feedback on these problems, you’ll be required to rewrite them 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 few weeks of class.

### Weekly Reports:

Most weeks, you will be required to submit a short “weekly report” about your responses to what’s happening in the course. (Follow the link on the class web page.) Your report must include at least two paragraphs:

- Briefly describe the most important idea(s) in this week’s reading assignment, in your judgment.
- List one or two questions that have been raised in your mind by the reading, the lectures, or the homework.

Your questions might address 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.” You may respond (respectfully!) to other students’ postings if you wish. In these reports, *there is no such thing as a stupid question!*

Your report may also include any other comments or questions you’d like to raise concerning the course, including the lectures, classwork, 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.

The due date for each reading report will be announced with the homework assignment. The reading reports will count collectively as one homework assignment. (The only thing that will be graded is whether you’ve submitted them; as long as you make a good-faith effort to include the two items mentioned above, the content of your reports won’t affect your grade.) You may skip at most one week and still get full credit.

### Exams:

- **Midterm: approximately halfway through the quarter; date to be announced.**
- **Final: Friday, August 17, 10:50–11:50 am.**

### Grading:

Your grade will be based on homework problems (30%), the midterm exam (25%), the final exam (30%), and the writing portfolio (15%).