

MATH 360: Advanced Calculus

Instructor: Lechao Xiao

Lecture: TTH 10:30AM-12:00PM, DRLB 3C8

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Office Hours: Wednesday 1:30 - 2:30pm and by appointment.

Course assistant: Sea Moon Cho

Office hours: Thursday 2-4pm at DRL 3C13

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Textbook: *Walter Rudin's Principles of Mathematical Analysis, 3rd ed.*

All texts are on reserve in the Math/Physics Library.

Course Website: Course materials/communications will be posted on Canvas:

<https://canvas.upenn.edu/courses/1309264> .

Prerequisites: Math 240 or permission of the instructor.

Course Description: In this course, we will explore the theoretical underpinnings of the classical calculus you have already learned. In contrast to previous courses you have had, we will not focus on computation, but instead on proving the familiar theorems upon which calculus runs. We will encounter a number of new objects, and we will also catch some old objects behaving badly. My plan is to cover roughly chapters 1-7 of the text.

Successful students in this course will, *through extensive practice*, develop the skills necessary to read, understand, and create mathematical proofs.

Grading policy: Your grade for the course will be determined based on the following factors:

- (I) **Homework and Lab:** 40%
- (II) **First and Second Midterms:** 15% and 20% respectively
- (III) **Final:** 25%

Homework: This course will feature weekly homework assignments. Homework will be posted on Canvas roughly one week before the due date. Submissions must be submitted to Sea Moon Cho before 2pm on Friday. Other relevant facts and expectations about homework:

1. Collaboration on homework assignments is encouraged, but any work you turn in must be your own. If you collaborate with other students, please write down their names.
2. Late homework will not be accepted but I will drop two of your lowest homework scores.

3. This textbook is perhaps one of the most commonly-used mathematical textbooks in the world. As such, solution manuals are easy to find online. DO NOT USE THEM. Reading proofs is much easier than writing proofs; solution manuals have nothing to teach about finding solutions (which is a much more important issue than merely knowing solutions).
4. This course is an excellent time to learn to use the mathematical typesetting software known as L^AT_EX. It is free, open-source, available on essentially all computing platforms, and more widely-used than all other options combined. You can download L^AT_EX from: <https://latex-project.org/ftp.html> . You are still free to submit hand-written work, but Sea Moon has permission to assign a score of zero to submissions which are difficult to read.
5. As the writer of a proof, the burden is on you to persuade your reader. Good proof-writers always provide thorough explanations of their reasoning rather than leaving the reader to fill in gaps.

Lab Sections: Attendance and participation in your lab section is mandatory. The lab section will give you an opportunity to ask questions about the current class material. A portion of the lab section will be reserved for you to present your homework solutions after they have been turned in. Everyone will have to present, and everyone should participate by asking questions of the presenter.

Exams: There will be two in-class midterm exams and one final. Please let me know within the first two weeks if you have a conflict with any of these dates. Absence from an exam is a serious problem. Depending on circumstances, you may or may not be allowed to make up a missed midterm exam.

1. First Midterm Exam: Feb 16th, Tuesday, in-class.
2. Second Midterm Exam: Mar 22nd, Tuesday, in-class.
3. Final Exam: TBA.

Students with Disabilities: Please dont hesitate in contacting SDS:
<http://www.vpul.upenn.edu/lrc/sds/>.

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