
Math 451: Advanced Calculus (Elementary Analysis)

TWF 12:00-1:50pm East Hall 4096

Webpage (Canvas): <https://umich.instructure.com/courses/677217>

Instructor:

Scott Schneider
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East Hall 3851

[†]Week 1 Office Hours:

Tuesday, 2pm – 3pm
Thursday, 10 – 11:30am

Recommended Text:

Introduction to Real Analysis, 4th edition
by Robert G. Bartle & Donald R. Sherbert.

Alternative Texts:

Elementary Analysis: The Theory of Calculus,
2nd edition by Kenneth A. Ross.
Understanding Analysis, 2nd edition*
by Stephen Abbott.

Prerequisites:

A thorough understanding of Calculus, experience both reading and writing mathematical proofs, and one of 217, 312, 412, or permission of the instructor.

Course topics and goals:

This course has two complementary goals: (1) a rigorous development of the fundamental ideas of Elementary Analysis, and (2) a further development of students' ability to deal with abstract mathematics and mathematical proofs. The key words here are *rigor* and *proof*; almost all of the material of the course is geared toward understanding and constructing definitions, theorems (propositions, lemmas, etc.), and proofs. **This is considered one of the more difficult among the undergraduate mathematics courses, and students should be prepared to make a strong commitment to the course. In particular, some course that requires proofs should be taken before Math 451.**

Topics covered include: techniques of proofs; cardinality; the real number system and its topology; sequences and series of numbers; limits and continuity of functions; differentiation, integration, and the Fundamental Theorem of Calculus; sequences and series of functions.

Alternatives:

Math 351 covers similar topics with somewhat less rigor, and is taught in an inquiry-based manner.

Grading: Your course work will be weighted according to the following percentages:

Homework & Quizzes: $\frac{1}{3}$ Midterm Exam: $\frac{1}{3}$ Final Exam: $\frac{1}{3}$

[†]These office hours are just for this first week, and will probably change starting next week. Please check the Canvas site for updates.

*Available at <https://link.springer.com/content/pdf/10.1007/978-1-4939-2712-8.pdf>

Website:

There is a Canvas site for the course that all registered students should be able to access. You should immediately verify that you are able to access this site. Announcements and course materials, including homework assignments, will be posted to this site.

Homework:

Weekly homework assignments will be posted to Canvas. **Assignments are due at the beginning of class on the day they are due. No late homework will be accepted.**

Students are expected to write solutions independently. You are allowed (and in fact encouraged) to work together on homework assignments, but **you must write up your solutions independently**. Your solutions may be typed or written by hand, but they should be clear and legible and show all of your work. *Do not* search for solutions to homework problems online; however, if you *do* make use of outside resources in solving homework problems, ***you must cite your sources.***

Quizzes:

Quizzes may be given sporadically as needed with or without warning if they become necessary in order to ensure that students are attending lecture and successfully keeping up with the course material. If any quizzes are given, they will be factored into the homework grade.

Reading:

Students are expected to read the textbook to supplement the material covered in lecture. The sections in the textbook that correspond to a given lecture will generally be indicated in lecture or on Canvas, but reading will not necessarily be “assigned” and it is the student’s responsibility to keep up with reading the appropriate sections of the text. You are encouraged to read whatever supplementary materials you find helpful from the library or the internet, but the official content of the course, including all notation and terminology, is based solely on lecture and the textbook.

Exams:

There will be one midterm exam and one final exam. No calculators, note cards, books, or other outside materials are allowed on any of the exams.

Midterm Exam: Friday, May 31, in class (12 – 1:50pm)

Final Exam: TBD (defaults to Thursday, June 27, 8-10am, unless we find another time)

Make-up exams will be available only to students who have a serious emergency, a strongly compelling personal reason, or grave academic conflict. Grave academic conflict is defined as having two examinations scheduled so that you cannot physically attend both, or having four or more examinations scheduled on the same day. Conflicts will be verified through the undergraduate office.

Students with conflicts should notify the instructor, with appropriate documentation if applicable, as soon as possible and no later than Wednesday, May 15.

Accommodations for students with disabilities:

U-M recognizes disability as an integral part of diversity and is committed to creating an inclusive and equitable educational environment for students with disabilities. Students who are experiencing a disability-related barrier should contact SSD (G664 Haven Hall, 734-763-3000, or ssdoffice@umich.edu). Accommodation requests should then be made via the *Accommodate* system, but please also be sure to inform your instructor directly as soon as possible. Students whose official forms are received through *Accommodate* and who speak with their instructor at least **two weeks** prior to an exam will be guaranteed an opportunity to take the exam with accommodations.
