Math 421: Analysis II

http://www.math.msu.edu/~seal/teaching/sp14/

Spring 2014

MICHIGAN STATE UNIVERSITY

MWF 13:50–14:40   Wells Hall A118

Instructor: David Seal (`seal@math.msu.edu`)

1   Course Overview and Instructional Objectives

Math 421 is the second course in a two-semester sequence designed for undergraduate and graduate students working on scientific, engineering, statistics, and mathematics majors. Analysis is one of the core disciplines in all of Mathematics, and is historically one of the oldest subjects. At its core, analysis is the study of limits, and studying properties of infinite limits, which are fundamental for studying sequences, derivatives, integration, etc. Real analysis is often studied as one of the first courses after the typical Calculus sequence, and oftentimes is used as an introduction to proof writing.

By the end of this course, students should be able to demonstrate the ability to read and write mathematical proofs for multivariable calculus.

1.1   Pre-requisites and Course Materials

This course is a continuation of MTH 320, which covers proof writing for single-variable calculus. Please visit the Registrar's website (https://www.reg.msu.edu) for a formal definition of what's required to enroll in this course. In addition, a vector calculus course (MTH 234 or MTH 254H or LB 220) will be useful given that we will be covering multi-variable calculus.

1.1.1   Required Materials:

- William R. Wade, *An Introduction to Analysis*, 4th edition.

Available on reserve in the library, from the MSU Bookstore, or from a private seller such as Amazon.

1.1.2   Recommended Materials:

- Kolmogorov and Fomin, *Introductory Real Analysis*. (A text with many excellent exercises)

- Rudin, Walter A., *Principles of Mathematical Analysis*. (This text is dense, but very complete).

- Gelbaum and Olmsted, *Counterexamples in Analysis*.

- Kenneth A. Ross, *Elementary Analysis: The Theory of Calculus*. (Review book).

1.2   Course plan

We will cover Chapters 5, 8, 9, 11, and 12 from Wade's book.

2   Office Hours

I live in **Wells Hall C330**. I guarantee my presence there every **Monday** and **Tuesday** from **15:00–16:30**. Meetings outside of this time can be scheduled by appointment with appropriate notice and availability.

3 Evaluation

Final grades will be based on homework (30%), two in class midterms (20% each), and a final exam (30%).

4 Important Dates

Every day is important, some more than others. For a list of the more important dates, many of which are available on the Academic Calendar, consider the following:

Jan 6	Classes begin.
Jan 20	Martin Luther King Day (university open - classes cancelled).
Feb 17	Exam 1.
Feb 26	Drop deadline.
March 3–7	Spring Break.
March 31	Exam 2.
Apr 25	Last day of class.
Apr 28	Final Exam.

The dates for the two midterms are subject to change depending on how much material has been covered. Our final exam is on Monday April 28, from 12:45-14:45, and will not change. *There will be no "make-up" exams.* The final exam schedule for all of your courses can be found on the Registrar's website.

5 Attendance Policy

It is your responsibility to learn the material presented in lecture. If you must miss a lecture for any reason, find notes from a classmate in order to make up the missing material.

5.1 On the use of electronic devices

Electronic devices of any type are not permitted to be used during lecture. This includes, but is not limited to cell phones, computers and music players.

6 Keys to Success

Mathematics is the art of problem solving, and therefore in order to practice this, you have to *solve problems*. In addition, Mathematics is the poetry of the sciences, which means that in order to understand a proof, you have to *read* slowly and carefully, and in almost every case, re-*read* portions of the text multiple times.

- Attend **Lecture**. Take complete notes in class: any supplemental material will be presented in lecture.

- Visit **Office Hours**.

- Read the textbook.

- Do *all* of the assigned **homework**. Start working on the assigned problems as soon as they're assigned.

- Take the **midterm**s!

7 Academic Honesty and Integrity

Don't cheat.[1] Unacceptable behavior will not be tolerated and will be reported. You *do not* want to jeopardize all of the hard work you've put into your degree!

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[1] Visit MSU's policy on "Student's Rights and Responsibilities" or "Graduate Students Rights and Responsibilities" for a full discussion.