

LECTURE: MWF 12 – 12:50 in GAB 317

INSTRUCTOR: William Cherry

OFFICE: GAB 405

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WEB PAGE: <http://wcherry.math.unt.edu/math3610>

OFFICE HOURS: Mondays 2–4, Wednesdays & Fridays 10:30–11:30, and by appointment.

PREREQUISITE(S): Math 3000

TEXT: Steven R. Lay, *Analysis, with an Introduction to Proof*, Fifth Edition, Prentice Hall, 2014. You will also need to purchase access to Weebassign separately at a cost of \$22.95.

GRADES: There will be six components to your final grade, weighted as follows:

Web Homework: 10%

Paper Homework: 10%

Quizzes: 5%

In Class Tests: 45% (15% each)

Final Exam: 30%

Students are also expected to complete a SPOT evaluation of teaching.

IMPORTANT DATES:

FINAL EXAM: Wednesday, December 14, 10:30 – 12:30

IN CLASS TESTS: Friday, September 30, Friday, October 28, and Friday, December 2.

ATTENDANCE: Class attendance will be taken by the daily quizzes. **Students who miss more than 10 of the daily quizzes will have their final course grade lowered by one letter grade. No late homework** will be accepted, and homework assigned for in class presentation must be presented as scheduled. **Students must plan to attend the in-class and final exams.** Makeup exams will be given only in extremely exceptional circumstances, such as serious illness, and must be arranged in advance.

ACADEMIC DISHONESTY: Cheating on exams is a serious breach of academic standards and will be punished severely. UNT's full policy on academic integrity can be found at:

<http://facultysuccess.unt.edu/academic-integrity>.

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at <http://disability.unt.edu>. You may also contact them by phone at 940-565-4323.

## Course Description

This course will examine the theoretical foundations of real analysis, or in other words, we will learn *why* calculus works. The course is also aimed at improving students' proof writing abilities and getting them more comfortable with precise mathematical rigor.

## Learning Objectives

Math 3610 contributes to the following mathematics undergraduate program objectives:

### Mathematical Reasoning

- MR 1. Read, understand, formulate, explain, and apply mathematical statements.
- MR 2. Formulate conjectures by considering examples that move from the specific to the general.
- MR 3. Distinguish between valid and fallacious arguments.
- MR 4. State and apply important results in key mathematical areas, with the ability to provide proof-based arguments of these and related results.
- MR 5. Use a variety of techniques – such as, mathematical induction, proof by contradiction, or direct application of axioms and previously proven theorems – to prove propositions.

### General skills

- GS 1. Solve mathematical problems individually and cooperatively.
- GS 2. Formulate strategies for solving novel analytical – both theoretical and applied – problems.
- GS 3. Communicate, both verbally and in writing, mathematical ideas at a variety of levels from technical to intuitive.

## Where to get help

Math 3610 is NOT one of the courses eligible for math lab tutoring. If you are having trouble, please make full use of your instructor's office hours. If the scheduled office hours are not convenient for you, make an appointment for another time. Working together with other students is also a good way to get help, but just be sure you are also able to work alone when it comes time to take the tests.

## Web Homework

You will turn in some of your homework for this class online via

<http://learn.unt.edu>

Note that you will have to purchase an access key for \$22.95 from WebAssign. The WebAssign access fee is non-refundable, but access is free for the first two weeks of class. If you are not sure you will remain in the class, you should wait to purchase the access code.

## Paper Homework

In this course, “how” you write up your homework is the most important aspect of homework. Often you are told the “answer” in advance, and the goal of the homework problem is to “prove” the answer is correct.

**Homework assignments must be neatly written and must have at most one problem per sheet of paper.**

**NO late homework will be accepted.**

## Daily Quizzes

Most class days will begin or end with a short quiz on recent course material. The quizzes will not be intended to be especially challenging. They are intended to ensure you are keeping up with the reading. Your nine lowest quiz grades will be dropped before computing final grades.

## Tentative Course Outline

The following is intended to provide a rough outline of what will be covered when in class. Depending on how quickly students master certain concepts, more or less time may be devoted to particular topics than indicated here. Students should consult the more detailed schedules that will be distributed weekly via *Blackboard* during the course for more up-to-date information on what will happen each week.

Monday	Wednesday	Friday
8/29: Convergence of Sequences §4.1	8/31: Convergence of Sequences §4.1	9/2: Limit Theorems §4.2
9/5: <b>Labor Day</b> No Class	9/7: Limit Theorems §4.2	9/9: Review: Completeness §3.3
9/12: Monotone Sequences §4.3	9/14: Cauchy Sequences §4.3	9/16: Subsequences §4.4
9/19: $\limsup$ and $\liminf$ §4.4	9/21: Limits of Functions §5.1	9/23: Limits of Functions §5.1
9/26: Review: Topology & Compactness §3.4 & 3.5	9/28: Test Review	9/30: <b>TEST 1</b>
10/3: Continuity §5.2	10/5: Continuity §5.2	10/7: Continuity §5.3
10/10: Continuity §5.3	10/12: Continuity §5.4	10/14: Derivatives §6.1
10/17: Derivatives §6.1	10/19: Derivatives §6.1	10/21: Mean Value Theorem §6.2
10/24: Mean Value Theorem §6.2	10/26: L'Hôpital's Rule §6.3	10/28: <b>TEST 2</b>
10/31: Taylor's Theorem §6.4	11/2: Taylor's Theorem §6.4	11/4: Integrals §7.1
11/7: Integrals §7.1	11/9: Integrals §7.2	11/11: Integrals §7.2
11/14: Fundamental Theorem §7.3	11/16: Series §8.1	11/18: Series §8.2
11/21: Series §8.3	11/23: Convergence §9.1	11/25: <b>Thanksgiving</b> No Class
11/28: Convergence §9.1	11/30: Convergence §9.2	12/2: <b>TEST 3</b>
12/5: Convergence §9.3	12/7: Review	12/9: <b>Reading Day</b> No Class
	12/14: <b>Final Exam</b> 10:30–12:30	

**Homework** (either web, paper, or both) will be due every class day. Most every class we will have a short **quiz**.