REAL ANALYSIS

MATH 3000.002

FALL 2019

Instructor: Dr. J. Iaia
Office: GAB 420
Office Hours: TR 11-1, or by appt.
Time: MW 2:00-3:20
Place: LANG 205
email: iaia@unt.edu
Homework assignments are online in "canvas" - go to learn.unt.edu
Text: S. Lay, *Analysis With an Introduction to Proof, 5th ed.*

GRADING POLICY

Exam 1	20%	*Wednesday Sept.* 18
Exam 2	20%	*Wednesday Oct.* 16
Exam 3	20%	*Wednesday Nov.* 13
Homework	20%	2 *times per week*
Final Exam	20%	*Monday Dec* 9, 1:30-3:30

Exams: Exams **must** be taken on the dates listed above. Exceptions will be considered *only* if one has **written documentation** certifying one's absence.

Homework: Homework will be assigned each class and collected twice a week. Homework is extremely important and students are highly encouraged to spend a lot of time working on the homework problems.

Attendance: Students are required to attend class.

Code of Conduct: Students are expected to be *respectful of others* at all times. This includes keeping talk and other noise to a minimum while a lecture is in progress or an exam is being taken. Any student being disruptive may be dismissed from the class meeting. **Cheating** will **not** be tolerated and anyone found guilty of cheating may receive an F for the semester.

Student Perceptions of Teaching (SPOT) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in feedback from students, as I work to continually improve my teaching. I consider the SPOT to be an important part of your participation in this class.

Students with disabilities: It is the responsibility of students with disabilities to provide the instructor with appropriate documentation from the Dean of Students Office.

Semester grades are determined by averaging the grades on the 3 exams, the final exam, and the homework. Letter grades will be based on this average and will follow this scheme:

A 90- ;B 80-89; C 70-79; D 60-69; F -59

Course Description

Introduction to mathematical proofs through real analysis. Topics include sets, relations, types of proof, continuity and topology of the real line.

Course Objectives

By the end of the semester you should be familiar with mathematical proofs of various types including induction, direct proof, proof by contradiction, existence proofs and uniqueness proofs. This will include cardinality, axioms of the real numbers, open and closed sets, compact sets and continuous functions. You will learn how to prove the Intermediate Value Theorem and the Extreme Value Theorem from calculus.

Course Outline

Meeting 1 - logic, set theory

Meeting 2 - axioms of the real numbers

Meeting 3 - upper bounds, least upper bounds

Meeting 4 - topology of the reals

Meeting 5 - completeness axiom

Meeting 6 - Review

Meeting 7 - Exam 1

Meeting 8 - more on topology of the reals

Meeting 9 - more on the completeness axiom

Meeting 10 - sequences

Meeting 11 - more on sequences

Meeting 12 - more on sequences

Meeting 13 - compact sets

Meeting 14 - Review

Meeting 15 - Exam 2

Meeting 16 - compact sets

Meeting 17 - continue compact sets

Meeting 18 - continue compact sets

Meeting 19 - continue compact sets

Meeting 20 - continuity

Meeting 21 - more on continuity

Meeting 22 - Review

Meeting 23 - Exam 3

Meeting 24 - extreme value theorem

Meeting 25 - more on extreme value theorem

Meeting 26 - intermediate value theorem

Meeting 27 - cardinality

Meeting 28 - induction

Meeting 29 - Review