# Elementary Analysis

## Math 316, CRN 17157

## Fall, 2017

Lecture: MWF, 9:00-9:50, 117 Fenton

Instructor: Yuan Xu, Office: Deady 101, Telephone: 346-5619 e-mail: yuan@uoregon.edu .

Webpage: http://uoregon.edu/~yuan/Teaching/M315.html

Office Hours: MF 1:00-1:50, W 10:00-10:50 or by appointment.

## Textbook

Abbott: Understanding Analysis.

## Prerequisite

Math 253. Math 307 is helpful.

## Course description

You have encountered concepts such as limit, continuity, derivative and integrals in Calculus, but these were mostly treated computationally with little justification or proof. We will study these concepts again but do it right, do it with rigorous mathematical proof. The course serves as an entry into proof based mathematics and prepare students for moer theoretically oriented 400 level courses. We will cover most of the first four chapters of the textbook (and part of the fifth chapter if time permits). We begin from the introduction to the basics (real numbers), which paves the way for a rigorous trenatment of limits of sequences and infinte series. We then discuss basic topology of the real line (open and closed sets, compact sets. ...), which prepares us for a serious study of limit of functions and continuity. A follow-up course, Math 317, will disucss derivatives, limit of functions, and integrals.

Students should be familiar with the mechanics of calculus. What this course will stress are the rigorous foundations of the subject.

## Learning Outcomes

Students must be able to demonstrate an understanding of the nature of mathematical proof by proving various assertions. They should be able to not only calculate but prove their answer for various limits. They should be able to give proofs related to open/closed sets, compactness, etc. They should be able to understand rigorous definition of limit, both sequential and functional. They should be albe to compute and prove the correctness of various converence tests for infinite series, as well as understant and deal with continuity.

# Homework

There will be a homework assignment for each week. You can check the assignments here. Homework will be collected each Wednesday in class on the material of the previous week. Late homework will not be accepted. Your lowest homework score will be dropped. It is very important to keep up with your homework. Start it early, do not wait until the night before you have to turn it in.

# Exams

There will be two midterm exams in class on Friday of week 4 (October 20) and Wednesday of week 8 (Novermber 15). If you must miss an exam due to extraordinary circumstances, you must get my permission and schedule a make-up exam in advance. The final exam is scheduled on 10:15 Tuesday, Decmeber 5 at 117 Fenton.

# Grade

Your course grade will be based on your homework, quizzes, midterm and final.

Homework and Quizzes:  20%
Midterm Exam 1:        20%
Midterm Exam 2:        20%
Final Exam:            40%

# Incomplete

Incomplete are only awarded in the Mathematics Department when two criteria have been satisfied: first, a student must have a passing grade at the time the $I$ is assigned; secondly, some work could not be completed due to extenuating circumstances (illness, auto accident, etc.). Under no circumstances will an $I$ be awarded as a substitute for a $W, D$ or $F/N$ . If you find yourself in trouble, drop the course!

# Disability Service

If you are a student with a documented disability please meet with me soon to discuss your needs. If you have not already requested a notification letter from Disability Services outlining recommended accommodations, please do so soon.

# Academic Misconduct

The University Student Conduct Code (available at http://dos.uoregon.edu/conduct) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act.