Syllabus for Math 317, Spring 2019

Instructor: Dr. Harrison Chapman

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Office hours: *In Weber 17*;

- Mondays 12pm–1pm (w/ Will)
- Wednesdays 10am–11am (w/ Harrison)
- Wednesdays 1pm–2pm (w/ Will)
- Thursdays 2pm–3pm (w/ Harrison)

Meeting times: MWF 11am–11:50am in Engineering E104.

Course Webpage: https://hchapman.github.io/317

Text: Elementary Analysis: The Theory of Calculus[1] available as a free PDF download from on-campus computers.

Course Overview

The goal of this course is to develop the theory of real numbers, limits, continuity, differentiation, and integration. These are the same concepts covered in typical calculus courses, so it's likely you have good intuition for all of these concepts. In this course, however, we will take a microscope to these concepts in order to understand them completely, rather than simply intuitively. We will rigorously define these concepts, carefully prove theorems which we have so far taken for granted, and develop frameworks that help us understand all of this.

We will try to have answers for the following types of questions:

- What are the real numbers?
- What is the limit of an infinite sequence?
- What is the structure of the space of real numbers, and how does this structure help us understand functions?
- What is continuity of functions, and what properties do continuous functions have?
- What are derivatives and integrals, and how are they related?

In order for us to appropriately cover these issues, we will develop a better understanding and greater facility with mathematical language and notation. A major part of this course will be learning to read and write convincing proofs. To achieve this, we will discuss how to make sense of mathematical definitions and statements and how to analyze and construct proofs.

Perhaps the most important thing to take away is that **this is a proofs course intended for those with a serious interest in understanding the "hows" and "whys" of mathematics, not only the "whats."**

Homework

Assignments will be posted to the course webpage and Canvas. Homework will be collected roughly weekly.

Some problems will be graded for completeness; serious attempts will receive full credit. The remainder will be graded for correctness out of 5 points; 1 point for clarity of exposition (writing and organization), and 4 points for content:

[1] http://link.springer.com/book/10.1007/978-1-4614-6271-2

- **4 points:** A completely correct solution
- **3 points:** A solution showing good understanding of the problem, but with minor omissions or mistakes
- **2 points:** A solution using a reasonable strategy, but which is incorrect due to a significant error
- **1 point:** An attempted solution with parts of good ideas
- **0 points:** No serious attempt at a solution

A good way to think about clarity of exposition is with the following question: "Could another student in this class understand my solution?" You are joining a community of scientists for which *communication* is a critical skill.

Homework must be turned in **stapled** with **your name at the top**. Homework should be neat and organized—I can't grade what I can't parse! Now might be a good time to start learning LaTeX (the industry standard!) to typeset your homework, but it is by no means required (If you're interested, you might want to check out Overleaf[2]).

I can't accept late homework (the class moves too quickly), so make sure to turn in whatever you have on the due date to maximize credit.

You are **strongly encouraged to work in solving homework problems with your classmates**, but the work you turn in **must be your own**, and in particular you must write up your final solutions independently.

Exams

We will have two midterm exams and a final. The midterms are both 50 minute in-class exams and are tentatively scheduled for **February 20** and **March 27**. The final exam will be in our regular classroom from **7:30am–9:30am** on **Thursday, May 16**.

Make-up exams will be given only under extraordinary circumstances that are appropriately documented (e.g. by a medical or legal professional). Please let me know as soon as possible if a university-sanctioned event will cause a conflict with one of the exam dates.

Grading

Your final grade for this class will be determined by,

- **Homework and Class Participation:** 30%
- **Midterms:** 20% each
- **Final:** 30%

This breakdown determines a score for you on a 0–100% scale. At the end of the semester, everyone's grades are sorted and I assign cutoffs for 'A', 'B', 'C', 'D,' that are typically lower than the standard 90, 80, 70, 60.

Point scores are recorded in Canvas. Please do make sure that these are correct; I am happy to make corrections as necessary.

Ultimately, I can only grade the course based on what you have actually demonstrated in written work.

Attendance

You are expected to attend and participate in every class, read the assigned material before each class, and to do the weekly homework.

[2] https://www.overleaf.com/

Academic Integrity

As a Colorado State University student, you have agreed to abide by the University Policy on Academic Integrity (see University Policies → Students' Responsibilities → Academic Integrity/Misconduct in the General Catalog[3]) and by the Student Conduct Code. Please see https://tilt.colostate.edu/integrity/ for more on academic integrity at CSU. All academic work must meet the standards described in the Academic Integrity Policy. At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.

Lack of knowledge of the academic honesty policy is not a viable explanation for a violation. Questions related to coursework and the academic honesty policy should be discussed with the instructor.

You are encouraged to *discuss* homework problems with your classmates, but the work you turn in **must be your own**, and in particular you should write up your final solutions independently. Remember that for all work in this course, the CSU honor pledge applies: "I have not given, received, or used any unauthorized assistance."

Additional Help

If you ever find yourself confused in this class, that's okay! There are a number of different resources that I encourage you to explore:

- Our learning assistant and I are happy to discuss anything during office hours.
- Your fellow classmates are a great resource. You are encouraged not just to work together on homework but also to ask each other general questions and study together.
- There are lists of tutors maintained at the math department website[4] and the Colorado State University tutoring webpage[5].

Accommodations

If you think you may need accommodations in this course due to the impact of a disability please meet with me privately during the first week of class. You should also contact the Student Disability Center[6] to confirm your eligibility for appropriate accommodations. Doing so early in the semester will help prevent unnecessary inconvenience.

Disclaimer

The course syllabus is a general plan for the course; deviations announced in class may be necessary.

[3] http://catalog.colostate.edu/general-catalog/
[4] http://www.math.colostate.edu/courses/Tutoring/tutoring.shtml
[5] http://tutoring.colostate.edu/
[6] https://disabilitycenter.colostate.edu