Welcome to Real Analysis! Please read this syllabus carefully, as you will be expected to understand this information. All this information and all future announcements will be available on the course webpage:

https://piazza.com/brandeis/fall2015/math110a/home

Course Learning Goals: The purpose of this course is to study the analysis of the real numbers and real-valued functions, emphasizing careful mathematical thinking and proof writing. As an honors course focused on proof-writing, it is highly recommended that you have taken Math 23b or passed the Math 23b exemption exam. In fact, mathematical thinking and proof writing could be said to be the principal emphasis, with real analysis as the mathematical topics you will practice with. The goal of the first half of the course will be to understand the real numbers, including sequences and series of real number and real-valued functions on the real numbers that you have studied in single-variable calculus. The goal of the second half of the course is to understand metric spaces, the basic abstraction from the real numbers, with some training in point-set topology included. With any extra time, we will discuss metric spaces composed of functions themselves.

Course Structure: Proof-writing will be a major component of the course, and there will be two writing assignments for you to practice, with a day of class spent on peer editing for each. Please see below for more detail. The rest of the course’s work will be weekly problem sets, one midterm exam, and a final exam.

Instructor
Carl Wang Erickson
Goldsmith 206
cwe@brandeis.edu

Course Assistant To be determined.

Time Tuesday and Friday, 11:00AM-12:20PM (Block H)

Room Goldsmith 117

Resources
- The course textbook, *Foundations of Mathematical Analysis*, by Johnsonbaugh and Pfaffenberger, presents the material quite clearly. There will also be a copy on reserve in the library.

- Other helpful books:
  - *Elementary Classical Analysis*, by Marsden and Hoffman. This book will be a reference for some material not in the main course textbook. There will be a copy on reserve in the library.
  - *Principles of Mathematical Analysis*, by Rudin. This book is a classic introduction to real analysis, but I found it too terse for this course. There is a copy on reserve in the library.

Office hours
Office hours are times when I will be sitting in my office, waiting for you to come talk to me. You don’t need to make an appointment to visit me during office hours; just come by! If you can’t make it to my scheduled office hours, you are always welcome to email me, and we can set up another time to meet. Office hours will be posted on the webpage.
**Grading:** Grades will be assigned according to this weighting.

<table>
<thead>
<tr>
<th>Weekly Problem Sets</th>
<th>30%</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>15%</td>
</tr>
<tr>
<td>Writing Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Final</td>
<td>35%</td>
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Rather than setting numerical standards for each letter grade, letter grades will be assigned according to performance on the grading rubric above. This will be to students’ advantage.

**Exams:**

- The midterm exam will cover the course content on real numbers, although proof writing will be the emphasis. The tentative date for the midterm exam is Tuesday, October 20, in class.
- The tentative date and time for the final exam is 9:15AM-12:15PM on Friday, December 11.
- No make-up midterm or final exams will be given, except in the case of a documented medical or other emergency.

**Problem Sets:**

- Problem sets are due at the beginning of the class on the day that they are due, which is expected to be each Friday. Problem sets are generally due weekly, and go on a full or partial pause around the time of the midterm exam and writing assignment.
- No late problem sets are accepted, but the lowest problem set grade will be dropped.
- You may occasionally be asked to submit a question on Piazza for problem set credit, usually a review question before an exam.
- **Collaboration policy:** You are encouraged to work on the problem sets with other students in the class, provided that you list who you worked with on your problem set. However, you may not copy written work from other students or any other source. Your submission should be your own work in your own words.
- It is to your advantage to submit clearly written problem sets with space for comments to be made. The grader is not under obligation to decipher illegible writing. If your writing is very poor, you may want to consider using a word processor such as LaTex.

**Writing Assignments:**

- There will be two writing assignments, one in each half of the course. The goal of the writing assignments will be to explain a mathematical idea clearly enough for one of your fellow students to learn the idea for the first time.
- First, you will write a draft, consulting any sources you like, and putting the ideas and arguments in your own words. Finding the “correct proof” is not meant to be an obstacle, and the TA and instructor will provide you with proofs if necessary. Your challenge is to give a clear explanation!
- Then, we will take a day of class for students to edit each others drafts. The drafts will then be collected and assessed (mostly for completion of the main elements) by the TA.
- After the edited and assessed draft is returned, the final draft, incorporating the edits and suggestions, will be due at the next class.
Academic accommodations and support: Students requiring special academic accommodations or support should present their letters of academic accommodation as early as possible, and no later than the end of September. See http://www.brandeis.edu/acserv/disabilities/undergradstudents.html. Accommodations cannot be granted retroactively, e.g. if you first present an accommodation letter for extra time on an exam at the beginning of the exam, no accommodation can be given.

Scheduling conflicts: It is your responsibility to read this syllabus and take stock of schedule conflicts, for example, those resulting from athletic participation or religious observance. These should be discussed with the instructor in the first two weeks of the semester, and will be handled according to university guidelines (which are available on the website for the Committee for the Support of Teaching).

Laptops and Phones: In most cases, I don’t anticipate the need to use your laptop, tablet, etc. in class. Please speak with me beforehand if you would like to use these devices in class.

Feedback: The Questions/Notes function of Piazza are an excellent way for us to be in conversation about the material of the course. However, it is even better to come to office hours to discuss the course. I also welcome your thoughts about how the course is going, as my goal is to create as effective of a learning conversation between us as possible throughout the course. I will solicit anonymous mid-term feedback from you, as well.

Four-Credit Course: (with three hours of class-time per week)

Success in this 4 credit hour course is based on the expectation that students will spend a minimum of 9 hours of study time per week in preparation for class (readings, papers, discussion sections, preparation for exams, etc.).

Academic integrity: You are expected to follow the university’s policy on academic integrity: http://www.brandeis.edu/studentaffairs/srcs/rr/index.html. In particular, this includes following the homework policy above.

If you have any questions about any of the items above, please ask. I reserve the right to make changes to the syllabus, but I do not expect to.

Tentative Schedule

Caveat: the midterm exam dates and final exam date and time are tentative. In particular, the midterm may be one class day earlier or later. Official midterm dates will be announced in class and on Piazza, and the final exam time will be fixed by the registrar.

- Friday, August 28: Introduction to the course, and the beginning of Unit 1 – The Real Numbers.
- Friday, Sept 11: Writing assignment 1 assigned
- Tuesday Sept 15: No class (holiday)
- Friday Sept 18: Draft of writing assignment 1 due in class; peer editing in class
- Tuesday, Sept 22: Drafts of writing assignment 1 returned in class
- Friday, Sept 25 (Or Oct 2; TBD): Final drafts of writing assignment 1 due in class
- Tuesday, Sept 29: No class (Brandeis Monday)
- Tuesday, Oct 13: In-class midterm review for Unit 1 – The Real Numbers
- Friday, Oct 16: Midterm Exam on Unit 1
- Tuesday, Oct 20: Beginning of Unit 2 – Metric Spaces
- Friday, Nov 20: Writing assignment 2 assigned
- Friday, Nov 27: No class (holiday)
- Tuesday, Dec 1: Draft of writing assignment 2 due in class; peer editing in class
- Friday, Dec 4: Drafts of writing assignment 2 returned in class
- Tuesday, Dec 8: Final drafts of writing assignment 2 due in class. Last day of class. In-class final exam review.
- Friday, Dec 11, 9:15AM-12:15PM: Final Exam