

MATH 112: REAL ANALYSIS

Instructor: Will Boney

Class Location: SC Hall E

Class Time: MWF 1:00-2:00pm

Textbook: Marsden and Hoffman, **Elementary Classical Analysis**, 2nd ed.

Instructor's Office: Science Center 238

Course Website: <http://www.math.harvard.edu/~wboney/112/>
(embedded hyperlinks)

Tuesday	4:00-5:00pm
Wednesday	10:00-11:00am
Friday	12:00-1:00pm

1. COURSE DESCRIPTION

The goal of analysis is to prove the wonderful theorems that you used in calculus. We will briefly cover the basics of proof and cover topics from:

- the topology of \mathbb{R}^n
- continuity and differentiability
- uniform convergence of sequences of function
- Riemann integration

1.1. **Prerequisites:** Multivariable Calculus (Math 19ab or Math 21ab) and familiarity with proofs or concurrent enrollment in Math 101

1.2. **References:** The textbook is Marsden and Hoffman, **Elementary Classical Analysis**, 2nd ed. Additional (and free!) resources are listed on the website.

2. POLICIES

The website goes into more detail on several of these items.

2.1. **Problem Sets.** Every week, we will have homework due on Wednesday in class. Homework will be assigned in class and posted to the course website. At the latest, the assignments will be posted when you turn in the previous ones. Late homework will not be accepted. However, you are given two 'grace' assignments that can be turned in up to one week late.

I encourage you to collaborate with classmates. We will be covering some hard material, and often quickly. Discussing these concepts with other students is one of the best ways to get to the heart of the matter. Math Night is an excellent venue for this. Additionally, I will be putting you into small groups for the first three assignments. It is not required that you do anything with these groups, but I will

give you extra credit on these assignments if you spend at least 1 hour working together.

In order to encourage you to learn from your mistakes (one of the most important skills), you are able to resubmit assignments for up to half of the points back. These resubmissions should be clean rewrites (rather than marking up the initially submitted work) and are due a week after you get the graded assignment back.

I want you to learn how to type your assignments using LaTeX. There is a scaling requirement of how many of your problem set problems must be type each semester detailed on the website, as well as some resources to get you started.

Each week, there will be three types of problems on the problem sets: Core, Niche, and Doc Brown. You are required to do the Core and Doc Brown problems each week, but may also substitute one of the Niche problems for a core problem. You are also required to do a total of 15 Niche problems throughout the semester (so aim for 1 or 2 week).

As for doing the homework, the work that goes into the answer, rather than just the answer, is the most important part. Thus, all problems require justification. Failure to give justification will result in no credit for the problem. Not providing enough justification will also result in lost points.

2.2. Readings. Each week, there will be a reading from Marsden and Hoffman that should be done by the start of that week.

2.3. Exams. There will be three exams: two take-home midterms and an in-class final on Thursday, May 3 9:00am-12:00pm. The first midterm is tentatively scheduled for President's Day weekend.

2.4. Percentage Breakdown.

Homework	50%
Low Midterm	10%
High Midterm	20%
Final	20%

2.5. Accessibility. I'm happy to accommodate any modifications suggested by the Accessible Education Office (AEO). Please be sure to provide me with the introductory letter as soon as possible.

2.6. Academic Integrity. I expect students at all time to follow Harvard's Honor Code and practice academic integrity. I understand that the line between collaboration and plagiarism can be murky on problem sets, but the following is a good (and oft quoted) rule of thumb: working together is fantastic, but you should always be able to separate and right up your solutions individually. If you have any questions, please don't hesitate to ask.