

## Math 321: Introduction to Analysis I

### Fall 2016

‘Analysis’ is kind of a strange name for a subject. The most succinct definition would be that analysis is “calculus done right”. This being real analysis, we will begin by analyzing the reals... by which I mean studying the properties of the field of real numbers, particularly those that distinguish it from the field of rational numbers and that make it the system in which we want to do calculus. After that we will begin a rigorous treatment of limits, continuity, differentiation, and integration.

“But I already know how to differentiate and integrate!” comes the cry. I certainly hope so! But the difference between calculus and “calculus done right” is in that word rigorous. Can you have a function that is continuous everywhere and differentiable nowhere? What do we mean by a sequence of functions limiting to another function? Why on earth do Taylor series “work”? Answering (or should we say analyzing?) thorny questions such as these requires precise definitions, careful arguments, and a fair bit of abstraction, and getting you comfortable with these things (aka “real math”) is one of the main goals of this class.

**Instructor:** Stephen Wang ([sswang@rice.edu](mailto:sswang@rice.edu))

**Classroom and Course Times:** Herman Brown Hall 227, MWF 3-3:50.

**Office and Office Hours:** Herman Brown Hall 410, tentatively Mondays 7-8:30 and Fridays 1-2, or by appointment. Monday office hours are likely to be held in Herman Brown 447. Feel free to just drop by as well, though I can’t promise I’ll always be available.

**Exams:** This course will have two midterms and a final exam. They will likely be take-home exams, dates to be announced.

**Homework:** Homework will be due weekly, usually at the beginning of class on Wednesdays. No late homework will be accepted, barring a documented serious illness or other emergency. However, the lowest-scoring homework assignment will be dropped.

Each student will have up to two opportunities to re-write a homework problem. This must be a problem that a genuine attempt was made on, and must be requested by email within two days of receiving the graded homework. The new grade will be the average of the grade on the rewrite and the grade of the original.

See also the separate handout for homework grading procedures.

**Textbook:** No textbook is required, but if you want to purchase one, Rudin's *Principles of Mathematical Analysis* is a good choice. <sup>1</sup>

**Grades:** Your course grade will be based 20% on each midterm, 25% on the final exam, and 30% on the homework. The remaining 5% will be based on your participation in, and preparation for, class.

**Collaboration Policies:** On the homework, you should work individually on the problems at first. Collaboration and discussion with others is encouraged, but only after you have given the problems a good amount of independent thought. Similarly, I am more than happy to talk with you about the homework, but only provided that you've worked on it before coming to me.

Please note the names of any collaborators on each problem. Furthermore, the final write-up of the problems should be done by yourself, alone. You should understand what you are writing well enough that you need not refer to any writing or notes produced during your collaboration. A good habit to get into is to use colored paper when working with others, and white paper when working alone. Under no circumstances are you to seek help from books (other than Rudin) or internet sites without express permission.

Following these instructions is part of your duty under the Rice Honor Code.

**Disability Support:** Students who think they may need accommodations in this course because of the impact of a disability should give me a written letter from Disability Support Services within the first two weeks of the course.

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<sup>1</sup>Also recommended: *Real Analysis with Real Applications* by Davidson and Donsig (out of print, but you may be able to find used copies).