Honors Analysis I **Math 4181H**

MTWRF 9:10-10:05 at BO (Bolz Hall) 124

Instructor: Alexander (Sasha) Leibman, office: MW406
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office hours: Mon 12-1pm, Thu 10:10-11am,
and by appointment

Textbook: Our official textbook is M. Spivak, *Calculus*, 4th edition. (There is not really much difference between the 4th and the 3rd editions, except that the exercises are numbered differently in some sections.) There is also an *Answer Book for Calculus*, by the same author, with solutions to many exercises. Our goal is to cover the material from Chapters 1–24 of the textbook except Chapters 16, 17, 21 and the appendices after Chapters 4, 12, 19. The book is very good and I highly recommend it; but I don't think it is ideal for a first introduction to real analysis, so I won't follow it to the letter and will post my own (not very friendly) lecture notes.

Topics: This is a pure mathematics course, which means we will focus on proving theorems rather than on calculations. The course is super intensive. We start with the most basic things, – the elementary properties of real numbers, – but then the material will become harder and harder very quickly. The topics we are planned to learn are: real numbers, sequences and their limits, functions and their limits, continuous functions, differentiation, Riemann integration, the fundamental theorem of calculus, elementary functions, Taylor polynomials, infinite series, functional sequences and series, power series and Taylor series.

Lectures and mentoring: There will be no recitations, just lectures five days a week; but during these "lectures" we can discuss problems as well as the theory. Your presence in class is not required; if you prefer to study the material on your own, – read the textbook, any other book on real analysis, or my lecture notes, – that's up to you. We will also have two mentors (two experienced students) who will meet with you twice a week to help you understand the material and do your homework.

Homework: There will be weekly homework (which will be graded by the mentors). You can use the hints at the end of the textbook, the answer book, and the help of mentors, but I recommend that you try to solve the problems by yourself (as this is the only way to study the material and prepare for the exams).

Exams: There will be four in-class midterms and an in-class final exam.

Grading: Your final grade will be calculated as follows: 30% homework + 40% midterms + 30% final.

Course webpage: I'll maintain a course webpage at https://people.math.osu.edu/leibman.1/analysis containing lecture notes, information about current topics, homework, exams, etc. I'll also use the OSU Carmen, which will be linked to the course webpage.