

Math 0450
Honors intro to analysis
Course Information

1 Formalities

Instructor: Stuart Hastings

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class website: www.math.pitt.edu/~sph/0450

office hours:(subject to change)

Monday, 2-4

Tuesday, 2-3

Other times by arrangement. Please confirm any appointment you make with me by email, and a reminder on the day of the appointment would also be helpful. I really hope you will come to office hours, and I will make every effort to find a time that we can meet if you can't make the scheduled times. If you are going to come near the end of an office hour, it would be safest to let me know by email ahead of time, as I have been known to wander off out of boredom or hunger if no one has come in the first 90 minutes!

Text: Introduction to Real Analysis, by Bartle and Sherbert

This is a fairly concise text, without a lot of discussion, for example, on how to prove things. A book with much more "philosophy" and general background is "Understanding Analysis", by Stephen Abbott. I will put a copy of this book on reserve in the math library. Some of you may find it helpful.

Prerequisite. You should have had at least one semester of calculus, and done well in it. If you took it at Pitt and got less than A-, you may want to reconsider whether you should be in this honors class. Remember, we move twice as fast as the regular introduction to analysis. (But we should also have twice as much fun!)

Keep in mind that despite the calculus prerequisite, this course will be very different from your calculus course. One of the chief goals is to learn how to write rigorous mathematical proofs. Little or none of this was done in your calculus course, but here there will be a lot of it. This will prepare you to take more advanced math courses, as well as introducing you to a fascinating topic in its own right.

one hour exam: 25%

final exam	35%
homework	20%
paper	20%

EXAM DATE: Wednesday, Feb. 18

The final will be held at the time scheduled for Math 0450 in the official exam schedule. No calculators will be allowed on exams.

Improvement will be taken into account in deciding the final grade. No grade will be more than one letter grade below your letter grade for the final. The final will be important in deciding borderline cases.

You are encouraged to discuss homework with fellow students, but the writeup should be done by yourself.

Homework will be assigned on Wednesday or Friday of each week. It is due at the beginning of class the following Wednesday. You can ask questions about it on Monday or send me an email question anytime up to Tuesday night. No late homework will be accepted, as I will go over some of the solutions immediately after they are handed in. To compensate for this, your lowest assignment grade (zero if you miss one) will be discarded in figuring your grade on the homework.

1.1 Recitations

You have two recitations per week. These are a very important part of the course, where you can discuss details at length, ask questions, see proofs presented on the board, and perhaps, if you wish, try presenting some of your own proofs to the class. The TA has been instructed not to give hints on the homework problems during the Tuesday recitation. Instead, if you ask about a particular problem, she will try to find a similar problem in the text, and work that one out for you. In the Thursday recitation she may give solutions to some of the problems which were due the day before.

2 Writing course

This is a “W”, or “writing” course. For us, this means writing mathematical proofs. You will be asked to do a lot of this in the homework, but each problem is fairly short. Also, as in all W courses, you will be asked to do a “paper”. This will involve choosing a topic from a list I will send around, consulting web or library sources about this topic, and writing a paper (5 pgs or more) which includes at least one longer proof. As required by the rules for writing courses, I will read it and make comments, and give it back to you for revisions. Below is list of some factors that are important when writing out a proof.

1. Use complete English sentences, which begin with a capital letter, end with a period, and use correct pronunciation. Here are some examples:

- Hence, $a < b$.
- From equation (1) and a familiar trig identity, we conclude that

$$x^2 + y^2 = 1.$$

- A further calculation shows that

$$u(t) \leq c,$$

where c is the speed of light.

2. Be sure all quantities used in an equation are defined, either before or during the current sentence.
3. Avoid run-on sentences, a common fault in student proofs. One way to check this is to read your proof out loud. It should make sense, and not require great effort in logic to follow. The entire proof may be complicated, but each individual sentence should be relatively simple in structure.

I will probably be adding to this list during the course.

3 Syllabus

I plan to cover the material in the text through all, or most, of chapter 8. Your paper will probably be about a topic which is not in the text.