Math 301 – Real Analysis – Course Policies

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Office Hours:	Posted on webpage **And by appointment** (Really!)
Text:	*Understanding Analysis* by Stephen Abbott

In this course we will delve into the wonders of the real line and explore some of the surprising ways that our intuition can lead us astray when considering properties of the real numbers and continuous and differentiable functions. We will focus not only on the amazing, rich content of analysis but also on understanding the need for rigorous, precise mathematical exposition.

I am very excited about this semester – I think it's going to be a lot of fun.

Goals for a 300-level Mathematics Course

Real Analysis plays an important role in your mathematical development and in the math curriculum at Wheaton. There are several primary objectives of any upper-level math course at Wheaton. In particular, by the end of this semester you should:

- Be able to write a concise, precise proof, including recognizing when an argument is complete or when further justification is needed.
- Be able to formulate a rigorous mathematical statement precisely.
- Be willing to approach a problem even if you do not know whether or not it will be successful. If it doesn't work out, try another!
- Appreciate the necessity of rigorous mathematical arguments.
- Continue in your development from being a *consumer* of mathematics to being a *producer* of mathematics.

Goals Specific to Real Analysis

Much of the mathematical content we will study this semester can be motivated by:

"How do we take intuitive ideas that we understand very well and
make them more precise and rigorous?"

Specifically, you should gain a deeper understanding of:

- The properties that distinguish the integers, the rational numbers, and the real numbers.
- What it means for two sets to have the same cardinality, or size, and how infinite sets may have different cardinalities.
- The rigorous definition of a limit and how to apply it.
- The difficulty of forming precise definitions of continuity and differentiability based on our intuitive understanding of these concepts.
- The strong connections between differentiability and integrability.

Evaluation

Your final grade will be determined by

Homework	40%
Two Exams	30%
Final Takehome Exam	20%
Course Glossary & Book Review	10%

The Honor Code

We operate under the Wheaton Honor Code for all of your academic work at Wheaton. This carries certain freedoms and responsibilities for both you as a student and me as a professor. I take this quite seriously.

Before class on Friday, September 2, you should read and understand the Wheaton Honor Code at *http://wheatoncollege.edu/about/honor-code/* including all of the subsections:

Community Standards
Affirming Diversity
Plagiarism
Technology Acceptable Use
Conduct Off Campus
Judicial Procedures

Most likely, no Honor Code issues will arise this semester. If you are uncertain about whether a particular situation falls under the Honor Code, then please consult with me. However, if an Honor Code issue does come up, I will assume that you are prepared for the full consequences after having acknowledged that you have read and understood the policies and procedures.

Remember that you should write out, and sign, the following statement on all course work:

"I have abided by the Wheaton College Honor Code in this work."

Exams

Each of the two exams will be entirely takehome, and the Final Exam will be comprehensive and also will be entirely takehome. You should not expect the exam questions to be identical to the assigned homework problems. Instead the exam questions will ask you to make connections and pull together ideas from several different topics.

You will have approximately one week to work on each exam. I will have a substantial number of office hours while you are working on the exams, but you may not communicate with *anyone* else during this time about the exam or the class! Any unauthorized communication will be viewed as a violation of the Honor Code.

Homework

A major emphasis in this course is that you learn how to write rigorous, precise, and concise mathematical proofs. This can be a challenging endeavor, but the process will not only aid your mathematical development but can also improve your clarity of thought in other disciplines as well. With this emphasis, your homework should be precise, comprehensible, completely justified, and written in complete sentences.

Each homework assignment will have two categories of problems:

- **Focus problems:** These will consist of three or four of the more difficult problems that I will grade carefully.
- **Basic problems:** These will be the more "routine" problems that are still very important in understanding the course material. Although I do not intend to grade the Basic problems, I reserve the right to include them in your course grade if I feel that you are not making a serious effort.

I encourage you to discuss the homework assignments with other students, but each person must turn in a separate write-up that represents his/her own work. In addition, you must indicate on your assignment the other student(s) with whom you worked!

Here are a few guidelines for the presentation of your homework. If you do not follow these, I reserve the right to deduct points or return your homework ungraded!

- Your writing must be clear and legible.
- If you write in pen, there should be no scratch-outs.
- Do not turn in paper torn from a spiral notebook with ragged edges.
- Clearly label each problem.
- Put the Focus problems at the beginning of your assignment.

Each Focus problem will be graded on a scale of 0–7 with the following guidelines:

7: Exceptional. All areas perfect.

5: Essentially complete. Needs minor improvements.

3: Needs substantial improvements

1: Needs improvement in all areas

The homework assignments are due in my office by 1:45 on Fridays.
I will not accept any homework after this time with one exception: I will allow you to turn in *one* homework assignment late during the semester. You do not need to give me any justification, but you must inform me in writing (email is preferred) before the homework is due that you intend to take advantage of your one late assignment. This late assignment is due at the beginning of class on the following Monday.

Course Glossary

One of the challenges in a course like Real Analysis is keeping track of the terminology and the theorems over the course of the semester. During this semester, the class will build an online Glossary through Wheaton onCourse that contains the definitions, propositions, and theorems that are included in the text. The basic structure is fairly simple:

- Two students will be assigned the task of entering the information for each day of class. You will need to consult with your partner to make sure that you agree that your submissions are accurate and complete. **You should complete your submission by 5:00 pm on the day before class.**
- If you were not one of the students assigned to enter the information, then you should read the assigned section(s) from the text and check the entries in the Glossary before class.
- I will display the definitions and theorems during class as a reference for our class discussions.

Book Review

The motivation for this assignment is that there are a lot of cool, interesting books out there about mathematics, and as part of your general education, you should develop the habit of reading them. This is an opportunity to learn about a mathematician or area of mathematics that you might not be exposed to otherwise.

I'll give you a handout in a few weeks that describes the project in detail.

Class Attendance

Although class attendance is not a specified percentage of your grade, I will keep a class roll to help me determine borderline grades at the end of the semester. If you do miss class, you are responsible for the material that was covered.

Getting Help

Please come see me during my office hours! If you have a conflict and cannot make my office hours, please call or email me and we can set up an appointment for another time.