Syllabus for Math 3333
Introduction to Real Analysis

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Instructor Web Site: www.math.uh.edu/∼tomforde
Course Web Site: www.math.uh.edu/∼tomforde/Math3333.html

Office Hours: MW 2:30PM – 3:30PM *(or by appointment)*

Note About Office Hours: I encourage you to come by my office if you have any questions, need help with homework problems, or would just like to talk about the material. If for some reason you are unable to make it to Office Hours, you are welcome to email me to set up an appointment for another time.

Meeting Times: Lecture: MW 1:00 – 2:30PM in 516 SR.

Prerequisites: Math 2433 (Calculus III).

Course Description: This class serves as an introduction to Real Analysis. Topics include: properties of the real number system, properties of continuous functions, and sequences of functions. In this course we will look more deeply at the concepts you learned in your calculus classes. In prior courses you have most likely learned a variety of facts and had experience computing limits, derivatives, and integrals to solve specific problems. In this class we will discuss how to prove many of the facts you have used in the past and look more deeply at what makes the computations work. We will also examine the precise definitions of notions (e.g. limits, continuity, differentiability) that in the past you may have had only an intuitive understanding of. This will give you a deeper understanding of the concepts, and make your reasoning more rigorous.

A major component of this course will be exposing you to proofs for the first time. The goal is for you to learn how to read, write, and understand proofs. Throughout the course there will be great emphasis placed on communication and writing. It is not enough to simply know to solve a problem — you are also responsible for explaining that solution and communicating it in written form. When writing proofs there are three things that you should be aware of:

(1) Writing mathematics requires full English sentences, with the understanding that certain mathematical symbols can replace the words they represent (so that the phrase "x is a member of the set of real numbers and x^2 is not equal to 4" may be written as "$x \in \mathbb{R}$ and $x^2 \neq 4$").

(2) When you write up a proof I will grade it for the way it is written as well as the ideas that are in it. Consequently, you should follow the rules of English usage, such as using proper grammar and punctuation.

(3) Your proofs will be graded on the degree to which they are: Correct, Clear, and Concise

Text: The textbook used for this course is *Elementary Analysis (8^{th} Ed.)*, by Kenneth A. Ross.

Course Web Page: The course web page is located at

www.math.uh.edu/∼tomforde/Math3333.html

On the course web page you will find the homework as it is assigned, as well as a copy of this syllabus, exam dates, and announcements as they are made.

Grading: The final grade for the class will be determined as follows:

Class Participation:	5%
Homework:	25%
Exam 1:	20%
Exam 2:	20%
Final Exam:	30%

Attendance: It is vital to attend every lecture and take careful notes. Some lecture material does not appear in the textbook. Questions on the exams will be drawn from homework, reading, and lectures. I also encourage you to ask questions and participate in class. As stated above, 5% of your final grade will be based on class participation.

Reading: Reading assignments will be given weekly on the course web page. Completing the reading assignments is just as critical as doing the written homework.

Homework: A list of homework problems will be given every week on the course web page. Each week I will give you a list of homework problems that will give you additional practice but do not have to be turned in, as well as a list of homework problems that will be turned in and graded.

Each homework assignment that is turned in will be worth 20 points, consisting of the following two pieces

(1) A proof worth 10 points that will be carefully graded with detailed feedback using the checklist described in class (a copy is attached at the end of this syllabus).

(2) Some shorter problems, which may or may not involve proofs, that will be worth 10 points total and graded with less feedback.

With regards to the homework that is turned in, the following policies will be in effect:

- Homework without a name will not be graded.
- If your homework is more than one page it should be stapled in the upper left-hand corner.
- Homework is due at the beginning of class on Mondays. Late homework will not be accepted.
- Homework that is not picked up within two weeks of the date it is handed back will be discarded.
- Your lowest homework score throughout the term will be dropped when calculating your final grade.

Doing the homework is esssential. Remember . . .

"You learn mathematics by doing mathematics."

Exams: There will be three exams: two midterm exams during the semester and one final exam at the end of the semester. Each exam will be a take-home exam.

Exam 1: Due Wed., Feb. 21 at the beginning of class.
Exam 2: Due Wed., Apr. 4 at the beginning of class.
Final: Due Mon., May 7 at 2PM.

Each take-home exam will be given to you approximately one week before it is due, and you will turn it in at the beginning of class. It is University of Houston policy that final exams are not subject to rescheduling, so please do not make plans to leave the Houston area until after the final exam time.

Makeup Policy: In general, not turning in a Take-Home Exam when it is due results in a score of zero, and you will not be allowed to make up the work. Exceptions may be made in the case of extreme circumstances, such as a documented, serious illness. In the event that you cannot be present on the day an exam is due you need to speak to me *in advance*, and make every attempt to turn in the the exam *before* (and not after) the rest of the class.

Policy on Incompletes: Incompletes are given only in very unusual circumstances, and never just to prevent a bad grade or provide the student with more time to prepare for an exam.

Honor Principal: University of Houston students are expected to adhere to the Academic Honesty Policy (see the Student Handbook for more details). In this course this shall mean the following: Homework can and should be worked on and discussed with others. However, the write-up should be independent and in your own words. In addition, exams shall be worked on independently. You are allowed to use your textbook, homework, and class notes for take-home exams, but you are not allowed to use outside books or talk with anyone except the instructor. In addition, if you are aware of anyone who is cheating or receiving unfair, outside assistance, you are honor bound to inform the instructor of what is occurring.

Anyone caught cheating will receive a failing grade in the course, and be turned over to the department chair and dean for further disciplinary action.

Special Needs: Any student with a disability or chronic health problem for whom special accommodations would be helpful is encouraged to discuss with the instructor the types of assistance that might be offered.

Announcement: I will be outside the continental U.S. from Jan. 26 through Feb. 2. Class will be held as usual and there will be a guest lecturer. I will be out of email contact while I am gone and Office Hours will be cancelled.

Proof Checklist

Format (1 Point)	Is the result written in "Claim: . . . Proof: . . . □" format? Is it clear what is to be proven? Are all hypotheses and assumptions stated? Does the proof have a clear beginning?	
English (2 Points)	Does the proof contain complete sentences? Are correct spelling, grammar, and punctuation used? Is it clear what all pronouns refer to? Do the sentences flow and contain proper transitions?	
Clarity (2 Points)	Are all of the variables defined and described adequately? Is the mathematical notation used correctly? Are symbols used properly when substituting for words? Are the arguments and logic easy to understand?	
Correctness (4 Points)	Is the mathematics correct? Does the argument solve the problem or prove the claim? Are theorems and prior results used correctly and referenced? Are all words used correctly and precisely?	
Organization (1 Point)	Is the proof written as simply and directly as possible? Are there any unnecessary sentences that could be removed? Is the explanation well organized? Are long arguments separated into lemmas?	