Math 310 B & C **Introduction to Mathematical Reasoning** **Autumn 2005**

Syllabus

ADMINISTRATIVE INFORMATION

Instructor: John M. Lee
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Office Hours: Mondays & Tuesdays 2:30–3:20
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Class Web Site: *www.math.washington.edu/~lee/Courses/310-2005*, or from the Math Dept. home page, choose *Selected Class Web Pages*.

Class Meetings: Math 310B: MWF 1:30–2:20, LOW 101
Math 310C: MWF 12:30–1:20, MEB 251

Required Text: *Reading, Writing, and Proving: A Closer Look at Mathematics*, by Ulrich Daepp and Pamela Gorkin.

Exams: Midterm: Wednesday, November 2, in class.
Final (310B): Monday, Dec 12, 2:30–4:20, LOW 101
Final (310C): Thursday, Dec 15, 8:30–10:20, MEB 251

Prerequisite: A grade of 2.0 or higher in one of the following:
MATH 125, MATH 145, or MATH 135.

COURSE CONTENT

Here's the official catalog description: *Mathematical arguments and the writing of proofs in an elementary setting. Elementary set theory, elementary examples of functions and operations on functions, the principle of induction, counting, elementary number theory, elementary combinatorics, recurrence relations.*

This course will probably be unlike any other math course you've taken. Most of your courses so far have concentrated on learning algorithms for solving particular types of problems; most courses after this one will focus instead on logical reasoning, conceptual understanding, and proofs. This course is supposed to be the "bridge" between the two ways of approaching mathematics. It will give you tools for thinking mathematically, reading critically and with understanding, solving conceptual problems, and writing mathematical proofs. You will use these tools in every math course you take from now on (and potentially in many other courses as well!).

REGISTRATION INFORMATION

All three sections of Math 310 has been filled for several weeks. It is likely that a few spaces will open up during the first two weeks of classes, as people decide to drop the course. If you are not currently enrolled, the only way to get in is by registering on line when space becomes available; no entry codes will be given.

REQUIREMENTS

Reading

Each week, you'll be assigned several sections in the textbook to read. There will also be a few handouts to read during the course of the quarter. The textbook is written in a pleasant and easy-to-read style, so it shouldn't be too demanding to actually sit down and read it—please do so! Besides, you'll need to read it for your response reports (see below).

Response Reports

Each week, you're required to submit a "response report," one or two paragraphs long, to the EPost discussion group for your section. (Follow the links on the class web page.) Your report can address the reading, the lectures, the homework assignments, or all three, but whatever you address, you should try to focus on one or more ideas that caused you to feel *stuck*. For difficult new mathematical concepts, it often happens that the most significant learning happens when you get stuck and don't know what to do next. The feeling of being stuck can be disconcerting, but you'll be much more successful in mathematics if you can learn to quell your frustration and use the experience as an opportunity to deepen your understanding. Writing about the ideas that got you stuck, and reading other students' responses, should help you to do this.

In your reports, you might consider addressing such issues as the hardest or most novel concept of the week, something you'd like to learn more about, why something is defined the way it is, or how a given concept might be of use. You may also respond (respectfully!) to other students' postings if you wish. In these response reports, *there is no such thing as a stupid qustion!*

Your weekly response report must be submitted to EPost no later than midnight Sunday each week. Part of your grade will be based on whether you've submitted all of the required reports. (The only thing that will be graded is whether you've submitted them; as long as you make a good-faith effort to address the issues mentioned above, the content of your reports won't affect your grade.) You may skip at most two weeks to get full credit.

Homework Assignments

Each week, there will be a two-part written homework assignment to turn in for a grade. Assignments will be posted on the web each Wednesday, due in class the following Wednesday. These assignments are the heart of the course. Some of them might take time to think about, so please don't put them off until the last minute. Late homework will not be accepted except in extraordinary circumstances and with advance permission.

I encourage you to work on the homework problems in groups. But when writing up solutions to hand in, you must write your own solutions in your own words, except on assignments that are specifically designated as group writing assignments. Please list the names of any people with whom you collaborated on any assignment.

The two parts of each assignment are as follows. Each week, you should hand in two separate assignments, with each part stapled together and clearly labeled with your name, your student number, the assignment number, and "Short Answers" or "Long Answers" as appropriate.

1. **Short Answers:** These will usually be problems from the textbook, sometimes supplemented by additional problems. Please write your answers *neatly*, in *numerical order*, with *space between problems*, with *any relevant work shown*, with *answers clearly identifiable*, and with *pages staped together. ("Short answer" does not mean "cryptic"!)* Don't forget to put your name and student number on the front.

2. **Long Answers:** Each week, there will be one or more problems (usually proofs) that you

will be asked to write up in detail, with due attention to the conventions of mathematical writing. All of the expectations about writing up the Short Answer assignments (numerical order, etc.) apply also to the Long Answer assignments, but in addition, you're expected to write in paragraphs composed of complete sentences, with the problem clearly stated and with a clear explanation of what you're doing and why. I'll give you more information about writing long answers soon. Because typesetting mathematical formulas by computer can be challenging, I don't care whether these are handwritten or typed, as long as they are *neat and legible*. Unless mathematical proofs spring fully and impeccably realized from your pen, your first draft is not acceptable. If you'd like to learn how to typeset sophisticated mathematics, I'd encourage you to learn about LaTeX. There will be links to some LaTeX resources the class web page.

Writing Portfolios

Early in the quarter, each of you will be assigned (based on your preferences, if you wish to express them) to a "writing group" of four or five students. Some of the Long Answer problems (probably one problem every week or so) will be designated as "Portfolio Problems" after they've been graded and returned to you. Then you'll work together with your writing group to revise and rewrite the solutions to the portfolio problems, coming up with a single final version for the group. At the end of the quarter, each group will turn in a completed writing portfolio for a grade. There will be some class time available to work with your writing group, but you'll also have to arrange time outside of class to work together (either electronically or in person).

Projects

At the end of the quarter, each writing group will do an independent project, similar in scope to one of the longer "Long Answer" homework assignments, but based on your own reading instead of on material covered in class. The final project will become part of your group's writing portfolio. I'll give out more information about these projects later in the quarter.

EXAMS

For each exam (midterm and final), you'll be allowed some notes; details to be announced.

You may not take exams other than at the scheduled times except for serious illness, religious reasons, or other extraordinary circumstances of grave personal import. To arrange an alternative exam time for reasons other than medical emergency, give Professor Lee a written request, accompanied by appropriate written documentation, no later than two weeks before the exam. Approval of such requests is by no means automatic. If you are unable to take an exam for medical reasons, you must contact Professor Lee before the exam or as soon as medically possible thereafter, and you will need to provide a written medical excuse.

GRADES

Your grade will be based on a weighted average of the following scores.

30%	Homework assignments
5%	Response reports
20%	Midterm exam
20%	Writing portfolio
25%	Final exam