Math 444/445 **Geometry for Teachers** **Summer 2008**

Handout #1: SYLLABUS

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Classes: MWF 10:50–1:00, MEB 246

Web site: *www.math.washington.edu/~lee/Courses/444-5-2008*
From the Math Dept. home page, **Class Web Pages → Math 444 & 445A**

Textbooks: *These are available for purchase (new and used) in the U Bookstore, and are on reserve in the Math Research Library (PDL C-306).*
Gerard A. Venema, *The Foundations of Geometry*, Pearson Prentice Hall, 2005
Dana Densmore (ed.), *Euclid's Elements*, Green Lion Press, 2002
Harold Jacobs, *Geometry: Seeing, Doing, Understanding*, W. H. Freeman, 2003

Prerequisites: Grades of 2.0 or better in Math 126, 308, and 310.

Exams: Math 444 Final: Wednesday, July 23.
Math 445 Final: Friday, August 22.

GENERAL DESCRIPTION

This course is designed for people who expect to be teaching geometry at the high school or middle school level, but it can be useful for many others as well.

Geometry is the first branch of mathematics that humans managed to systematize and place on a rigorous footing, and it has served as a model for rigorous logical thought for more than two millennia, as well as being one of the most practically useful branches of mathematics.

In this course, my goal is to help you acquire a deep understanding and appreciation for geometry, and learn to think about it the way mathematicians do. I *won't* be teaching you "how to teach geometry"; that's something you'll have to learn from education courses and hands-on practice. But in order to be a successful K–12 math teacher, you need to have what the experts call "profound understanding of elementary mathematics." In this course, most of the mathematical topics we discuss will be rather elementary, but our approach will be far from elementary.

The main topics in the course will be the following: critical reading of Euclid; introduction to and comparison of different axiom systems for geometry; in-depth study of the most important results of Euclidean geometry and their proofs; comparison of intuitive, graphical, verbal, and axiomatic ways of understanding geometry; critical reading of a high-school geometry text; a look at the history and central results of non-Euclidean geometries.

REQUIREMENTS

Because the summer version of this course compresses twenty weeks of work into eight and a half weeks, things will move along rapidly. There will be a homework assignment after virtually every class, to be handed in at the next class. You should be prepared to spend up to four hours on the homework for each class, sometimes more.

Reading

After most classes, you'll be given a reading assignment from one or more of the required books. These will usually correspond to the material that will be discussed in the next class or two. I will expect you to read through the assignment quickly before the relevant classes, and then to reread it carefully after it is covered in class. There will also be a few handouts to read during the quarter. All reading assignments are required.

Classes

Although I won't keep a record of daily attendance, I expect you to attend all classes. Sometimes I will introduce new concepts and techniques that are not covered in either the textbooks or the handouts. Sometimes there

will be unannounced quizzes. If you will miss a class for a religious holiday, let me know in advance and I'll arrange to get you a summary of lecture and any materials that you missed. If you must miss a class for some other unavoidable reason, it's your responsibility to find out what happened, and get your homework to me by class time.

Geometry Blog

I've set up a Math 444/5 Geometry Blog, accessible from the class website. I will try to post on it after every class. Part of the requirement for this course is to reply to each of my blog entries before the next class. Your posts won't be graded for quality, but for full credit you must post at least twice a week, and each of your posts must address at least two of the following:

- What do you think are the most important ideas in the latest reading, and why?
- Why do you think the latest definitions, theorems, or proofs are structured the way they are? Can you think of other ways that might have been better?
- What questions have been raised in your mind by the latest reading, lecture, and/or homework?
- Respond to questions or comments in my own most recent post, or in those of other students.

If you wish to write about specific homework problems, please confine your comments to general questions and suggestions about how to get started.

Homework Assignments

After each class, there will be a written homework assignment to be completed and brought to the next class. I'll usually announce the assignment in class, and then confirm it on the Geometry Blog. Late homework will not be accepted except in extraordinary circumstances and with advance permission.

I encourage you to work on the homework problems together with other students (it's usually the best and fastest way to learn). However, when you write up your solutions to hand in, *you must write your own solutions in your own words.* More details about how to write up homework assignments will be given in an upcoming handout.

Quizzes

At sporadic intervals throughout the quarter, I will give short quizzes in class. These will often be simply homework problems that you've already done, which I will ask you to answer in a timed setting without looking at your notes. Other times, they will be short questions that test how well you've absorbed the concepts that have been discussed recently. Not all quizzes will be announced in advance. Quizzes cannot be made up, but your lowest quiz score will be dropped, and any quiz missed for religious or medical reasons (with a doctor's note) will not count against you.

Writing Portfolios

Some of your written homework problems will be designated as "Portfolio Problems," usually after they've been graded and returned to you. You'll revise and rewrite the solutions to the portfolio problems, often with feedback from other members of the class and/or me. After a couple of rounds of revision, you'll coming up with a final version to keep in your portfolio. At the end of the quarter, you'll turn in a completed writing portfolio for a grade. This course carries "W" (writing-intensive) credit.

GRADES

Your grade for each half of the course will be based on a weighted average of the following scores.

25%	Homework assignments
25%	Quizzes
5%	Blog posts
15%	Writing portfolio
30%	Final exam

Individual homework and quiz scores will be recorded as percentages, and the lowest homework score and lowest quiz score will be dropped before averaging the rest.