

Math 305, Modern Geometry, Spring 2012
MWF 1:00-1:50pm SC 006

Instructor: Amy DeCelles

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Office hours: M 2-3pm, W 4-5pm, F 2-3pm, and by appointment

Course Content: Euclidean geometry: compass and straightedge constructions, axioms; analytic geometry: coordinates, vectors, transformations, geometry over fields; projective geometry: perspective drawing, axioms; transformation groups: isometries, non-Euclidean geometry; axiom systems and finite geometries; fractal geometry

Course Materials and Resources:

- Main source: *The Four Pillars of Geometry*, by John Stillwell
- Supplementary sources: *A Course in Modern Geometries*, by Judith Cederberg, and *Geometry: Euclid and Beyond*, by Robin Hartshorne. These sources are on reserve at the library.
- Course webpage: <http://people.goshen.edu/~adecelles/math305.html>. Notes and other information will be posted there.

Course structure: We will be working through Stillwell's *Four Pillars of Geometry*. I will assign reading and exercises for you to do to prepare for class. During class we will discuss the reading and the exercises, and occasionally we will have a quiz on the reading. In addition, we will have two research projects: a short historical project, to be done individually, and a more extended exploration project, to be done in groups.

Homework and Quizzes: Reading and exercises will be assigned as preparatory work for each class. Exercises will be graded on a scale of 0-4. You will have opportunities for resubmission, provided that your first attempt was submitted on time. Presentation counts: to receive full credit, your work must be neat, organized, and complete. Quizzes on the assigned reading will evaluate your reading comprehension and reflection.

Historical paper: Each student will research a mathematician who has made a significant contribution to geometry and write a short paper describing their contribution.

Group Project: In addition to the topics in Stillwell's book, we will divide into three groups to explore the following topics: (1) axiomatic systems and finite geometries, (2) geometry over fields, and (3) fractal geometry. Each group will present the results of their investigation to the whole class in a twenty minute presentation during our final exam period and write a paper to be submitted at the time of the presentation.

Final Course Grade: The final grade for this course will be determined as follows:

- Homework exercises (50%): due each class
- Quizzes (10%): occasional quizzes on the reading
- Historical paper (10%): due Feb 8
- Project presentation (10%): Tues Apr 17, 1-3pm
- Project paper (20%): Tues Apr 17, 1pm

Disability Accommodations: Goshen College wants to help all students be as academically successful as possible. If you have a disability and require accommodations, please contact Lois Martin, the Director of the Academic Resource & Writing Center early in the semester so that your learning needs may be appropriately met. In order to receive accommodations, documentation concerning your disability must be on file with the Academic Resource & Writing Center, Good Library 113, x7576, lmartin@goshen.edu. All information will be held in the strictest confidence. The Academic Resource and Writing Center offers tutoring and writing assistance for all students. For further information please see www.goshen.edu/studentlife/arwc/.