

MATH 402 Non-Euclidean Geometry

Fall 2018

Instructor: Emily Cliff

Lectures: F13 MWF 2pm 243 Altgeld Hall

Availability:

- *Email:* ecliff AT illinois.edu

- *Office Hours:* Mon. 3:00–3:50pm, Thurs. 12:00–12:50pm, or by appt. (165 Altgeld Hall)

Official course description: Historical development of geometry; includes tacit assumptions made by Euclid; the discovery of non-Euclidean geometries; geometry as a mathematical structure; and an axiomatic development of plane geometry.

Prerequisites: MATH 241; MATH 347 or MATH 348, or equivalent; or consent of instructor.

Textbook: Geometry (with Geometry Explorer), Michael Hvidsten

This book is out of print, but the author has generously made an electronic copy available for personal use. It can be found at <http://new.math.uiuc.edu/public402/Hvidsten.pdf>.

Software: Geometry Explorer.

Download from <http://homepages.gac.edu/~hvidsten/gex/download-3.0.html>.

Grading scheme:

Project reports	10%
Homework	15%
Midterm exams	3 x 15%
Final exam	30%

Understanding lectures: In addition to attending lectures and taking notes, there are several steps I expect you to take to help you to process the information:

- **Reading assignments** for each lecture will be announced before class. You should look over the relevant sections of the textbook so that you know what to expect in class. This will make a big difference in how much you follow.
- **Participation:** Everyone is expected to be an active class participant. Speak up in class if you are confused—likely other students are too.
- Math is hard. You will not understand everything that is said in lecture as you take notes. However, you should make time to **go over your notes after class**, ideally before the next lecture and definitely before attempting the homework. If you are still confused, ask me for help.
- I will post **review sheets** that list the important topics for you to study. Don't wait until right before an exam to start studying—the more familiar you are with the material we've covered so far, the easier it will be for you to understand the new material. Review sheets will also contain extra (optional) practice questions.

Practicing your new skills: There are three kinds of assignments you will be given. In addition to helping you to practice, these assignments give feedback to both the instructor and the student, to see how well you are understanding the material. Although it is tempting for students to try to get better grades on their homework by copying answers that they don't fully understand, or by giving vague answers to cover up their confusion, this defeats both of the purposes of the assignment, and ultimately will be a barrier to getting the most out of the class. Don't do this.

- Roughly one class per week will be devoted to group work. You will be given *worksheets* of problems, which you will solve in groups. To get the most out of this activity, it is extremely important to come to class prepared, i.e. have the reading assignments absorbed. You will not be required to hand in the worksheets, but it is expected that you will complete them. The worksheets will introduce new concepts that will not otherwise be covered in lectures, and *the exams will contain material directly related to these worksheets*. If you do not have time to finish a worksheet in class, you are welcome to come to office hours to discuss anything you are stuck on.
- Almost every week a *project* will be assigned, a short *report* for which needs to be turned in the following Monday in class. You will be asked to perform some experimentation with a mathematical phenomenon using the Geometry Explorer software. Moreover, you will supplement that with formal reasoning in order to understand the patterns or mathematical laws at play. This will be given a completion grade and a *presentation* grade.
- **Homework** will be assigned weekly, due every Friday at the beginning of class. These will be problems to be solved in a formal mathematical way, and the correctness of the argument will matter. Assignments will be graded out of approximately 50 points, and an additional 5 points will be awarded for *presentation* based on neatness and organization. To earn these points, make sure you label your assignment and each question clearly, staple all pages correctly, and type your solutions or write them out neatly.

Crucial: You are strongly encouraged to discuss homework problems and project reports with your classmates. However, you must write the assignment on *your own*. This does not mean simply the physical act of writing, but that the write-up should be done independently. Your submitted paper should include the names of your collaborators (or discussion buddies), as well as all sources consulted.

The lowest two of your completed and submitted homeworks will be dropped from your final grade. Zeroes from incomplete homeworks will not be dropped.

Midterm exams will be on the following dates, during class time:

- Exam 1: Friday September 28
- Exam 2: Wednesday October 31
- Exam 3: Wednesday December 5

The final exam will be comprehensive. It looks like it will be on Friday, December 14, 7–10pm, but confirmation will be given in class and on the course webpage.