Math 395: Geometries from an Advanced Viewpoint II

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Course website: http://math.uoregon.edu/~ddugger/ma395.html
Homework assignments, reading assignments, and any handouts for the course will be posted here.

Text: *Euclidean and transformational geometry: a deductive inquiry*, by Libeskind. (Do not buy this book unless you already have it, as we will only be using it for a portion of the course).

Presentations: Half of this course will be conducted in a seminar format, with students giving presentations of the material. This is to help prepare students for teaching mathematics. Presentations will typically be 15 or 20 minutes, followed by 5 or ten minutes of audience feedback. This feedback is intended to be constructive rather than critical, with audience members talking about what worked well or didn’t work well during the presentation.

Presentation topics will be assigned at least 1.5 weeks (and usually more) ahead of time, to give students the chance to learn the material and decide how they want to present it.

On each presentation day we will try to get through two student presentations, but will have “overflow” into the next class period if need be. In the calendar below, the boxed days are presentation days:

| Week 1: | 5 | 7 | 9 |
| Week 2: | 12 | 14 | 16 |
| Week 3: | MLK | 21 | 23 |
| Week 4: | 26 | 28 | 30 |
| Week 5: | 2 | 4 | 6 |
| Week 6: | 9 | 11 | 13 |
| Week 7: | 16 | 18 | 20 |
| Week 8: | 23 | 25 | 27 |
| Week 9: | 2 | 4 | 6 |
| Week 10: | 9 | 11 | 13 |
**Homework:** Written homework assignments will be due weekly, on Fridays. In this course we will grade proofs very strictly, with presentation counting for the majority of the points. See the “Guide to writing proofs” on the course website.

One exercise that we will sometimes do in this course is have students grade each other’s proofs. The point of this exercise is to help students understand the importance of clear proof-writing, and also to understand some of the pitfalls by experiencing them first-hand. When we do this exercise there are two things to keep in mind: (1) for a student writing a proof, the grade will always be given by the instructor or the official grader for the course (not a peer student), and (2) a student grading a proof will earn their own grade based on how good a job they do on the grading (I know this sounds complicated!)

**LaTeX:** In this course students will learn to use LaTeX, which is the typesetting software most commonly used by mathematicians. Every homework assignment will include some exercises that develop your familiarity with this software.

**Computer geometry software:** In this course you will continue to develop familiarity with GeoGebra, which is a software package for exploring geometry on a computer. You can find it at the following website:

www.geogebra.org

I encourage you to download the appropriate version of this software to your computer and start playing around with it, in preparation for using it on upcoming homework assignments.

For those of you with Macs, the GeoGebra website only links to the latest version—which requires OSX 10.9. If you have an older version of OSX (like I do) you can instead install GeoGebra 4.4:

http://download.geogebra.org/installers/4.4/

This might be helpful for some of you running Windows as well.

Another good software package is Geometers Sketchpad. You can use this on your homework assignments rather than GeoGebra, if you prefer. Geometers Sketchpad is available at many of the computer labs around campus. Unfortunately, Geometers Sketchpad costs money to download onto your personal computer.

**Exams:** There will be a midterm on Friday, February 6, in class. In place of a final exam, you will turn in a final paper (see below).

**Final paper:** Students will write an “extended lesson plan” that covers a topic in geometry. The paper should be a written version of lecture material that would be presented to a math audience, together with homework exercises on the topic and a solution key. Some appropriate history of the topic should be included. Students will choose a topic in consultation with the instructor; in most cases the topic will expand on something covered in MA394 or 395, but other topics are possible. A list of
suggested topics will be provided by the end of week 4 (but students can also choose a topic not on the list). The paper must be written in LaTeX and should run 5–7 pages.

**Grades:** Your grade will be based on the following percentages:

- Homework 40%
- Participation 10%
- Midterm 25%
- Final paper 25%

**Course learning outcomes:** Students successfully completing this course will be able to:

1. Give clear and concise written proofs of propositions in both beginning and advanced Euclidean geometry.
2. Give verbal presentations of geometric topics in front of a group of people.
3. Know the statements, and be familiar with the proofs, of several theorems from projective and transformational geometry. Moreover, students should be able to use these results in the proofs of other theorems.
4. Use GeoGebra to demonstrate and investigate geometric results.
5. Use LaTeX to compose documents containing mathematical symbols.

Weekly homework problems, the midterm, and the final paper will provide students with opportunities to demonstrate the level of their abilities relative to the above learning outcomes.

**Learning Environment:** The University of Oregon strives for inclusive learning environments. Please notify me if the instruction or design of this course results in disability-related barriers to your participation. You are also encouraged to contact the Accessible Education Center in 164 Oregon Hall at 541-346-1155 or uoaec@uoregon.edu.

**Academic Conduct:** The code of student conduct and community standards is at conduct.uoregon.edu. In this course, it is appropriate to help each other on homework as long as the work you are submitting is your own and you understand it. It is not appropriate to help each other on exams, to look at other students’ exams, or to bring unauthorized material to exams.