MAT 3272: Geometry II


Professor: Charles Delman  Professor’s Office: M3216
Email: cidelman@eiu.edu  Office Hours: MW: 1-2 p.m., 4-5 p.m.; Th: 3-5 p.m.
Office Phone: 581-6274  Home Phone: 348-7786 (before 9 p.m., please)

You are welcome to drop in or make appointments at times other than my office hours; however, please do not disturb me between 9 a.m. and noon unless it is absolutely necessary. I reserve this period as research time. Thanks!

1. Course Content

Major theorems of neutral geometry, including an introduction to number systems, continuity, and measurement; the metric approach to geometry; major theorems of Euclidean geometry; history of the discovery of hyperbolic geometry; major theorems of hyperbolic geometry; models and the proof of the relative consistency of hyperbolic geometry; introduction to geometric transformations and symmetry (time permitting); spherical and elliptic geometry (time permitting); projective geometry as a unifying framework for the three classical geometries (time permitting); applications and additional advanced topics (time permitting).

2. Objectives

(1) The student will independently write clear, logically sound definitions and proofs.
(2) The student will be able to verify that the axioms of a system hold in a model of that system.
(3) The student will be able to use models to prove the relative consistency of an axiom system.
(4) The student will be able to discuss the cultural, historical and philosophical context of mathematics as it applies to the development of geometry.
(5) Without reference to outside sources, the student will be able
   • to define the major concepts of geometry which have been covered and state their purpose;
   • to state and prove the major theorems of geometry which have been covered and discuss their consequences and the relationships among them.
(6) The student will be able to explore an open-ended question by positing conjectures and either proving them or finding counterexamples.

3. Requirements

**Class participation:** You are expected to be in class every day and to be prepared to discuss the class material.

**Homework:** Written homework problems will be regularly assigned and graded (with comments). I encourage you to discuss the course material with your classmates. You may hand in joint papers; just give credit at the top to all of the authors of a homework paper. The authors of a joint paper will receive the same grade.

**Exams:** There will be two exams during the class term (in addition to the final), which may be partly or wholly given as take-homes. Make-up exams will be given only
under extraordinary circumstances or in case of serious emergency; prior permission to
miss an exam must be obtained from the professor if at all possible.

**Final exam:** The final exam will be comprehensive. It may be partly or wholly given
as a take-home, and it may have an oral component.

*Exams may not be done jointly!*

4. **Grading**

I do not grade on a “curve”. Under no circumstances will your grade directly depend
on how well your fellow students do. If you do a good job of learning the material, you
will receive a good grade, regardless of how well the other members of the class perform.
Don’t forget that the reverse is also true: if you do a poor job of learning the material,
you will receive a poor grade, regardless of how poorly everyone else does.

I will assign letter (rather than numerical) grades, based on the objectives stated
above and standards clarified in class. Grades correspond to my judgement of quality as
follows:

- **A** Excellent. The work exhibits mastery of nearly all important ideas, including
  those which are subtle or difficult, much insight and originality, highly coherent
  organization and fine expository style. Errors and omissions, if any, are minor.
- **B** Good. The work exhibits substantial understanding of most important ideas,
  including some which are subtle or difficult, some insight and originality, coherent
  organization and correct usage, grammar and spelling. There are some
  substantive errors or omissions.
- **C** Fair. The work exhibits basic understanding of many fundamental ideas, al-
  though not those which are subtle or difficult, and demonstrates some coherence.
  The presentation is readable, with at most minor errors of usage, grammar or
  spelling. There are many substantive errors or omissions.
- **D** Poor. The work exhibits some understanding of a few fundamental ideas, but
  not those which are subtle or difficult, and it fails to demonstrate coherence. Us-
  age, grammar and spelling are mostly correct. There are a great many substantive
  errors or omissions.
- **F** No credit. The work exhibits too few of the positive qualities noted above to
  be worthy of credit.

Each requirement will count toward your final grade according to the scheme below
(possibly subject to slight modification):

- Homework: 40%
- In-term Exams: 30%
- Final Exam: 30%

*Complete honesty on assignments and exams is expected of all students.*