

Mathematics 3061, Fall 2011

Modern Geometry

Instructor: Dr. Bruce Conrad

Meeting times: Wednesdays, 1730-2000 in Barton B-401. The first meeting will be on August 31, and the last will be on December 7. There will be no class on November 23, because of the Thanksgiving holiday. The final examination will take place on December 14 in our classroom, at our regular meeting time.

Office: Wachman 616

Telephone: (215)-204-2896

E-mail: conrad@temple.edu

Hours: Tuesdays, Thursdays, 1100-1150 and Wednesdays 1630-1720. If these hours conflict with your schedule, you may make an appointment by email.

Text: *The Four Pillars of Geometry*, by John Stillwell. Springer Verlag New York, ISBN 978-0-387-25530-9.

Prerequisites: Linear algebra. This is needed in our study of transformational geometry. You need some basic familiarity with the properties of orthogonal matrices. For our work in hyperbolic geometry, you will need some familiarity with complex numbers.

Additional resources:

1. Euclid, *The Elements*. Translated by Thomas Heath.
<http://aleph0.clarku.edu/~djoyce/java/elements/elements.html>
2. Feeman, Timothy G. *Portraits of the Earth: A Mathematician Looks at Maps*. American Mathematical Society, 2002. GA13.F44
3. Hartshorne, Robin. *Geometry, Euclid and beyond*. Springer-Verlag New York, 2000. QA457.H1

Course Goals: Geometry is a broad area, and we cannot touch upon every aspect. In this course you will be introduced to synthetic, analytic, projective, transformational, and non-euclidian geometry. Our goal is to understand what these are, and to become familiar with major results. In the process, we explore the role of models for axiom systems. We will use "The Geometer's Sketchpad" software in our exploration of these areas.

Course Grading: Homework, 20%; WEEKLY Quizzes based on homework, 10%; Midterm, 20%; Final, 20%; Group project, 20%, Class participation, 10%.

Exam Dates: Midterm: October 19. Final: December 14.

Attendance Policy: Please attend each class. You can't afford to miss a whole week. If missing a class is unavoidable, send me an email, and plan to spend extra time catching up. You will need to visit me in my office for a bit of guidance.

Blackboard: This course is on Blackboard. You can see my entries for you in the gradebook, and I will post important information in Course Documents. All assignments will be posted in Assignments, and links to useful web sites will be found in Course Links.

Homework: The class will be divided into groups of three or four students; each group hands in its solution to the weekly homework exercises. There will be a quiz each week, with questions based on the homework. Your group's homework grade is the sum of the points awarded for the homework, as handed in, plus the mean score of your group on the quiz.

Group project: Each homework group will do an extended project. A list of suggested projects will be placed in "Course Documents," but if a group proposes a project that is not listed, I'm willing to consider it. No two groups will be allowed to select the same project—first come, first served! If a group has questions about its project, I will be glad to answer them.

Each group will prepare an outline describing what it intends to do in the project. Outlines are due on October 26, and one-fourth of the group's project grade will be based on the quality of the outline. To be acceptable, the outline must specify the writing responsibility of each member of the group. Each group is to submit one outline; the grade will be the same for each member of the group.

Each student is to write a paper covering the topic specified in his/her group outline. The grade (50% of project grade) is individual, but group members are encouraged to proofread each other's papers and to make constructive suggestions regarding writing and content. Papers are due on Nov. 30.

The last class of the semester (Dec. 7) will be a symposium for the presentation of these projects. Each student must present his/her part of his/her group's project. The quality of presentation, as well as the project results, will be evaluated. PowerPoint is available if your group wishes to use it. The presentation grade (25% of the project grade) will be the same for each group member.

Summary:

Midterm	October 19
Project outline due	October 26
Paper due	November 30
Oral presentation	December 7
Final Exam	December 14

Withdrawals and incompletes. Requests to withdraw from or drop this course should be taken to the advising office for your college; you do not need my approval for this. You may not drop the course after September 12, and no withdrawals are permitted after October 31.

The grade *I* is reserved for extreme circumstances. To be eligible for an *I* grade you need a good reason, and to have missed not more than two of the first nine classes. You must also have passed the midterm exam, and have a passing average on the quizzes that you have taken. If you were unable to take part in your group project, you will have to do a project on your own and write it up for grading. If you missed a quiz, you will have to write up the solutions for that week's homework. Of course, if you missed the final, you'll have to take a makeup exam. It is necessary to have completed almost all of the course with a passing, or near passing average, and to file an *Incomplete Contract* specifying what is left for you to do. I am required to submit a default grade with an *I*. This will be your grade if the contract is not fulfilled after 12 months. The change will be made automatically by the Registrar's computer.

If you miss the final, you should contact me immediately and discuss your intentions. *Any student who misses the final and does not get in touch with me before I turn in the grades will be graded F.*

Any student who has a need for accommodation based on the impact of a disability should contact me privately to discuss the specific situation as soon as possible. Contact Disability Resources and Services at (215) 204-1280, 100 Ritter Annex, to coordinate reasonable accommodations for students with documented disabilities.

Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has adopted a policy on Student and Faculty Academic Rights and Responsibilities (Policy # 03.70.02) which can be accessed [here](#).