

Foundations of Geometry

MAT 550.101

Spring 2010 • Prof. Schaeffer

COURSE DESCRIPTION

This course is designed for students who have, in addition to an interest in geometry, some previous experience in this subject at the college level. Topics include the historical foundations of geometry; postulational systems and their properties; Euclidean and non-Euclidean geometries; and geometric transformations.

COURSE OBJECTIVES

By the conclusion of this course, the student will:

- (a) Study geometry as a discipline in which there are many inter-related postulational systems, and to consider Euclidean geometry and its relationship to the general framework of geometry, showing that Euclidean geometry is really a special case of more general geometries.
- (b) Examine Euclidean geometry from a rigorous postulational viewpoint.
- (c) Study non-Euclidean geometries, their relationship to Euclidean geometry, and their place within the general geometrical framework.
- (d) Develop an understanding and appreciation of the role played in mathematics by postulational systems, the nature and method of deductive proof, and the structural aspect of geometry.
- (e) Trace in part the historical development of geometry.

TEXTBOOK

Experiencing Geometry, 3rd Edition by Henderson & Taimina: published by CRC Press/Prentice Hall

COVERAGE (The complete “official” course syllabus is available online on my Web site.)

Chapter 0: Historical Strands of Geometry

Chapter 1: What is Straight?

Chapter 2: Straightness on Spheres.

Chapter 3: What is an Angle?

Chapter 4: Straightness on Cylinders and Cones.

Chapter 5: Straightness on Hyperbolic Planes.

Chapter 6: Triangles and Congruencies.

Chapter 7: Area and Holonomy.

Chapter 8: Parallel Transport.

Chapter 10: Parallel Postulates.

ASSESSMENT

The course assessment will be a subset of tests, projects, papers, presentations, quizzes, homework, team assignments, and final exam, as detailed below:

MIDTERM EXAM: Approximate date: March 2.
Value: 100 points.

CLASS PARTICIPATION: You can't “experience” geometry if you don't participate! There will be numerous class activities for which your participation will be crucial.
Value: 100 points.

FINAL EXAM: Cumulative. Date: Monday, May 3.
Value: 150 points.

GRADING SYSTEM

Based on points, each item weighted according to its significance. Precise cutoff scores for letter grades will be determined at the end of the semester, but will essentially follow the standard 60-70-80-90 model, according to the rubric below:

90-100% Exemplary Response

Gives a complete response with a clear, coherent, and unambiguous explanation; includes a clear and simplified diagram if appropriate; communicates effectively; shows understanding of the problem's mathematical ideas and processes; identifies all the important elements of the problem; may include examples and counterexamples; presents strong supporting arguments.

80-89% Competent Response

Gives a fairly complete response with reasonably clear explanations; may include a diagram if appropriate; communicates effectively; shows understanding of the problem's mathematical ideas and processes; identifies the most important elements of the problem; presents solid supporting arguments.

70-79% Minor Flaws But Satisfactory

Completes the solution satisfactorily, but the explanation may be muddled; argumentation may be incomplete; diagram may be inappropriate or unclear; understands the underlying mathematical ideas; uses mathematical ideas effectively.

60-69% Serious Flaws But Nearly Satisfactory

Begins the solution appropriately but may fail to complete or may omit significant parts of the solution; may fail to show full understanding of mathematical ideas and processes; may make major computational errors; may misuse or fail to use mathematical terms; response may reflect an inappropriate strategy for solving the problem.

50-59% Begins, But Fails to Complete Problem

Explanation is not understandable; diagram may be unclear; shows almost no understanding of the problem situation; may make major computational errors.

0-49% Unable to Begin Effectively

Work does not reflect the intent of the problem; drawing misrepresents the problem situation; copies parts of the problem but without attempting a solution; fails to indicate which information is appropriate to the problem; leaves the problem blank.

ATTENDANCE

As in all university classes, your attendance is expected. Activities have been planned for which your attendance is necessary (see Class Participation above). In short: You miss, you lose! You will be permitted to make up missed work only for those absences for which you have University-approved written excuses.

CONTACT INFORMATION

Office: Lytle 262; Phone: 610-683-4419; e-mail: schaeffe@kutztown.edu

Web site: <http://faculty.kutztown.edu/schaeffe>

OFFICE HOURS

Tu 5:00–6:00; W 4:00–5:30; Th 3:00–5:30 (also other times by appointment)

ACADEMIC DISHONESTY

At a minimum, you will receive a “0” on the applicable graded activity. Additionally, the instructor reserves the right to invoke the sanctions set forth in the Academic Dishonesty Policy (as printed in *The Key*).

ACCOMMODATIONS

If you have a disability that requires accommodations, please let me know so that I can assist you.