Synthetic Geometry
MAT 240.010
Fall 2008 • Mr. Schaeffer

COURSE DESCRIPTION
This course is designed for students who have, in addition to an interest in geometry, some previous experience in this subject either on the high school or college level. Topics include Euclidean geometry using Hilbert’s axioms; neutral geometry; the historical development of non-Euclidean geometries; and hyperbolic geometry. Prerequisite: MAT 224.

COURSE OBJECTIVES
By the conclusion of this course, the student will:
(a) Recognize some of the flaws in Euclidean geometry.
(b) Examine those foundations of Euclidean geometry using Hilbert’s axioms.
(c) Examine historical development of non-Euclidean geometry.
(d) Study the basic fundamentals of neutral geometry.
(e) Study the basic fundamentals of hyperbolic geometry.
(f) Increase his/her capability for carrying out deductive proofs.
(g) Understand the need for both intuitive and deductive thought processes in the doing of mathematics.
(h) Understand and appreciate the nature of geometry.

TEXTBOOK

COVERAGE
Chapter 1: Euclid’s Geometry.
Chapter 2: Logic and Incidence Geometry.
Chapter 3: Hilbert’s Axioms.
Chapter 4: Neutral Geometry.
Chapter 5: History of the Parallel Postulate.
Chapter 6: The Discovery of Non-Euclidean Geometry.
(For a complete list of topics, go to my Web site and view the complete course syllabus.)

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

TESTS: There will be three (3) tests (exact dates to be announced, but approximately September 25, October 23, & November 20). Value: 200 points each.
Missed tests: must be made up in a manner and date to be determined by the instructor; a university-approved excuse is required.

QUIZZES: Several (approximately 5–8); usually unannounced. Value: 15-25 points each (approximate).
Missed quizzes: in-class quizzes not made up, but not counted against you; take-home quizzes must be made up.

HOMEWORK: One learns how to do mathematics by much practice—the assigned work will reflect this conviction. Specific homework problems (announced in advance) will be collected and graded.
Value: 15-25 points each (approximate).
**BOARD WORK:** Each student will be expected to go to the board a few times throughout the semester (value to be determined).

**FINAL EXAM:** Cumulative. Date: Tuesday, December 9, 11:00 am  
Value: 300 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 Board Work 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.