

COURSE SYLLABUS MTH 583
GEOMETRY AND MEASUREMENT FOR ELEMENTARY TEACHERS
SPRING 2008

Location of class meeting: The University Center, The Woodlands, TX

Class meeting times; Monday, 5:30 – 8:30 PM

Instructor: Dr. Bill Jasper

Office location: Lee Drain Building, Room 439A

Instructor contact information: Phone 294-1575, FAX: 936-294-1882, Email: jasper@shsu.edu

Office Hours: Mon. 5 – 5:30 PM and 8:20 – 9:30 PM (at the University Center)

Appointments by special arrangement.

COURSE OBJECTIVES/COURSE DESCRIPTION:

This course is a graduate level course for middle school mathematics teachers, based on the National and Texas standards for teaching mathematics. This course will include a study of congruency, similarity, transformations, coordinate geometry, and measurement, using Geometer's Sketchpad dynamic software. It is specifically designed for middle school teachers with a mathematics specialization who wish to obtain the master's degree in education with a minor in mathematics. The four main themes recommended by the NCTM Principles and Standards (problem solving, reasoning, communication, and connections) will be emphasized. Students are expected to practice communications skills and participate in hands-on activities, including the use of math manipulatives and technology. Prerequisite: Elementary or secondary school mathematics certification and MTH 383 or equivalent. 3 hours.

COURSE OBJECTIVES:

Upon completion of this course, students will be able to:

- Apply knowledge of the axiomatic structure of Euclidean Geometry to justify and prove theorems
- Use Geometer's Sketchpad dynamic software to visually show geometric relationships and to develop classroom discovery lessons
- Describe and justify geometric constructions made using a compass and straight edge, reflection device, patty paper, and other appropriate technologies
- Use translations, reflections, glide-reflections, and rotations to demonstrate congruence and to explore the symmetries of figures
- Use the properties of congruent triangles to explore geometric relationships and prove theorems
- Use dilations (expansions and contractions) to illustrate similar figures and proportionality, and apply relationships among similar figures
- Use symmetry to describe tessellations and show how they can be used to illustrate geometric concepts, properties, and relationships
- Apply concepts and properties of slope, midpoint, parallelism, and distance in the coordinate plane to explore properties of geometric figures and to solve problems
- Apply transformations in the coordinate plane
- Select and use appropriate units of measurement (e.g., temperature, money, mass, weight, area, capacity, density, percents, speed, acceleration) to quantify, compare, and communicate information
- Apply dimensional analysis to derive units and formulas in a variety of situations (e.g., rates of change of one variable with respect to another) and to find and evaluate solutions to problems
- Apply the Pythagorean theorem, proportional reasoning, and right triangle trigonometry to solve measurement problems

- Use and understand the development of formulas to find lengths, perimeters, areas, and volumes of basic geometric figures
- Use a variety of representations (e.g., numeric, verbal, graphic, symbolic) to analyze and solve problems involving two- and three-dimensional figures such as circles, triangles, and polygons
- Analyze the relationship between three-dimensional figures and related two-dimensional representations (e.g., projections, cross-sections, nets) and use these representations to solve problems
- Explore non-Euclidean geometry systems and fractals

TEXT AND MATERIALS:

Wyatt, K., Lawrence, A., and Foletta, G. (2004), *Geometry Activities for Middle School Students with The Geometer's Sketchpad*, Key Curriculum Press, ISBN 1-55953-647-0 (book only)

Geometer's Sketchpad software Version 4, Key Curriculum Press (packaged with textbook), ISBN 1-931914-00-1

Supplemental materials provided by the instructor

GRADING:

Grades for this course will be based on the total number of points earned, as listed below:

A = 315 points or more B = 280 - 314 pts C = 245 - 279 pts F = below 244 pts

Grades will be assigned for the following areas:

Curriculum project – 50 points

Geometer's sketchpad project – 75 points

Mini-projects – 25 points

Take-home Midterm exam – 100 points

Comprehensive final exam - 100 points

Total points possible – 350 points

EXAMS AND ASSIGNMENTS:

The midterm and final exams will include problems that are similar to problems assigned and worked in class, but will be focused more on concept understanding rather than memorization of procedures and formulas. A portion of each test may include multiple choice or short answer problems. A second portion of each test will include problems where students must show all of their work correctly, as well as arrive at the correct solution.

Projects are worth almost half of your grade in this course, and they will be used to assess geometric concept understanding and knowledge of Geometer's Sketchpad as an alternative assessment method. Late assignments will be assessed point penalties that will vary in accordance with how late the assignment is submitted. A missed final examination can be made up only by approval of the Dean of the College of Arts and Sciences or a higher administrative official.

ATTENDANCE/PROFESSIONALISM:

Regular and punctual attendance is expected of every student. Every scheduled class (3 hours) involves a normal week of lessons during a full semester, and every effort should be made to attend classes. There are no grade penalties for missed classes, but students with excessive absences will have a more difficult time on the midterm and final exams.

Students are also expected to put forth their best effort in this class. A professional graduate student understands that learning course objectives is important mostly for the knowledge obtained and not just for a grade in the course. For this reason, students will be allowed to work independently on projects to develop their understanding of geometric concepts.

GENERAL STUDENT SYLLABUS GUIDELINES:

You may find online a more detailed description of the following policies. These guidelines will also provide you with a link to the specific university policy or procedure:

<http://www.shsu.edu/syllabus/>

Academic Dishonesty: Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. *See Student Syllabus Guidelines.*

Classroom Rules of Conduct: Students are expected to assist in maintaining a classroom environment that is conducive to learning. Students are to treat faculty and students with respect. Students are to turn off all cell phones while in the classroom. Under no circumstances are cell phones or any electronic devices to be used or seen during times of examination. Students may tape record lectures provided they do not disturb other students in the process.

Student Absences on Religious Holy Days: Students are allowed to miss class and other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Students remain responsible for all work. *See Student Syllabus Guidelines.*

Students with Disabilities Policy: It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should visit with the Office of Services for Students with Disabilities located in the Counseling Center. *See Student Syllabus Guidelines.*

Visitors in the Classroom: Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar's Office.

COURSE SCHEDULE:

A course schedule will be provided after student needs and availability are analyzed.