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COURSE SYLLABUS: Math 383-01, 3 credit hours, Fall 2007
GEOMETRIC MEASURE AND TRANSFORMATIONS

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CLASSROOM AND SCHEDULE: Tuesday and Thursday, 11:00 – 12:20 PM
                                                                     Room 209, Lee Drain Building

INSTRUCTOR: Dr. Bill Jasper
        Office: Room 439A, Lee Drain Building
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        Email: jasper@shsu.edu
        Office Hours: Mon/Wed, 10 AM – 12 noon
                Tues./Thurs., 10 - 11 AM, and 2 – 3:30 PM.
                Appointments by special arrangement

COURSE DESCRIPTION:
This course is an upper level mathematics course for prospective middle school mathematics teachers and can be applied only toward middle school teaching certification. Students are expected to practice communications skills and participate in hands-on activities, including the use of math manipulatives and technology. Topics will include National and Texas standards for teaching mathematics, measurement in one, two, and three dimensions, the metric system, transformational geometry, congruences, similarities, geometric constructions, and coordinate systems. The four main themes recommended by the NCTM Principles and Standards (problem solving, reasoning, communication, and connections) will be emphasized throughout this course. Students will also participate in class discussions and group work during this course. Prerequisite: Mathematics 185 and Math 285 or Math 142 with a grade of C or better. 3 semester hours.

COURSE OBJECTIVES:
Upon completion of this course, students will be able to:
- 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
- Develop, justify, and use conversions within measurement systems
-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
- Describe the precision of measurement and the effects of error on measurement
- Apply the Pythagorean theorem, proportional reasoning, and right triangle trigonometry to solve measurement problems
- Use the properties of congruent triangles to explore geometric relationships and prove theorems
- Describe and justify geometric constructions made using a compass and straight edge, reflection device, pattty paper, and other appropriate technologies
- Apply knowledge of the axiomatic structure of Euclidean Geometry to justify and prove theorems
- Use and understand the development of formulas to find lengths, perimeters, areas, and volumes of basic geometric figures
- Apply relationships among similar figures, scale, and proportion and analyze how changes in scale affect area and volume measurements
- 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, polygons, cylinders, spheres, and prisms
- Analyze the relationships between three-dimensional figures and related two-dimensional representations (e.g., projections, cross-sections, nets) and use these representations to solve problems
- Use Geometer's Sketchpad dynamic software to visually "prove" geometric relationships and to develop classroom discovery lessons

COURSE OBJECTIVES (cont.):

- Use translations, reflections, glide-reflections, and rotations to demonstrate congruence and to explore the symmetries of figures
- Use dilations (expansions and contractions) to illustrate similar figures and proportionality
- Use symmetry to describe tessellations and shows 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 solve problems
- Apply transformations in the coordinate plane
- Use the unit circle in the coordinate plane to explore properties of trigonometric functions

TEXT AND MATERIALS:

Serra, M. (2003), Discovering Geometry: An Investigative Approach (3rd Ed) Key Curriculum Press
Geometer's Sketchpad software, Key Curriculum Press (packaged with Serra textbook in bookstore)

GRADING:

Grades for this course will be based on the total number of points earned, as listed below:
A = 450 points or more   B = 400 - 449 pts   C = 350 - 399 pts   D = 300 - 349 pts   F = below 300 pts

Grades will be assigned for the following areas:
Three exams, weighted 100 points each
Homework and projects - 60 points
Class participation, attendance, professionalism - 40 points
Comprehensive final exam - 100 points

ATTENDANCE/PROFESSIONALISM:

Regular and punctual attendance is expected of every student. As a prospective teacher, you must demonstrate your reliability and conscientious attitude by your faithful attendance. **Students who miss more than two classes (three hours) during the semester will be assessed a point penalty, up to one letter grade for severe attendance problems.** Attendance will be taken every class. If you are late to class, it is your responsibility to let me know immediately after the class that was missed. Any student who is more than 30 minutes late to class will be counted absent. Tardies will count against your attendance record (3 tardies = 1 absence). Unless approved by the instructor, leaving class early will count as an absence. If absent or tardy, you are still responsible for all material covered in class, and you will need to check with a classmate about what was discussed. Serious health or family problems that are well documented will be handled individually. However, if you are unable to attend class regularly, you should drop the course.

In addition to attending class faithfully, students are expected to put forth their best effort in this class.   If you do not participate in class discussions, are sleeping in class, or are talking when I am talking or when a classmate is talking, you are not demonstrating the professional attitude required to be a teacher. Point penalties will be assessed for any problems in this area. Up to 40 points are designated for participation and professionalism in this course, and you must be "near perfect" to earn all of these points.

TESTS AND ASSIGNMENTS:

Tests will include problems that are similar to problems assigned and worked in class. A portion of each test will 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.

Unless approved by the instructor prior to the date of a test, there will be no make-up for a missed test. If a student misses a test, then the final exam will count double. Late assignments will not be accepted. Zero points will be recorded for any assignment not turned in on or before the class date when it is due (even if you are absent that day). 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.

A Geometer's Sketchpad project will be required for this class and occasional homework assignments may be collected for a grade. Late assignments will incur substantial late point penalties. Assignments are due in class or before the class date when it is due (even if you are absent that day).

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.

The Sam Houston Writing Center: The Sam Houston Writing Center, located in Farrington 111, provides one-on-one help with your writing assignments. The Center is open from 8 a.m. to 7 p.m. Monday through Thursday, 8 a.m. to 3 p.m. Friday, and 2-7 p.m. on Sunday. It is not necessary to schedule an appointment; however, you may call 936-294-3680, twenty-four hours in advance to schedule one.

MATH 383 COURSE SCHEDULE (TENTATIVE)

WEEK OF	TOPIC	CHAPTER
Aug 20	Introduction, spatial visualization	1
Aug 27	Geometric reasoning	2
Sep 3	Labor Day holiday, Sept 3 Reasoning, tools	2, 3
Sep 10	Tools, Geometer's Sketchpad	3
Sep 17	**Exam #1 (Sep 18)** Triangle properties	4
Sep 24	Polygon properties	5
Oct 1	Circle properties	6
Oct 8	Transformations, tessellations	7
Oct 10	Last day to drop w/o an F grade	
Oct 15	**Exam #2 (Oct 16),** sketchpad	
Oct 22	Area	8
Oct 29	Pythagorean theorem	9
Nov 5	Volume	10
Nov 12	**Exam #3 (Nov 13)**	
Nov 19	Similarity	11
Nov 26	Geometric art, fractals Transformations on a coordinate plane	7.2, 9.5
Dec 3	Additional measurement topics	

Final Exam: Thursday, Dec. 13th, 11 AM – 1 PM