

GEOMETRIC MEASURE AND TRANSFORMATIONS

Math 3383.01; 3 credit hours,

Fall 2017

INSTRUCTOR: Dr. Mark Klespis

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Office Hours: MW: 10:30 AM – Noon

TTh: 11:00 AM – 12:30 PM

& by appointment

CLASSROOM AND SCHEDULE: Tuesday and Thursday, 12:30 – 1:50 PM; LDB 403

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: Math2385 or Math 1420 with a grade of C or better.

REQUIRED TEXT AND SOFTWARE:

You do not need to purchase a textbook for the class. I will provide materials and post them on Blackboard.

GeoGebra (software). This software is required. It is **free** and can be downloaded from www.geogebra.org

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
- 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 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, patty paper, and dynamic geometry software
- 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

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- 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 GeoGebra dynamic software to show and explore geometric relationships
 - 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

GRADING:

Grades for this course will be based on a percentage of the number of points you have earned divided by the total points possible.

Grades will be assigned for the following areas:

- Three exams & comprehensive final: 400 points
- Assignments & quizzes : 100 to 300 points
- Project: 100 points

Total points 600 to 800 points

A letter grade will be assigned based on the following percentage of your total points:

- A: 90 to 100%
- B: 80 to 89%
- C: 70 to 79%
- D: 60 to 69%
- F: Less than 60%

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 may be assessed a point penalty, up to one letter grade for severe attendance problems. Attendance will be taken every class. 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.

TESTS/QUIZZES/ASSIGNMENTS:

Tests will include problems that are similar to problems assigned and worked in class. 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.

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 percent grade on the final exam will be used. Your final exam grade may be used to replace your lowest semester test grade. 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. The final exam is comprehensive.

Online quizzes will be given periodically throughout the semester. You will be given a certain time frame to take and complete the quiz, which will be timed. There are no make-ups for missed quizzes.

In class and out of class assignments will be collected for grades. If you are absent for an in-class assignment, you cannot make it up. **Late assignments do not exist.** One GeoGebra project will also be required.

THE FINE PRINT

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

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.

Use of Celular Telephones in Academic Classrooms and Facilities: The use by students of electronic devices that perform the function of a telephone or text messenger during class-time may be prohibited if deemed disruptive by the instructor to the conduct of the class. Arrangements for handling potential emergency situations may be granted at the discretion of the instructor. Failure to comply with the instructor's policy could result in expulsion from the classroom or with multiple offenses, failure of the course. Any use of a telephone or text messenger or any device that performs these functions during a test period is prohibited. These devices should not be present during a test or should be stored securely in such a way that they cannot be seen or used by the student. Even the visible presence of such a device during the test period could result in a zero for that test. Use of these devices during a test is considered de facto evidence of cheating and could result in a charge of academic dishonesty (see student code of conduct <http://www.shsu.edu/students/guide/StudentGuidelines2010-2012.pdf#page=29>).

Note: There might be times when I will ask you to use your cell phone to search for some information. Apart from that instance, use of cell phones in class is not allowed.

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 register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see: <http://www.shsu.edu/dept/academic-affairs/documents/aps/students/811006.pdf>

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.