

**COURSE SYLLABUS MTH 5383**  
**GEOMETRY AND MEASUREMENT FOR ELEMENTARY TEACHERS**  
**SPRING 2018**

Location of class meeting: The Woodlands Center, Room 245, The Woodlands, TX

Class meeting times; Mondays, 5:30 – 8:20 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](mailto:jasper@shsu.edu)

Office Hours: Monday, 5-5:30 PM, TWC Room 245

**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 or Geogebra 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 3383 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
- Become familiar with GeoGebra and other geometry software programs
- 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:**

There is no textbook for this course. I will use my own teacher prepared materials and the Internet, which obviously will save you some money. However, YOU MUST HAVE YOUR OWN COPY OF Geogebra or GEOMETER'S SKETCHPAD. Some of you might have a disk copy of Sketchpad from MTH 3383 or 3363 at SHSU, and that will probably work. This copy needs to be Version 4 or 5, which would be fine. Since Geogebra is a free download, we will use this program mostly.

Since we will be using the geometry software program during most classes, you should bring a laptop to class if you have one (much better to save files). If you do not have a laptop, let me know and we can have you use the computer lab in another room of the TWC.

### **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
- Geogebra/Geometer's sketchpad projects,  
Mini-projects/homework – 100 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/Geogebra 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 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.

**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. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. Academic dishonesty includes, but is not limited to, cheating on examinations or other work, plagiarism, collusion, and the abuse of resource materials. *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 may tape record lectures provided they do not disturb other students in the process.

**Use of Telephones and Text Messagers 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 will 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>).

**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](mailto: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**, located in Farrington 111, is open from 8 a.m. until 7 p.m. Monday through Thursday, 8 a.m. until 3 p.m. on Friday, and 2 - 7 p.m. on Sunday. Writing tutors will work with you at any stage of the writing process (brainstorming, generating a draft, organizing a draft, or revising a draft) for any written assignment. The Writing Center operates on an appointment system, so please call (936) 294-3680 to schedule a session with a writing tutor. Skype sessions are available for distance students, and a tutor is available at the University Center. See website for more information: [www.shsu.edu/wctr](http://www.shsu.edu/wctr).

Tentative Schedule - Classes meet on the dates indicated

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|-----------|---|
| Jan 22    | First class meeting   |
| Feb 5     | Class   |
| Feb 12    | Class   |
| Feb 19    | Class   |
| Feb 26    | Class   |
| Mar 5     | Class   |
| Mar 12-16 | Spring break for SHSU (we will discuss which class to miss) |
| Mar 19    | Class   |
| Apr 6     | Last day to Q drop  |
| Apr 2     | Class   |
| Apr 9     | Class   |
| Apr 16    | Class   |
| Apr 23    | Class   |
| Apr 30    | Class   |
| May 7     | Final Exam in Class   |