Math 5137: Geometry for K-8 Teachers Syllabus

Course Information: **Semester: Spring 2023** **Credit Hours**: 3

Math 5137A/GA / Statesboro Math/Physics 1311 / Mon & Wed 4:00 - 5:15 pm /Final: Wed., May 3, 3 - 5 pm

Student Study Sessions (in-person or Zoom; individual or groups) - please email for evening sessions

Student help hours are a specific chunk of time I have set aside for you. Please take advantage of this time & ask when you need help! ***It helps YOU*** because *(yay!)* I can personalize explanations to you! ***It helps ME*** because *(yay!)* I get to know you & how you learn! I'm happy to schedule other times if you email me. Or, ask questions & ask for tutorial videos in our Google Space.

Regular Hours:	**Alternate Hours:**
I'll always be on Zoom or email during these times!	*Let me know ahead of time if you want to meet!*
Mon & Wed 1–2 pm Office/Zoom	**Mon 5:15 - 6:15 Office/Zoom**
Tue & Thu 9–10 am Zoom only	**Sat 6:00 - 7:00 Zoom only**

Instructor Information

Instructor: Dr. Eryn Maher **Email**: estehr@georgiasouthern.edu
Office: Statesboro Campus: Math/Physics 2303

My email is always open when I'm working (except during class) so I can respond quickly. In email subject lines, please include "5137" with a brief description. To practice healthy work-life balance, I rarely check email between 5 pm - 8 am. Your well-being & concerns are important to me, so I'll always answer your questions & respond to your emails within 24 hours during the week. My responses are within 48 hours on weekends or breaks.

Welcome to Math 5137!

Course Description

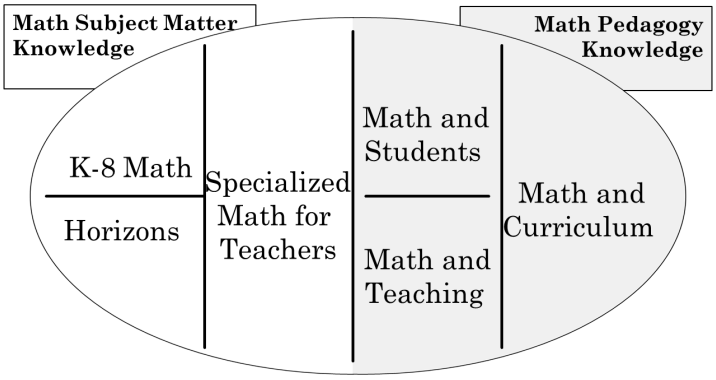
A continuation of the study of geometry from MATH 3032. Focus will be on two and three dimensional geometry. Motion geometry and tessellations will also be covered. For Early Childhood and Middle Grade majors only. **Prerequisites**: Completion of Math 3032 (with a grade of C or better).

Required Resources

- **Bring to class every day:** 1" math binder, paper, pencil/erasable pen (a few colors are helpful), notecards, scientific calculator, protractor, compass, ruler **Please let me know if you need geometry tools or calculators; I have many to loan.
- **Textbook:** Musser, G. L., Trimpe, L. E., & Maurer, V. R. (2008). *College geometry: A problem-solving approach with applications* (2nd ed.). Upper Saddle River, NJ: Pearson Education, Inc.
- **Access to Folio:** Check **daily** for important announcements, handouts, grades, etc.
- **Other resources**: external free websites like Perusall, notes, videos, other downloadables published to our Folio site

Learning Outcomes: **After successfully completing the course, you should be able to**:

- Understand and apply geometric definitions, postulates, theorems, and properties.
- Understand and utilize relationships among geometric concepts.
- Appropriately apply definitions, postulates, theorems, and properties to demonstrate or verify geometric relationships (e.g., simple proof writing).
- Use appropriate tools and technology (e.g., by hand using compass & straightedge, online using GeoGebra or Desmos) to build and explore basic geometric constructions. Be able to justify constructions.



Adaptation of MKT Egg (e.g., Ball, 1990; Ball et al. 2008)

When you teach your own class, you'll be the math authority:

- ***creatively*** designing tasks;
- ***confidently*** explaining concepts & procedures;
- ***quickly*** understanding student confusion & questions; and
- ***flexibly*** changing explanations & strategies to support different thinkers.

This course is different from methods courses in the College of Education. This course isn't focused on how to teach math (i.e., **math pedagogy**). It's focused on **math content**, helping you master K-8 math along with specialized math that only teachers need to know.

This class is your opportunity to learn to be successful as a mathematician and math authority. Learning math to ***teach*** a class is very different from learning math to ***pass*** a class. It's knowing the ***hows*** & ***whys*** & even what ***knowing math*** means! In this class, we dig deep into geometry concepts and think about them in ways other people don't have to.

In a nutshell, this course is about re-learning geometry to

- deeply understand how to apply, explain, **and justify** measurement, concepts, and shapes in 1D, 2D, & 3D
- how definitions, postulates, theorems, and properties connect and build on each other
- how to constructively struggle to write proofs and solve problems.

Math Content (this course) focuses on: Math Subject Matter	**Math Methods focuses on: Math Pedagogy**
K-8 Math: topics you'll probably teach **Horizons Math:** what your students… ○ should know (from previous grade levels) ○ need to know (to succeed in future grades) **Specialized Math for Teachers:** Because your future students will think & learn in many ways, you will need to… ○ explain & represent ideas in many ways ○ know how to approach topics in many ways ○ understand & respond to many questions ○ understand & evaluate many strategies ****Math Content course****	● math and students, ● math and teaching, and ● math curricula. e.g., interviewing students, choosing tasks, writing lesson plans ****Math Methods course****

Professor's expectations (I expect you to:)

- **attend class prepared** (bring course materials; complete checklists & take good notes before class)
- **take good notes during class**: what's on the screen ***and*** tasks / examples you work on or discuss
- **valiantly try in-class and out-of-class assignments**. You are in the class to learn. Just like building muscles or learning any sport or skill, **learning things you don't know yet can feel uncomfortable and you have to be imperfect and make mistakes in order to learn (sorry!).** I want to see you show ***curiosity & persistence.***
- **accept responsibility for your learning.** My role is to facilitate your development as an ***independent*** learner, because you'll need to be able to quickly and independently learn and relearn math when you are a teacher!
- **be active in your learning**. Ask questions. Talk to me early if you need help so I can help you. Experiment with math learning strategies and study topics and strategies outside of class.

Course Assessments

Your success in achieving course goals will be measured by different assessment types, based on Bloom's Taxonomy.

Assessment	Percent
Before Class Homework (due before each class @ 11:30 am)	20%
In-Class Engagement (Attend, Quizzes, Tasks, Groupwork)	15%
Exams @ 15% each	45%
Final Project: Modified Critical Area Project	20%

Grade	Percentage
A	90% - 100%
B	80% - 89.9%
C	70% - 79.9%
D	60% - 69.9%
F	0% - 59.9%

Before Class Homework (textbook work and tasks on checklist; **due by the start of each class)**

Goal: learn the content well enough that you will be able to teach it. Before each class, activate your brain with ideas, vocabulary, and exercises. Complete a checklist of tasks: reflect on prior experiences, actively read textbook sections, comment on articles & videos in Perusall, and valiantly attempt problems using problem-solving steps and strategies. You will test your understanding on textbook questions and reflect on tasks in reading quizzes. Turn in written homework at the start of each class and be prepared to ask questions. **Grading is based on completeness and follows the checklist in the schedule.**

In-Class Engagement (ongoing work in class)

The goal is to build on prior knowledge (including homework). Engagement: take notes, turn in classwork and quizzes, & try problems (risk being wrong, use problem-solving steps, talk about mistakes, examine consequences), explain & ask questions (without monopolizing class time), listen & respond to classmates, reflect. Follow the standard COE P3 rubric (Professionalism, Preparation, Participation). **Grading is based on completeness, being in class, and COE P3 rubric.**

Attendance: Attendance and participation are essential in this class. **Physical absence:** If you are not in class, you will be counted absent. There is no distinction made between "excused" or "unexcused." If a class is missed, it is your responsibility to use Zoom to find out what was missed, do the tasks, and learn the material. **Mental absence:** Checking email, texting, sleeping, or doing work for another class are examples of being mentally absent. If you are not actively participating in class, you will be marked absent. ***No absences: 1% bump on your final grade; Fewer than 2 absences: ½% bump on your final grade***

Exams (dates shown in course schedule)

Goal: demonstrate your individual procedural and conceptual learning. You cannot use a calculator, notes, or classmates. You'll create representations, use multiple strategies, solve problems, explain & justify, and analyze student work. **Grading based on completeness & correctness.**

Final Project (multiple deadlines shown in course schedule)

Final Project: You will complete an adapted Critical Area project. You will create a 4-6 minute video for your future students, based on research on a course concept using the Georgia Standards of Excellence and other resources.

Extra Credit (opportunities will be announced in class and posted in News items on Folio)

Volunteer at the Math Tournament (2% pts; March 25) or to run math tasks at STEM nights (1% pts per night). If you want an event added, please let Dr. Maher know. **Dr. Maher's mistakes:** If I make a mistake (in class, course materials, emails)**, let me know!** You will earn 0.1% points each for the whole class! I appreciate the opportunity to fix my mistakes–it helps me learn and improves the course.

Late Work or Missing Exams: If health or other issues prevent you from completing tasks, contact me as soon as you are able. Submit any late work for half credit until the last day of the relevant module. A missed exam will be a zero. In rare circumstances, make-up exams may be scheduled. Let me know ahead of time (**not** after) if you have scheduling conflicts. **Final exams must be taken at the scheduled time**. A student must have permission from the instructor, chair, and dean to reschedule their final exam time.

Academic Honesty: All work submitted for evaluation should be your own work and reflect your personal understanding of the concepts and strategies covered in the course. Specifically, work on exams using identical wording to a classmate may result in penalties including failing the course and possibly expulsion from the university.

Face masks: Please consider wearing masks. COVID is less of a problem, but stomach viruses, RSV and this year's flu strains are hitting hard. Many of you spend time in K-8 classrooms (or have classmates and friends who do) where it's easy to pick up viruses.

- A person may not know they are sick but can still be contagious.
- Juggling work, home, and school responsibilities is often overwhelming. Adding the physical & mental exhaustion from being sick can make it all impossible. Even if you normally don't get too sick, some of your classmates may not be so lucky.
- **YOU and your health and your families are precious.** Long-term COVID symptoms such as brain fog or reduced lung capacity may come and go the rest of your life, and let's face it - the last thing any of us need is more brain fog!

*With this in mind, **you can earn a 1% bump on your final grade if you wear a mask** each day that you attend class. This policy benefits all students in this course because limiting exposure makes it more likely we can meet face-to-face all semester.*

Please review the Georgia Southern Code of Conduct for all institutional policies: Link to Code of Student Conduct

Classes Missed due to a Campus-wide Emergency (e.g., hurricane policy)

- Announcements will be posted on Folio.
- **One class missed:** Class time (75 minutes) is made up on Folio before the final exam.
- **Two classes missed:** Online assignments and due dates posted on Folio to cover missed work, based on the situation. I'll be respectful of students without electricity or internet services.
- **Three or more classes missed:** The first week of missed class is on Folio, following the above. Additional days will be made up by scheduling classes during evenings or weekends.

HB 280 (Campus Carry) went into effect on July 1, 2017. Please see www.usg.edu/hb280 for more information.

ADA Accommodations for Students

Georgia Southern University is committed to providing reasonable accommodations to students with documented disabilities as required under federal law, including **ADD or AD/HD, autism spectrum, brain injuries, chronic medical conditions, communication disorders, visual or hearing impairment, learning disabilities, mobility impairment, and psychological disorders.** The purpose of accommodation is to provide equitable access to the academic material and assessments. If you need accommodations, please contact the Student Accessibility Resource Center (SARC). Meet with a SARC staff member who can help you gather documentation or refer you to an appropriate resource for assessment. Once approved, SARC staff will send me an accommodation letter detailing the approved accommodations. **Please contact me so we can discuss and implement your accommodations.** Disability accommodations work best at the beginning of the semester, but can be approved at any point in the semester (but not given retroactively). Statesboro is on the 2nd floor of Cone Hall – (912) 478-1566. For Savannah and Liberty, 2nd floor Memorial College Center – (912) 344-2572.

Equitable Learning Opportunities and Inclusive Excellence

It is my intent that students from all diverse backgrounds are well-served by this course, learning needs are addressed in and out of class, and the diversity you all bring to this class is viewed as a resource & strength. It is my intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, culture, ... I will attempt to foster an environment in which each class member is able to hear and respect each other. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally, or for other students or student groups. Please let me know if something said or done in the classroom, by either myself or other students, is particularly troubling or causes discomfort or offense.

Here are ways to alleviate some of the discomfort or hurt you may experience:

- Discuss the situation privately with me. I welcome students' experiences and changing my thinking and strategies.
- Discuss the situation in class. Other students can develop a fuller understanding of context and impact of actions.
- Notify me through another source such as your academic advisor, a trusted faculty member, or a peer.

Inclusivity specific to math… Math is often perceived as neutral, allowing equitable access to anyone. Many believe math exists independently, clean and unchanging, identical to everyone. This stance is untrue and dangerous. It hides implicit biases and barriers--often reinforcing that only special people can be good at math. Mathematics is messy, individual, and often beautiful. People can be good at math in many ways. You should be able to be creative, make assumptions and interpretations, and push hard on math by asking why something works one way but not another. ***You will teach math, so you should get to feel ownership of the math you will teach (so your students can also get that opportunity).***

Workload and Practicing Strategies for Studying Smarter, not Harder

As you continue to become a teacher, your workload will get heavier (unfortunately). Both your student handbook and my faculty handbook state Georgia Southern's expectations are ***at least*** 2 hours out of class each week ***per credit hour***. Basically that means that a 3 credit hour course should require at least 6 hours of work outside of class. I do my best to limit your out-of-class work, but there will be heavy weeks. Be sure to plan ahead around our deadlines, other course deadlines, and your work schedule. Feeling overwhelmed can be painful and frustrating. I wish I could protect you from that! ...but it happens in every profession and especially for teachers. If there were a "one size fits all" solution then I would share it. But because everyone thinks and works differently, I incorporate strategies and ideas throughout the semester to support you in learning how to choose and tailor strategies to meet your learning needs.

Practice and revise your time management skills every semester!

- Practice ***boundaries*** and ***efficiency*** by setting a timer for each task. Do the best you can in that time.
- **When you don't finish a task**, write a note to your future self about what to try differently next time.
- Come chat with me or the Academic Success Center if you need to brainstorm what to try next!

Self Care: Your Well-being Matters

College is both exciting and challenging! Taking time to care for yourself and seeking appropriate support can help you achieve your academic and professional goals. I encourage you to maintain a healthy lifestyle by eating a balanced diet, exercising regularly, avoiding drugs and alcohol, getting enough sleep, and taking time to relax. We all benefit from assistance and guidance at times. Georgia Southern provides many resources to support your well-being

If you or anyone you know struggles to come to campus or class or with overwhelming academic stress, persistent difficult feelings, and/or challenging life events, please seek support.

Consider reaching out to friends and loved ones or a faculty member you trust for help finding resources.

Counseling can be an opportunity to talk with an objective person who helps you develop skills for managing life's challenges. The University Counseling Center is here for you. Call 912-478-5541 (Statesboro) or 912-344-2529 (Armstrong/Liberty) 24/7.

Use of Student Work:

I may use student work as examples in class, presented anonymously. Links to final project videos will be shared to all students & may be used in future classes as examples. If you prefer your work not be used, please send me an email early in the semester.

Disclosure of Potential Research Recruitment and SoTL Research Survey

As part of my ongoing development as an educator, and a member of the larger math education research community, I am passionate about understanding and supporting your mathematical thinking. I may ask for your consent to use coursework as data to help me improve my teaching and to communicate what I'm learning with colleagues in Georgia, or national and international colleagues. There is no impact on your grade or academic standing whether you participate or not. I do not know who consents until after grades are submitted at the end of the semester. If you consent but change your mind, let me know after the semester ends. Currently, I'm working on a research project investigating how students learn and how the COVID pandemic affected our students. I/we will use this research to help us develop better teaching skills and to enhance how future students learn these subjects. In this class, I will kindly ask you to participate in an online anonymous survey. A link to the survey will be made available later. I/we plan to analyze your survey answers as part of a Scholarship of Teaching & Learning (SoTL) research project. In presenting results, I/we will not include names or any identifying details. If you provide a narrative, please do not include any names or details that can identify you or persons referred to. If you are under the age of 18 or object to any questions, I/we ask you to not participate. There is no impact on your grade or academic standing whether you participate or not. Please contact me with any questions or concerns about the research.

Important Dates:

- Classes begin: Monday, January 9
- Dr. Martin Luther King Jr. Day (no class): Monday, January 16
- Last day to withdraw without academic penalty: Monday, March 6
- Spring Break (no class): March 13-18
- Last day of class: Monday, May 1
- **Final exam schedule: Wed., May 3, 3 - 5 pm**

You must be in class during the scheduled time. If you can't be in class, you must fill out Georgia Southern's "change in final exam" request. The last day of classes and final exams are scheduled by Georgia Southern University and can be found at these links: Spring 2023 Academic Calendar Spring 2023 Final Exam Schedule

Tentative Course Schedule

Day	Date	Topic(s)	Final Project Due Sat. @ 11:59 pm
Unit 1: Problem-Solving, Geometric Shapes, and Measurement			**Step 1: 1/14** Get Started due in Google Drive Peer Folder **Step 2: 1/21** Content standard due in Google Drive Peer Folder **Step 3: 1/28** Draft Research due in Google Drive Peer Folder **Step 4: 2/11** Peer Feedback on Research due in Google Drive Peer Folder **Step 5: 2/18** Final Research Paper due on Folio Dropbox **Step 6: 3/04** Draft Video due in Google Drive Peer Folder **Step 7: 3/18** Peer Feedback on Video due in Google Drive Peer Folder **Step 8: 4/29** Final Video + Rubric / Reflect due on Folio Dropbox
01	Mon. Jan. 9	Course Orientation	
02	Wed. Jan. 11	Problem-Solving, Basic Concepts, & Measurement (1-1, 2-1)	
03	Wed. Jan. 18	****No class Dr. Martin Luther King Jr. Day, Mon. Jan. 16**	
04	Mon. Jan. 23	Measuring Perimeter & Area of 2D Shapes (2-2, 3-1, 3-2)	
05	Wed. Jan. 25		
06	Mon. Jan 30		
07	Wed. Feb. 1		
08	Mon. Feb. 6	Measuring Perimeter & Angles of Triangles (2-3, 3-3)	
09	Wed. Feb. 8		
10	Mon. Feb. 13	Measuring Surface Area & Volume of 3D Shapes (3-4, 3-5, 2-4)	
11	Wed. Feb. 15		
12	Mon. Feb. 20		
13	Wed. Feb. 22	**Unit 1 Exam**	
Unit 2: Formal Geometry (aka writing Proofs)			
14	Mon. Feb. 27	Reasoning & Proof (4-1) + Construction 1	
15	Wed. Mar. 1	Triangle Congruence Conditions (4-2) + Constructions 2 & 3	
16	Mon. Mar. 6		
17	Wed. Mar. 8	Problem-Solving w/ △ Congruence (4-3) + Constructions 4-6	
18	Mon. Mar. 20		
19	Wed. Mar. 22	Parallel Postulates (5-1 & 5-2) + Construction 7	
20	Mon. Mar. 27		
21	Wed. Mar. 29	Parallelograms & Rhombuses (5-3) + Related constructions	
22	Mon. Apr. 3		
23	Wed. Apr. 5	**Unit 2 Exam**	
Unit 3: Applications of Number Sets and Operations			
24	Mon. Apr. 10	Rectangles, Squares, Trapezoids (5-4) + Related constructions	
25	Wed. Apr. 12		
26	Mon. Apr. 17		
27	Wed. Apr. 19	Similar Triangles (6-2)	
28	Mon. Apr. 24		
29	Wed. Apr. 26	Isometries & Congruence (9-1)	
30	Mon. May 1		
	Wed., May 3, 3 - 5 pm	**Final Exam / Unit 3 Exam** **Attendance is required. Be sure to arrange your schedule accordingly.**	