

Math 321: College Geometry

Spring 2019

3 credits

Instructor: Dr. Dibbs

Instructor: Rebecca Dibbs, PhD

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Office: 318 Binnion

Office Hours: MW: 11-12; TR: 10-11; by appointment

Class Meets: TR 12:30-1:45

Fax: 903.886.5945

Texts: The readings for this course will come from photocopied handouts.

Course Materials: You will need a folder or binder in which to keep your written work and a flash drive on which to keep your work done on the computers. You will also want to have a sphere of some kind to look at when we study spherical geometry. Tennis balls work well, as do the plastic spheres often available at craft shops.

Other required materials:

- Access to Lesson Sketch: set up a free account at <https://www.lessonsketch.com/login.php>
- Access to a high school geometry textbook

Course Description: This course is about geometry, but it is also a course about learning to develop and express your own mathematical ideas. It will emphasize ideas and imagination in addition to techniques and calculations. We will be investigating not only the planar Euclidean geometry that you probably studied in high school, but also geometry on spheres, cylinders, cones, pool tables, and other surfaces. We will try to imagine what geometry would be like for someone living on each of these surfaces. We will be studying these geometries not only because they are useful and can tell us surprising things about the world in which we live, but also because they are beautiful and fascinating subjects.

This course may be very different from most other math courses that you have taken. High school and introductory college math courses usually focus on teaching methods of doing computations: mathematics as finding the correct answer. In this course, we are going to focus on another kind of mathematics: mathematics as a way of thinking about and trying to understand the world. We'll try to understand how people decide what is true, and how they reason about mathematics and geometry in particular. We are going to focus on the process as much as the results of mathematical thought.

Writing is an important part of this process. Contrary to what some other math courses may have led you to believe, it is virtually impossible to do mathematics without writing about it. Writing is a tool for communicating ideas to other people, but it can also be used as a tool for clarifying one's own ideas. It can be very hard to spot a flaw in a line of reasoning if you haven't written it down; conversely, writing down a line of reasoning is often the best way to expose any problems that it might have. For these reasons, practicing mathematicians invariably use writing as a vital part of their work, and writing will be an integral part of this course.

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This course will require a willingness to invest significant amounts of effort grappling with developing your own ideas. In this course, as in the real world, you will be the ultimate arbiter of what you believe to be true. Deciding for yourself what is true is not easy, but it can be very rewarding.

Grades: I expect everyone to complete all course requirements. The effort, detail, and thoughtfulness you put into your work should reflect the standards of performance you will be expected to meet as a teacher or other professional:

- meticulous preparation
- use and application of mathematical knowledge
- careful consideration of alternatives
- genuine curiosity about all ideas
- collegial work
- analysis and reflectiveness
- clear expression, with respect for the place and value of precision
- organization
- Timeliness

Your final grade will be composed as follows based on your performance of each of the course requirements (described in detail in the sections that follow):

Homework and Writing Assignments	25%
Participation	10%
Group Projects	15%
Exams & Quizzes	40%
Portfolio	10%
Total	100%

All grades will be rounded to the nearest percent, then assigned letter grades based on the following scale

90-100 A	60-69 D
80-89 B	0-50 F
70-79 C	

Homework and Writing Assignments: There will be regular classwork and daily assignments to be used as tools to develop your understanding of topics. Homework assignments will be assigned daily in class and submitted prior to the next class period through D2L. They will be graded for completion and attempted work and may include responses to readings and student work along with proofs and other formats of questions. Writing assignments will be given regularly and will involve more in-depth explanations

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and writing. They will be graded for accuracy and completeness. At least one week will be given to complete a Writing Assignment.

Participation: Professional participation is expected during all classes. You will be given a participation grade for each day of class. Absence from class for any reason will result in losing all of the points for that day. In addition, points may be deducted for lack of preparation, failure to participate fully during class, and inappropriate use of electronic devices during class.

Assessments: There will be one Mid-Term Assessment consisting of in-class and take home sections and one cumulative final exam. There will also be short announced and unannounced quizzed during the semester. Questions will focus on reasoning and explanation of ideas, reflect the classwork and homework assignments, and will include demonstration of your mathematical knowledge for teaching.

Portfolio: Throughout the semester you will gather selected pieces of your work and write reflections on your learning through that work. The collection of work will be submitted electronically at the end of the semester.

Group Projects: There will be two group projects during this semester. The first project will be completed outside of class and submitted through D2L. The second will involve a 10 minute presentation on a geometric topic selected from a list provided by the instructor. Presentations will be given during the last few weeks of class. Presentation slots will be randomly assigned.

Hints for Success: The best approach is to strive for a solid understanding of the course topics and to accept at the start that this necessarily entails some struggling with ideas and feelings of frustration. The course problems take time, especially time to explore and think about the ideas. Often you will need to walk away for a while or for a day, and return to a problem for a second or third look before writing up your response. Expect this. However, do not get behind on the problems. Try to cultivate an approach that is a nice balance between "just getting it done" and avoiding it altogether. Stay connected, and come see me if you are having difficulties.

Group Work: We will often work in groups in this course. Whenever a group hands in a written assignment, they are required to put on the paper the names of those who participated fully, and only those names. Each person must sign the final copy. Your signature certifies that you participated equally in the project. It is dishonest to turn in work that is not solely and equitably the creation of the team members. You are not required to include on the report the name of someone who started but did not finish, or who did not contribute their share. Also, as the instructor I reserve the right to assign group members different grades if it doesn't appear that every contributed equally.

Outside Sources: A central aim of this course is to help you learn to develop your own ideas about mathematical questions. You therefore should **NEVER** consult any reference materials

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outside of the course texts in answering questions for this course. This includes materials found on the internet. *The ideas that you present should be your own.*

Office Hours: My office hours are listed above, and will be held in 318 Binnion Hall. Please come see me! The best way to make an appointment or to get in touch with me for any other reason is to send me an email.

Attendance: It is absolutely vital for an interactive class like this that you come to class and participate. Your attendance will count as part of your class participation grade, and excessive late arrivals will count as an absence.

Licensure: This course provides content necessary to enable secondary licensure standards to address the K-12 Texas TKEs.

Disability Support Services: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library- Room 132

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

StudentDisabilityServices@tamuc.edu

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Tentative Calendar

Tuesdays	Topic	Thursdays	Topic
Jan 16	What is Geometry?	Jan 18	Axiomatic Systems: Straightness
Jan 23	Axiomatic Systems: Lines and Distance	Jan 25 *	Axiomatic Systems
Jan 30	Axiomatic Systems	Feb 1	Axiomatic Systems
Feb 6	Axiomatic Systems: Incidence	Feb 8	Axiomatic Systems: Incidence
Feb 13	Axiomatic Systems: Parallels	Feb 15	Axiomatic Systems: Parallels
Feb 20	Axiomatic Systems: Parallels	Feb 22	Transformational Geometry
Feb 27	Transformational Geometry	March 1	In-Class Mid Term Exam
March 6	Spring Break – No Class	March 8	Spring Break – No Class
March 13	Transformational Geometry	March 15	Transformational Geometry
March 20	Transformational Geometry	March 22 **	Transformational Geometry
March 27	Transformational Geometry	March 29	Similarity and Area: View Tubes
April 3	Similarity and Area	April 5	Similarity and Area
April 10	Similarity and Area	April 12	Similarity and Area
April 17	Similarity and Area	April 19	Similarity and Area
April 24	Similarity and Area	April 26	Reading Day – No Class

Note: There will be no class Tuesday, March 27. The reading day will move to compensate.