
MATH 5341

Modern Geometry

COURSE PREREQUISITES: Graduate standing in mathematics or consent of the instructor.

COURSE GOALS and OBJECTIVES: This course explores Euclidean and Non-Euclidean geometry, with connections to history. Geometric properties of the plane, spheres, and other surfaces will be explored through problems using direct experience, intuition, and formal reasoning. Activities will emphasize collaborative learning, classroom discourse, and written justifications and proofs. It will also challenge your existing notion of what geometry (more generally, mathematics) is all about and connect advanced geometric reasoning and proof to geometry in secondary school settings.

Student Learning Outcomes: Upon successful completion of this course, you will be able to:

- Apply problem-solving skills to problem situations in modern geometry.
- Describe historical origins of modern geometry.
- Describe connections among Euclidean geometry and other non-Euclidean geometries.
- Explain geometric concepts using clear mathematical arguments and proofs.
- Make connections between advanced geometric concepts and the teaching and learning of geometry in secondary school.

ELECTRONIC COMMUNICATION STATEMENT:

UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

SPRING 2018

T 5:30-8:20 in PKH 311

Instructor: **Dr. J. Álvarez**

E-Mail: james.alvarez@uta.edu

Phones: 817-272-5047 (office)

817-272-3261 (math dept.)

Office: PKH 404

Office Hours: M 3:00-5:00 & by appt.

Website: <http://www.uta.edu/faculty/alvarezia>

Blackboard: <https://elearn.uta.edu>

Faculty Profile:

<http://www.uta.edu/profiles/james-epperson>

TEXTBOOK:

Experiencing Geometry: Euclidean and Non-Euclidean with History (Third Edition)

David W. Henderson & Daina Tamina
(ISBN-13: 978-0131437487)

Published by Pearson Education, Inc.

MATERIALS:

Additional readings will be provided via UTA Blackboard (elearn.uta.edu).

Blackboard will also be used for course communication and assignments. For assistance with Blackboard, please contact the UTA Helpdesk at the Office of Information Technology.

Inexpensive household objects will be requested throughout the semester as the need arises, including rubber bands and a tennis ball or plastic sphere.

GRADES:

Writing Assignments	70%
Quizzes	15%
Final Exam	15%
Total	100%

CLASS FORMAT: Each class will consist of a combination of lectures and some collaborative work. Occasionally we may meet in the computer lab.

DETAILS ABOUT THE COURSE

Grades will be assigned using the following scheme (approximate):	90-100	A
	80-89	B
	70-79	C
	60-69	D
	59 or Below	F

Course Assignments and Examinations:**Writing Assignments:**

You will be asked to write your solutions to several of the problems discussed in class. Seven writing assignments (WAs) will be given. During class time, you will work in groups to solve problems, but the WA you submit should be your own work. You will be allowed three drafts of each WA, and the submission/ revision process will be as follows:

1. Submit Draft 1 of your WA.
2. A peer will make comments on Draft 1 (three times this semester), OR instructor will make comments on Draft 1.
3. Submit Draft 2 of your WA.
4. Instructor will make comments on your Draft 2.
5. Submit Final Copy of your WA.

The goal of the WAs is to develop skills for writing proofs through an ongoing dialogue among students and instructor. As such, you will be asked to critique the reasoning and arguments of your peers as well as respond to comments and questions on your own writing. A grading rubric will be provided.

WAs may be hand-written, typed, or a combination (such as typed with hand-drawn figures). Hand-written portions must be neat and readable. You will submit all your drafts and final WA versions via Blackboard, but you are expected to bring hard copies of your work to class. For peer-reviewed assignments (D1 of WA#1, WA#5, and WA #7) you will upload the peer-review comments and/or markups with D2 of the corresponding writing assignment. After you receive comments for each draft, you may submit responses to questions and comments in a separate paper, or you may rewrite the original assignment. All drafts and peer comments are due on class days at 5:30pm. You will need a paper copy of your completed peer comments to discuss with your partner (and provide them with a copy or a markup of their D1—use ink that is of a different color than that used by author). No comments will be made on late drafts, and your grade will be lowered for late or missing critiques on peer work.

Technology (e.g., Geometer's Sketchpad, Geogebra) will sometimes be used to supplement written work. Further instructions will be provided for submitting technology assignments. With advance notice, your group may be asked to give short presentations and lead discussions on your solutions to problems discussed during class.

Quizzes:

You will have five short quizzes to assess readings and content covered in the course. Quiz dates are on the course schedule. These quizzes will be at the beginning of class, and you may use your textbook, readings, and all notes during the quizzes. If you stay connected in the course and work to your potential, you will find the quizzes to be a welcome challenge rather than a cause for concern.

Final Exam:

The final exam is cumulative.

Other Course Expectations:

Attendance: At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I have established the following attendance policy:

Because this course relies heavily on group participation and meets only once per week, attendance is mandatory. You may miss one class period (3 hours) for any reason without penalty. Your final course grade will be lowered one-half letter grade (5%) for each additional absence (including arriving significantly late).

Professionalism: You are expected to actively participate in and stay on task during classroom activities and discussions. You are encouraged to offer suggestions and conjectures even if you aren't sure of the answers. In addition, you are expected to work with others, respect others' ideas, and celebrate others' successes. Students with lack of or inappropriate participation will be required to meet with the instructor to develop an action plan.

HELP OUTSIDE OF CLASS: My office hours are listed on the first page of this syllabus. These are times when I will be available, in my office, to discuss the material/homework/tests. No appointment is necessary for those times. If, however, those times are inconvenient for you, then please make an appointment with me for another time (e.g., e-mail me stating the times you prefer). *Please use the subject heading "MATH 5341 Student Question" when sending Dr. Álvarez an e-mail and identify yourself (full name) in the communication.*

Personal Technology Use: Cellular phones should either be switched off or set to silent mode during all class meetings. Cellular phone use will not be permitted during class unless you are using it to access an APP such as Desmos or GeoGebra. If you must take an important phone call, please leave the classroom. Cellular phone use is prohibited during exams and quizzes. If you have a watch, or other device, that beeps please turn this off during class meetings as it is disruptive for other students. Students must request permission to use a laptop or tablet during class. Inappropriate use will result in loss of this privilege.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://www.uta.edu/aao/fao/>).

COURSE SCHEDULE¹:

Topics	Date	Assignments Due							
		Quiz	WA #1	WA #2	WA #3	WA #4	WA #5	WA #6	WA #7
Historical Strands of Geometry	Jan 22								
What is “straight”?	Jan 29	Q1							
Straightness on spheres	Feb 5		D1						
	Feb 12		PR	D1					
What is an angle?	Feb 19		D2		D1				
	Feb 26	Q2		D2		D1			
Straightness on cylinders and cones	Mar 5		FC		D2		D1		
	Mar 12	NO CLASS: Spring Break							
	Mar 19			FC		D2	PR		
Straightness on hyperbolic planes	Mar 26				FC		D2	D1	
	Apr 2	Q3				FC			D1
Triangles and Congruencies	Apr 9						FC	D2	PR
	Apr 16	Q4							D2
Area and Holonomy	Apr 23							FC	
	Apr 30	Q5							FC
ALL	May 7	FINAL EXAM							

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA)*, *The Americans with Disabilities Amendments Act (ADAAA)*, and *Section 504 of the Rehabilitation Act*. All instructors at UT Arlington are required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a **letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Student responsibility primarily rests with informing faculty **at the beginning of the semester and in providing authorized documentation through designated administrative channels.**

If you require an accommodation based on disability, I would like to meet with you in the privacy of my office, during the first week of the semester, to make sure you are appropriately accommodated.

¹ As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled. – Dr. James A. M. Álvarez

Non-Discrimination Policy: *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.*

Title IX Policy: The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.*

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit (located to the right as we exit our classroom). When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

Important Dates:

First Day of Classes	16 January
Census Date	31 January
Spring Break	12-17 March
Drop Date	30 March, by 4 pm
Last Day of Classes	04 May
Final Exam	07 May, 5:30-8:00 pm