Geometry
MTG 3212
3 Credit Hours
Spring 2024

Instructor:	Stephen Adams
Office:	LIT 326
E-mail:	stephen.adams@ufl.edu
Office Hours:	MWF Period 4 in LIT 326
Lecture:	MWF Period 5 in AND 21

Prerequisites MAC 2312 with a minimum grade of C or AP/IB/AICE credit for MAC 2312.

Course Description This course introduces an axiomatic approach to the development of neutral, Euclidean, and hyperbolic geometry. This course is particularly useful for prospective secondary mathematics teachers.

Learning Outcomes After completing this course students will understand how axiomatic systems can be used to develop models of geometry. Students will learn about the historical development of geometry as well as how the choice of a parallel postulate (or the lack of one) leads to models of geometry that share many similarities but also have some key differences. Students will improve their critical thinking, problem solving, and proof-writing skills. Students will also better understand the core geometry content in the high school curriculum.

Required Materials We will use a preliminary version of the textbook *Geometries* by Stephen Adams and Emma Wright which can be found on Canvas.

E-Learning Canvas: E-learning canvas, a UF course management system, is located at elearning.ufl.edu. Use your Gatorlink username and password to login. All course information including your grade, course homepage, syllabus, office hours, assignments, etc. can be accessed from this site.

You are responsible for verifying that your grades are accurate. **You have one week after a score has been posted to contact your instructor if you believe there has been a recording error. There is no grade dispute at the end of the semester.**

Please note: Important course information is clearly communicated in this course guide, the MTG 3212 homepage and links in Canvas, and announcements in lecture.

E-mail All communication between student and instructor and between students should be respectful and professional. All official class communications will be sent only to the ufl.edu addresses. Students are responsible for acquiring, checking their email accounts regularly, and any class information sent to their ufl.edu account. Please be sure to sign your name to your e-mails.

Lectures Every Monday, Wednesday, and Friday during period 5 (except for school holidays and exam days), there will be a 50 minute lecture in AND 21. These lectures will introduce and provide examples of new course material. Attendance at these lectures is strongly encouraged as this is where you will be introduced to the course material.

Exams Midterm exam dates are as follows:

Friday, February 9

Friday, March 22

Final: Wednesday, April 24

There will be two in-class midterm exams throughout the semester. The FINAL EXAM will take place on the last day of classes, Wednesday, April 24 from 11:45 AM to 12:35 PM in AND 21.

Each midterm exam is worth 20% of your final grade while the final exam is worth 20% of your final grade. No exam grades will be dropped. There are no exam retakes. Midterm exam dates are subject to change but will be finalized at least one week in advance.

Homework

You are expected to read the book before you come to class. This course will be more abstract than the geometry you took in middle/high school. It is much easier to understand the material discussed in class if you have read it over beforehand. You should also re-read the sections covered in the book when you get home to reinforce the material. While reading is not an explicit component of your grade, it will greatly help you learn the material and it is important for your success in this course.

Homework assignments will be assigned periodically in class. These assignments will primarily be proof-based. **Proof-based problems can be difficult and you may not know how to solve them. This is ok.** You can learn a great deal by thinking about the problems even if you are not able to formulate a complete solution. **If you have any questions about the assignment problems please see me! I am here to help you.** You may discuss the problems with your classmates but the work you turn in must be your own.

These assignments will be graded for both correctness and clarity and are to help develop your critical thinking, problem solving, and written communication skills. These assignments count for 20% of your final grade.

Labs

There will be several labs throughout the semester that will require the use of GeoGebra. These labs count for 20% of your final grade. GeoGebra is a free interactive computer program that is used to teach and learn geometry. It can be downloaded for free at http://www.geogebra.org/.

Make-up Policy

All make-up work must be arranged with the instructor.

• **Make-up Exams** If you are participating in a UF sponsored event or religious observance, you may make up an exam only if you make arrangements with the course coordinator at least ONE WEEK PRIOR to the event. You must present documentation of a UF sponsored event.
If illness or other extenuating circumstances cause you to miss an exam, contact your instructor (no later than 24 hours after the exam) by email. Then, as soon as possible after you return to campus, provide the appropriate documentation.

• **Make-up Homework**: There are no make-ups.

• **Make-up Labs**: There are no make-ups.

Incomplete

Students who are currently passing a course but are unable to complete the course because of illness or emergency may be granted an incomplete grade of I which will allow the student to complete the course within the first two weeks of the following semester. See the policy on http://www.math.ufl.edu/fac/incompletes.html. If you meet the criteria, you must contact the course coordinator before finals week to be considered for an I. An I only allows you to make up your incomplete work, not redo your work.

Grading

Homework: 20%

Labs: 20%

Midterm Exams: 40% (20% each)

Final Exam: 20%

Your final grade will be rounded to the nearest hundredth and a letter grade will be given using the following grading scale:

Grading Scale

90.00-100 A	87.00-89.99 A-	84.00-86.99 B+	80.00-83.99 B
77.00-79.99 B-	74.00-76.99 C+	70.00-73.99 C	67.00-69.99 C-*
64.00-66.99 D+	60.00-63.99 D	57.00-59.99 D-	0-56.99 E

For those take the S-U option: 70.00-100 S 0.00-69.99 U

Approval of the S-U option must be obtained from the course coordinator. The deadline for filing an application with the Registrar and further restrictions on the S-U option are given in the Undergraduate Catalog.

For a complete explanation of current policies for assigning grade points, refer to the UF undergraduate catalog:

catalog.ufl.edu/ugrad/regulations/info/grades.aspx

NOTE: Disputed points will not at the end of the semester. All grade concerns must be settled within one week of the return of the paper.

Extra Credit

There is no extra credit.

Calculators

Calculators are **NOT** permitted on exams.

Cell Phones

Cell phones must be turned off (not on vibrate) before coming to class. Use (defined as having one physically in your hand) of a cell phone during a test or quiz will be considered contact with another person and will be viewed as a form of academic dishonesty because I cannot be assured in such a circumstance that you have not taken a picture of the test/quiz or sent a text message to someone. As a result, **using a cell phone during a test or quiz for any reason will result in an automatic grade of zero and possible disciplinary action.** Wait until after you have left the room and are finished with the test/quiz to use it.

Music Players

iPods and other music players are not to be used during class tests and quizzes. Having one out during a test or quiz will result in a grade of zero and possible disciplinary action.

Students with Learning Disabilities

Students requesting class and exam accommodations must first register with the Dean of Students Office Disability Resource Center (DRC), www.dso.ufl.edu/drc/. That office will provide a documentation letter via email to the course coordinator. This must be done as early as possible in the semester, **at least one week before the first exam**, so there is adequate time to make proper accommodations.

COVID Policy

In response to COVID-19, the following recommendations are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to further the health and safety of ourselves, our neighbors, and our loved ones.

- If you are not vaccinated, get vaccinated. Vaccines are readily available and have been demonstrated to be safe and effective against the COVID-19 virus. Visit one.uf for screening / testing and vaccination opportunities.
- If you are sick, stay home. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 to be evaluated.
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work.

Diversity and Inclusion

The Mathematics Department is committed to diversity and inclusion of all students. We acknowledge, respect, and value the diverse nature, background and perspective of students and believe that it furthers academic achievements It is our intent to present materials and activities that are respectful of diversity: race, color, creed, gender, gender identity, sexual orientation, age, religious status, national origin, ethnicity, disability, socioeconomic status, and any other distinguishing qualities.

Academic Honesty Guidelines

All students are required to abide by the Academic Honesty Guidelines which have been accepted by the University. The academic community of students and faculty at the University of Florida strives to develop, sustain and protect an environment of honesty, trust, and respect. Students are expected to pursue knowledge with integrity. Exhibiting honesty in academic pursuits and reporting violations of the Academic Honesty Guidelines will encourage others to act with integrity. Violations of the Academic Honesty Guidelines shall result in judicial action and a student being subject to the sanctions in paragraph XIV of the Student Code of Conduct. The conduct set forth hereinafter constitutes a violation of the Academic Honesty Guidelines (University of Florida Rule 6C1-4.017).

The Mathematics Department expects you to follow the Student Honor Code. We are bound by university policy to report any instance of suspected cheating to the proper authorities. You may find the Student Honor Code and read more about student rights and responsibilities concerning academic honesty at the link www.dso.ufl.edu/sccr/.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaintto the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student

Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Important Spring 2024 Academic Dates and Deadlines

Classes Begin	Monday, January 8
Drop/Add	Monday, January 8 - Friday, January 12 (11:59 PM)
Withdrawal deadline (full refund)	Friday, January 12 (11:59 PM)
Withdrawal deadline (25% refund)	Friday, February 2
Drop deadline (no refund)	Friday, April 12 (11:59 PM)
Classes end	Wednesday, April 24

Holidays (no classes)

Martin Luther King Jr. Day	Monday, January 15
Spring Break	Saturday, March 9 - Saturday, March 16

Note: Information in this syllabus is subject to change. Any changes will be clearly announced in class or through e-mail.

List of Topics

Chapter	Topics
1	Preliminaries: Introduction to Rigorous Geometry; Axioms, Models, and Independence; The Need for Undefined Terms and Postulates
2	Neutral Geometry: Postulates for Neutral Geometry; Pasch's Axiom and the Crossbar Theorem; Congruence Conditions; Perpendicular Lines; Parallel Lines in Neutral Geometry; The Saccheri-Legendre Theorem; Polygons and Area in Neutral Geometry; Circles in Neutral Geometry
3	Euclidean Geometry: The Euclidean Parallel Postulate; Polygons and Area in Euclidean Geometry; Similar Triangles; Pythagorean Theorem; Circles in Euclidean Geometry; Circumference and Area of Circles; Euclidean Trigonometry (time permitting)
4	Hyperbolic Geometry: The Hyperbolic Parallel Postulate; Common Perpendiculars; Angle of Parallelism; Defect and Area; Hyperbolic Functions; Poincaré Disk Model; Angles in the Poincaré Disk; Hyperbolic Circles

The topics covered are tentative. Some topics may be added or removed depending upon time and class interest.