MATH 316-01 Euclidean and Non-Euclidean Geometry
FALL 2024

Instructor: Eric Swartz
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Office: Jones 133
Office Hours: TR 12:30-2 PM, 3:30-4 PM
Course Homepage: We will use **Blackboard** as our course homepage.
Important dates: September 9 (Add/drop deadline), October 28 (Withdrawal deadline)

Content: This course will cover Euclidean and Non-Euclidean geometry from an axiomatic standpoint. Topics include incidence and projective geometry, Euclidean geometry and the Parallel Postulate, and hyperbolic geometry. We will follow along with the historical development of the subject and discuss the significance and philosophical implications of the material.

COLL 200: COLL 200 courses encourage you to make coherent and meaningful interconnections across academic disciplines and recognize the difference in methodologies, modes of inquiry, and ways of knowing. They are "anchored" in at least one of the three knowledge domains: Arts, Letters, and Values (ALV); Cultures, Societies, and the Individual (CSI); and Natural and Quantitative Reasoning (NQR). These courses "reach out" to one or both of the other knowledge domains, highlighting commonalities and differences among disciplines.
This class is anchored in NQR and reaches out to ALV. Among other course objectives, this course specifically will ask you to:

1. Master basic ideas and methods central to the primary knowledge domain(s).
2. Make coherent and meaningful interconnections across the academic domains.

Textbook: *Euclidean and Non-Euclidean Geometries (Fourth Edition)* by Marvin Jay Greenberg.
We will cover as much of Chapters 1–8 as we can.

Grading:

Homework:	50%
In-Class Participation:	10%
Quizzes:	10%
Final Project:	30%

Final letter grades are assigned using the scale: A 93–100, A- 90–92, B+ 87–89, B 83–86, B- 80–82, C+ 77–79, C 73–76, C- 70–72, D+ 67–69, D 63–66, D- 60–62, F <60
This scale is not rigid! Lower cutoffs are often used.

In-Class Participation: Participation grades are based on faithful attendance and participation during lecture as well as actively working and participating during any group activities. Attendance and discussion one-on-one with me during office hours will also be looked on favorably and are an alternative option for students who experience anxiety. The participation grade will (necessarily) be somewhat subjective in the eyes of the instructor, but I *want* everyone to get a perfect (or near perfect) participation score!

Class Absences: If you are forced to miss class, please let me know! Excused absences will not affect your participation grade. **Lecture notes are always posted on Blackboard.** I will work with you as best I can to cover the material that you miss!

Homework Overview: Homework will be assigned during nearly every lecture. The definitive list of assigned homework will be posted on Blackboard. You are strongly encouraged to do all or most of each assignment before the next Tuesday/Thursday. However, correctness is even more critical than promptness. Incorrect proofs will be returned for you to repair, and you will not receive a grade from me until they're completely correct. The final due date for each problem is two weeks after the problem is assigned, unless otherwise noted. Your final homework grade will be based on the number of *completely correct* proofs handed in on time, *regardless of how many incorrect versions you turned in previously.* Partial credit may be given in some circumstances, but most problems will be scored as either 0 or 1!
Don't wait until the day before a problem is due to make your first attempt! Especially early in the semester, as you are getting used to writing proofs, problems may take multiple tries to get completely correct! Turn in an attempt as soon as possible after it's assigned so that you can get feedback. Late homework will only be accepted under truly extraordinary circumstances (e.g., major surgery). In order to be counted correct, a proof must be written in clear, correct English. This course is about proofs and proof writing, so you should try to express your proofs as clearly as possible!
While you may discuss the problems with your classmates (and you are in fact encouraged to do so!), copying someone else's work is strictly prohibited and will result in scores of zero for *everyone* involved. In particular, you may not use another student's final work as a "model," and you may not allow other students to study your final work. Everyone must hand in final proofs separately. Needless to say, copying or adapting a proof from another source (e.g., book or internet) is strictly prohibited as well. **In particular, the use or incorporation of any AI-generated content (such as from ChatGPT) in assignments is not allowed. Submitted work may be reviewed, as needed, for AI-generated content.**

LaTeX: Your homework assignments must be typeset using LaTeX. Being able to use this software is a useful skill to have, and the programs are available for free, if you so choose.
You may also use the online editor available at `https://www.overleaf.com/`. Simply sign up for free, start a new project, and paste the text from "sample.tex" into the source side.
It is easy to google commands/techniques that you don't know, but a list of common symbols is available at `http://cklixx.people.wm.edu/TeX-symbol.pdf`

Homework Policy: PDF files are to be emailed directly to me at easwartz@wm.edu. You should name the file you are turning in starting with "LastnameFirstname" in the filename; for example, `SwartzEric_HWAug29.pdf`. (Name the file whatever you want, but *always* start with "LastnameFirstname"!) **You should combine HW from different assignments into a**

single file that you turn in on a given day, and you should either omit or mark as graded/correct problems that you have already gotten correct. HW that is turned in by 9 AM ET on a given (non-holiday) weekday will be graded that day (or very shortly thereafter). HW turned in at other times may not be graded until the next "batch" (but may be graded sooner, if possible). If HW is due on a given date, I will accept it if it is turned in by 11:59 PM ET that day (but I might not grade it until the next day's "batch"). **Try to turn in HW by 9 AM ET on weekdays if you can!**

Quizzes: There will be a short quiz most Thursdays. The quizzes will largely be to check how well you have followed along with concepts that we have covered recently in class and that you have been keeping up with the readings.

Final Projects: You will need to submit a proposal for your project by Tuesday, October 8. A complete proposal consists of the idea for your project (summarized into a few paragraphs) and one source (which could a website, article, book, or a project from the textbook). **The proposal and any written component of your final project must be typeset using LaTeX.** Your final project will be due Wednesday, December 11, by 5 PM.

Student Accessibility Services: William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who feels they may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2512 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please see `https://www.wm.edu/sas`

Honor Code: Students are expected to uphold the honor code in this class. Any suspected infraction will be reported. Rest assured, I am older and more experienced than you are. **I will catch you if you cheat!**

Mental and Physical Well Being: William & Mary recognizes that students juggle different responsibilities and can face challenges that make learning difficult. There are many resources available at W&M to help students navigate emotional/psychological, physical/medical, material/accessibility concerns, including:

- The W&M Counseling Center at (757) 221-3620. Services are free and confidential.
- The W&M Health Center at (757) 221-4386.
- To seek assistance for interpersonal, academic, and wellness challenges, please contact Care Support Services at (care@wm.edu).
- For a list of other resources available to students, see here:



As your professor, I also ask you to reach out to me if you are facing challenges inside or outside the classroom; I will guide you as best I can to appropriate resources on campus.