

MATH 304: Geometric Structures - Dr. Miller - Course Information - Spring 2018

Meeting Times/Place: TR 9:30-10:45 in VSC Room 107 (pending approval)

Course Description/Content:

- “Finite and infinite axiomatic systems, including Euclidean and projective geometries ”
- This course builds heavily on proof-writing skills from MATH 235 - Modern Concepts and is very VERBAL.
- A key theme is using logic to deeply understand geometric concepts and learn why looks can be misleading.

Prerequisites and Follow-Ups:

- Prerequisites: C or better in MATH 235 - Modern Concepts
- A course on this material is required for Pennsylvania teacher certification.

Text/Print Resources: To be announced as we go along

Contact and Office Hours: Email: lyn.miller@sru.edu - Phone: 724-738-2878 - Office: Room VSC 200B

- My web page is granite.sru.edu/~lmiller . (No “www.” and no D2L except for exam grades)
- Assignments, other information will be posted regularly on the sub-page for our course (not D2L).
- Drop-in Office Hours: MWF 9:30-10:30, MW 3-4:30. I’m also available by appointment or “capture.”
- In person or email, **SEEK HELP EARLY AND OFTEN!**

Classroom environment: I write by hand on the board and use some software demos; take detailed notes.

- I CANNOT ALLOW FOOD/DRINKS in the classroom due to SRU-documented disability.
- See me if this restriction conflicts with your own documented accommodations.

Technology: (Calculators are allowed, but you’ll rarely ever need one.)

- We’ll work some with Geometers’ Sketchpad (GSP) software for drawing, teaching, and learning geometry.
- GSP will be installed in this classroom, and it is already on the computers in VSC 202.
- If you want your own copy, they MAY be available at a discounted price; I’m looking into it.
- Exams and HW may include some assessment of your GSP skills.

Grading: $A = 90 - 100\%$; $B = 80 - 89\%$; $C = 70 - 79\%$; $D = 60 - 69\%$; $F = 0 - 59\%$.

- Course total = 550 points: HW Score = 100 pts, Exams = 300 pts total, Final = 150 pts
- Students with SRU-documented test or HW accommodations should notify me ASAP.

Homework: Worth 100 points (scaled): lowest score will be dropped at end of semester

- HW is due once a week except near exams, probably on Thursdays or Fridays (in my box or email).
- HW problems will be a mix of GSP tasks, computation or reasoning problems, and proofs.
- This course is quite verbal, so write legibly and leave plenty of room for me to comment.
- **Make-ups - NONE**, nor any late. Dropping your lowest score allows for travel, illness, etc.
- This is like earning “personal days” at work; everybody is allowed to miss, but choose wisely.
- You may collaborate: **do not COPY** from others, the web, solution manuals, past semesters, etc.
- Inappropriate collaboration may result in a score of 0 for all involved, regardless of intent.
- Solutions (sometimes partial) will typically be posted outside my office door.
- To honor copyright and other laws, do NOT share solutions on social media or web sites.

Mid-Term Exams: Worth 300 points total: two OR three exams at either 100 or 150 pts each, no collaboration

- The exact number of exams will be decided as we go along.
- Topics List will be provided in advance. Study thoroughly, based on that List.
- Answers without work do not earn full credit. When asked, justifications must be rigorous.
- Justifications/work are graded on correct MATH knowledge, notation, reasoning, and style.
- Make-up approval requires prior notification, and documentation. **The Final is your make-up.**
- Mid-term exam dates: first 1-2 exams will be decided as we go, last midterm on April 26

Final Exam: cumulative, worth 150 points total, no collaboration

- We'll choose a time for the Final as it gets closer: the standard timeslot is Thursday, May 10, 8-10am, but as a small group, we may coordinate a more convenient time for the exam (still during Finals Week).
- Students with SRU-documented disabilities must submit exam paperwork one week in advance.

Attendance: I'll mark attendance daily, but it does NOT count toward your grade.

- If you are absent, YOU must make arrangements to catch up for the next class.
- Get contact info for at least one classmate. If you're absent, get notes from them.
- (I lecture from a basic outline, so I don't *have* any written materials to xerox if you're absent.)
- Assignments and announcements are available via my web page granite.sru.edu/~lmiller.

Student Outcomes - Math 304: Geometric Structures

(SRU Department of Mathematics - Spring 2014 PDF version)

1. Students will demonstrate an understanding of and competence in working with logic. This includes the following topics:
 - Informal logic
 - An introduction to axiomatics and proof
 - The role of examples and models
2. Students will demonstrate an understanding of and competence in working with Hilbert's Axioms. This includes the following topics:
 - Axiom of betweenness
 - Axiom of congruence
 - Axiom of continuity
 - Axiom of parallelism
3. Students will demonstrate an understanding of and competence in working in Neutral Geometry. This includes the following topics:
 - Alternate interior angle theorem
 - Exterior angle theorem
 - Angle measure and the ruler and protractor postulates
 - Pasch's postulate
 - Saccheri-Legendre theorem
 - Angle sum of a triangle
4. Students will demonstrate an understanding of and competence in working in Euclidean Geometry. This includes the following topics:
 - Equivalencies of the parallel postulates
 - Congruence criteria
 - Similar triangles and Pythagorean theorem
 - Circles and polygons, as time permits
5. Students will demonstrate an understanding of and competence in working in Non-Euclidean Geometries. This includes the following topics:
 - History of discovering of non-Euclidean geometries
 - Hyperbolic geometry
 - Beltrami-Klein model

(University policy allows a department to deviate from a course's outcomes for ONE semester to experiment with course revisions. The Math/Stats Department is concerned to include more Euclidean geometry for our future secondary teachers, so I may choose to take advantage of this policy as we go along.)

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Important University-wide policy statement on sexual violence, required on all course syllabi:

"Slippery Rock University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University protection of minors policy. Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: <http://www.sru.edu/offices/diversity-and-equal-opportunity/sexual-misconduct-and-victim-resources>."