

**MTH 402: Topics in Geometry (2.0 units)****Time & Place: 8:30-9:25 T & TH in Latter 102****Instructor:** Dr. Catherine Crockett**email:** catherinecrockett@pointloma.edu**office phone:** 619-849-2723**Office:** Gym parking lot, Trailer #2/RS222    **Office hours:** M F 1-3, W 1-2:30, T TH 10:00-11:30, or by appointment.**Texts:** *Taxicab Geometry: An Adventure in Non-Euclidean Geometry* by Eugene F. Krause*Exploring Advanced Euclidean Geometry with GeoGebra* by Gerard A. Venema**Required Materials:**

- A straight edge and a compass
- Laptop or access to a computer with Java enable in the web browser
- GeoGebra- free software, download at <https://www.geogebra.org/download>

**Important Dates:****First Portfolio: Due February 14****Mid Term: April 28****Second Portfolio: Due April 16****Final Exam: May 2****PLNU Mission**

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**To Teach ~ To Shape ~ To Send**

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

**Department Mission**

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The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

**COURSE DESCRIPTION**

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A study of the foundations of geometry, Affine, non-Euclidean and projective geometries. A synthetic development of advanced Euclidean geometry including geometric transformations, convexity, and constructions.

**LEARNING OUTCOMES**

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- Students will be able to demonstrate facility with analytical concepts.
- Students will be able to write proofs.
- Students will be able to apply their mathematical knowledge to solve problems.

## ASSESSMENT AND GRADING

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Grade Components:

Mid Term Exam	20% of the course grade
Final Exam	35% of the course grade
First Portfolio	15% of the course grade
<u>Second Portfolio</u>	<u>30% of the course grade</u>
Total:	100%

**Homework and Late Submission Penalties:** The homework is designed to allow you to master the concepts of Geometry; it is not an end in itself. Assignments will be announced on Tuesday and Thursday. The work will be submitted as two portfolios. The first portfolio containing the Taxi-Cab problems will be submitted on or before February 14, 2019. The second portfolio containing the problems from Euclidean Geometry will be submitted on or before April 16, 2019. Late submission of a portfolio will be assessed a  $2^{n-1} \times 10\%$  deduction where  $n$  = the number of weekdays late. The day counter for late work begins at the start of class on the weekday it is due. For example, a portfolio submitted at 3:30 on the first weekday after the due date will incur a two day late penalty deduction of 20%.

### Examinations and the Final Examinations:

There will be a Mid-Semester Examination and a comprehensive Final Examination. The Mid-Semester and Final Examinations will include problems and questions over the material assigned in the text, readings and handouts, as well as material presented in class. No examination shall be missed without prior consent by me or a well-documented emergency beyond your control. In such cases, all make-up exams will occur at 8:30 am on the Saturday between classes and Final Exam Week. A score of zero will be assigned for an examination that is missed without prior consent or a well-documented emergency beyond your control.

### Grading Scale:

Grades are based on the number of points accumulated throughout the course with the following exceptions. A student must pass at least one of the Mid-Semester Examination or Final Examination in order to pass the class. That is a score of 60% must be achieved on one of the Examinations, or else the final grade will be an F regardless of all other points totals. Approximate minimal percentages required to obtain a given grade are:

Grades in percentages					
	A	B	C	D	F
+		[87.5,90)	[77.5, 80)	[67.5, 70)	[0,60)

	[92.5,100]	[82.5,87.5)	[72.5, 77.5)	[62.5,67.5)	
-	[90, 92.5)	[80, 82.5)	[70, 72.5)	[60, 62.5)	

**Class Enrollment:** It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

**Side Note:** Turn off any cell phone, pager or things that make noise while you are in class. Also, do not text or work on other classes while in class -to do so is disrespectful to your classmates and me. You may be asked to leave the class for such behavior, resulting in an absence.

<b>University Policies:</b>
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### FINAL EXAMINATION POLICY

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**The final examination is 7:30 to 10:00 on Thursday May 2<sup>nd</sup>, 2019 and it is a Comprehensive Examination.**

The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

### PLNU COPYRIGHT POLICY

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Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

### Credit Hour

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In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for a 2-unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

### PLNU ACADEMIC HONESTY POLICY

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Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See

[http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic\\_Honesty](http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty) for definitions of kinds of academic dishonesty and for further policy information.

### PLNU ACADEMIC ACCOMMODATIONS POLICY

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While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At

Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. ([DRC@pointloma.edu](mailto:DRC@pointloma.edu) or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

### PLNU ATTENDANCE AND PARTICIPATION POLICY

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Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See [http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class\\_Attendance](http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance) in the Undergraduate Academic Catalog.

### Course Schedule:

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Please note this schedule is **tentative**. Any changes will be announced in class and posted in canvas.

week	Tuesday	Thursday
1 1/7- 1/11	1/8 No class	1/10 Introduction to Non-Euclidean Geometry Taxicab Geometry Chapter 1
2 1/14- 1/18	1/15 Taxicab Geometry Chapter 2	1/17 Taxicab Geometry Chapter 2 Out of Class assignment
3 1/21-1/25	1/22 Taxicab Geometry Chapter 3 & 4	1/24 Taxicab Geometry Chapter 4
4 1/28- 2/1	1/29 Taxicab Geometry Chapter 6	1/31 Taxicab Geometry Chapter 6

5 2/4 – 2/8	2/5 Introduction to GeoGebra Venema: Section 1.2	2/7 Venema: Section 1.3
6 2/11-2/15	2/12 Venema: Section 1.4	2/14 Venema: Section 2.2 <b>First portfolio due ( Taxicab Geometry Problems)</b>
7 2/18- 2/22	2/19 Venema: Section 2.3	2/21 Venema: Section 2.4
8 2/25- 3/1	2/26 Venema: Section 2.5	4/28 <b>Mid-Term Exam</b>
<b>Spring Break 3/ 4 to 3/8</b>		
9 3/11- 3/15	3/12 Venema: Section 4.1	3/14 Venema: Section 4.2
10 3/18- 3/22	3/19 Venema: Section 4.3	3/21 Venema: Section 5.1
11 3/25- 3/29	3/26 Venema: Section 5.2	3/28 Venema: Section 5.3
12 4/1- 4/5	4/2 Venema: Section 7.1 & 7.2	4/4 Venema: Section 7.3
13 4/8 – 4/12	4/9 Venema: Section 8.1	4/11 Venema: Section 13.1 & 13.3
14 4/15- 4/19	4/16 Venema: Section 14.1 <b>Second Portfolio Due (Euclidean Geometry Problem)</b>	4/18 <b>No Class</b> <b>Easter Break</b>
15 4/22-4/26	4/23 Venema: Chapter 14	4/25 <b>Review</b>
<b>Finals week</b> 4/29- 5/3	4/30	5/2 <b>Final Exam 7:30- 10:00</b>