Course Syllabus   MATH 618: Foundations of Geometry

Instructor	Nicholas Vlamis	**Office**	507 Kiely Hall
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Class	TuTh 4:40–5:55pm, 414 Kiely Hall		

Course Description. This is a course on the foundations of both Euclidean and non-Euclidean geometry. Euclidean geometry is the geometry you are most familiar with and the one you learn about in secondary school; however, there are many other geometries. In Euclid's text he gives 5 axioms that all of Euclidean geometry can be derived from. The first 4 axioms are straightforward, but the fifth is quite involved. Many mathematicians over many centuries tried to prove the fifth postulate from the first four. However, it turns out this is impossible and investigating a universe with only the first 4 postulates leads to new and interesting geometries.

We will begin the course by reviewing some Euclidean geometry, including rigid motions and some trigonometry. The majority of the course will be spent rigorously exploring hyperbolic geometry – a non-Euclidean geometry developed in the nineteenth century in order prove that Euclid's fifth postulate is indeed independent of the first four.

Prerequisites. The official prerequisites for the course consist of one year of calculus. However, experience with multivariable calculus, familiarity with complex numbers, and some experience writing proofs will be useful.

Course Textbook. The course does not have an official textbook and the class notes should suffice. However, the text *A Gateway to Modern Geometry: The Poincaré Half-Plane* by Saul Stahl is a good optional text for the course.

Google Classroom Notes, homework, and grades will be posted on Google Classroom. To join the course, go to http://classroom.google.com, login using your qc.cuny.edu email address, and use class code **tz304l** to join.

Homework. Homework will be assigned every Wednesday and will be due the following Wednesday at the beginning of class. Homework assignments will be posted on Google Classroom. The homework will consist of 5-10 problems, 3 of which will be marked to be written up and turned in. One of the three problems turned in will be graded.

Exams. There will be 3 exams of equal weight. The first two exams will be in class; the third exam will be cumulative and be given during the final exam slot appointed by the college. At least 75 % of an exam's questions will be taken from homework assignments.

Accommodation. If you have a documented disability requiring special accommodations, please inform me as early as possible.

Assessment Plan

Your course grade will be determined from the following categories and weights:

Homework	15%
Exams	85%

The exams are scheduled for the following dates:

Exam 1:	Wednesday, March 6
Exam 2:	Wednesday, April 17
Final Exam:	TBA