

MATHEMATICS 300 GEOMETRY

I. Introduction

A. Catalog Description

The course will present a rigorous treatment of the foundations of Euclidean geometry and an introduction to a non-Euclidean geometry. The course will emphasize the axiomatic method and students will be expected to do proofs. Students will be introduced to the history of the discovery of non-Euclidean geometry. This course is especially recommended for prospective mathematics teachers. *Prerequisite: Math 122.* Satisfies the proof-based requirement in major contracts.

B. Objectives

This course is designed specifically to prepare prospective mathematics teachers to teach geometry. The emphasis is on the axiomatic method and the use of logic. The course should give the student a rigorous background in geometry and the history behind the development of non-Euclidean geometry.

C. Prerequisites

Math 122 with a grade of C- or better.

II. Required Topics

1. Set Theory
2. Logic: truth tables, negation, quantifiers, proofs.
3. Hilbert's Axioms: incidence, betweenness, congruence, continuity, parallelism.
4. Neutral geometry: geometry without parallel axiom, exterior angle theorems, angle sum of a triangle.
5. History of the Parallel Postulate
6. Discovery of Non-Euclidean Geometry

III. Bibliography

Greenberg	<u>Euclidean & Non-Euclidean Geometries</u>
Hilbert	<u>Foundations of Geometry</u>
Moise	<u>Geometry</u>
Ryan	<u>Euclidean & Non Euclidean Geometry</u>
Wallace/West	<u>Roads to Geometry</u>