MATH 3640/8645:
Modern Geometry

TR 4:00-5:15 PM | On-Campus | Dr. Darren Holley

Topic description: This course will develop Euclidean Geometry using Hilbert's axioms for Euclidean geometry. Historical development of Geometry will be discussed from Euclid to the work of Bolyai and Lobachevsky. Neutral geometry with Lambert and Saccheri quadrilaterals will be explored. Non-Euclidean Geometry will be encountered through the Hyperbolic geometry models of Klein and Poincare.

Pre-requisites: MATH 2230 with a C- or better. Knowledge of high school geometry theorems is assumed.

Textbook: Euclidean and Non-Euclidean Geometries 4th Ed. – Greenberg

Official course content description: This course will study the modern foundations of Euclidean and Non-Euclidian Geometry. Included will be a study of the principles of axiomatic systems. Euclidean Geometry will be investigated using Hilbert's axioms for Euclidean geometry (or another equivalent Euclidean geometry axiom set). Hyperbolic geometry will be encountered through the models of Klein and Poincare. Neutral geometry with Lambert and Saccheri quadrilaterals will be studied. Finite geometries and projective geometries will also be explored

Grading: Students will be graded based on homework, class presentations, two unit exams, and a final exam.

Topics will include:

- Euclidean Geometry

- Neutral geometry

- Lambert and Saccheri quadrilaterals

- Hyperbolic geometry
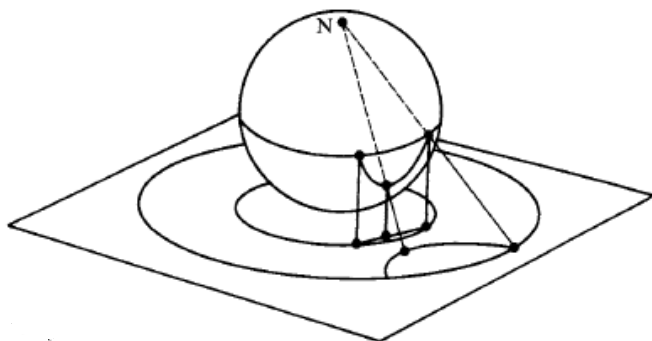
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