Course Outline

Department of Mathematics and Statistics

Minnesota State University, Mankato

Math 435  Modern Geometry  (4 semester hours)

Course Description:

Geometry of spaces including Euclidean and non-Euclidean and applications of contemporary geometry.

Prerequisites: MATH 247 and MATH 290 with grade of "C" (2.0) or higher or consent

Learning Outcomes:

Students will be able to:

1. Acquire an appreciation of the great discoveries and developments in geometry that followed Euclid.
2. Learn a sequence of significant topics including the Hilbert axioms for Euclidean plane geometry, hyperbolic and elliptic geometry.
3. Meet the specific needs of prospective teachers of the secondary curriculum.

Content Outline:

1. Euclid’s axioms and Euclidean geometry
2. Geometric transformations
3. Hilbert axioms for Euclidean plane geometry
4. The parallel postulates and non-Euclidean geometries
5. Fundamentals of Lobachevskian geometry
6. Introduction to elliptic geometry
7. The projective plane and Desargues’s theorem

Textbook/Related Readings/Materials:

5. Geometric Software such as Geometers' Sketchpad and the Hyperbolic MacDraw.