Math 443 Modern Geometries

1. <u>Catalog Description</u>

    MATH 443. Modern Geometries   **4 units**

    Prerequisite: MATH 442.

    Non-Euclidean and projective geometries. Properties of parallels, biangles, Saccheri and Lambert quadrilaterals, angle-sum and area. Limiting curves: hyperbolic trigonometry, duality, perspectivity, quadrangles, fundamental theorems of projective geometry, conics. 4 lectures.

2. <u>Required Background or Experience</u>

    Math 442 or equivalent.

3. <u>Learning Objectives</u>

    The student should develop:

    a. Additional understanding of neutral and Euclidean geometry.
    b. An appreciation of Euclidean geometry as one of several possible geometries.
    c. A basic knowledge of the non-Euclidean geometries that include hyperbolic geometry, spherical geometry, and projective geometry.
    d. A basic knowledge of analytical and transformational geometry.

4. <u>Text and References</u>

    - Greenberg, Marvin J., <u>Euclidean and Non-Euclidean Geometries</u>
    - Reynolds, B., and W. Fenton, <u>College Geometry Using the Geometer's Sketchpad</u>
    - Wallace, Edward C., and Stephen F. West, <u>Roads to Geometry</u>
    - <u>California Common Core State Standards – Mathematics</u>   Retrieve from http://www.cde.ca.gov/ci/cc/
    - <u>Standards for Mathematical Practice</u> Retrieve from http://www.corestandards.org/the-standards/mathematics/introduction/standards-for-mathematical-practice/

5. <u>Minimum Student Materials</u>

    Paper, pencils, notebook, compass, straightedge, and geometry dynamic software.

6. <u>Minimum University Facilities</u>

    Classroom or lab with ample chalkboard space, overhead projector, and computers.

7.   <u>Content and Method</u>

<u>Topic</u>   <u>Lectures</u>

   a. Properties of hyperbolic geometry   12
   b. Properties of spherical geometry   2
   c. Properties of projective geometry   12
   d. Properties of transformational geometry   <u>12</u>
                                                      Total   38

<u>Method</u>

Lecture and discussion, student-presented solutions of problems and demonstrations of theorems, and dynamic geometry software activities.

8.   <u>Methods of Assessment</u>

Homework, quizzes, constructions, activities, oral presentations, and exams.