

## MATH 442 Euclidean Geometry

### 1. Catalog Description

#### **MATH 442 Euclidean Geometry**

**4 units**

Prerequisite: MATH 248 with a grade of C- or better or consent of instructor. Recommended: MATH 300 or familiarity with dynamic geometry software.

Foundations of Euclidean geometry, finite geometries, congruence, similarities, polygonal regions, circles and spheres. Constructions, mensuration, the parallel postulate. Appropriate for prospective and in-service mathematics teachers. 4 lectures.

### 2. Required Background or Experience

Math 248 with a grade of C- or better. Math 300 recommended.

### 3. Learning Objectives

The student should develop an appreciation of:

- a. Axiomatic systems.
- b. Geometric constructions by compass and straightedge and with dynamic geometry software.
- c. Neutral geometry.
- d. Euclidean geometry.
- e. The historical background of geometries.

### 4. Text and References

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

### 5. Minimum Student Materials

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

### 6. Minimum University Facilities

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

7. Content and Method

<u>Topic</u>	<u>Lectures</u>
a. Axiomatic systems and their properties	6
b. Finite geometries	2
c. Axioms for incidence geometry	6
d. Neutral geometry	5
e. Congruence conditions	2
f. Parallel postulate	2
g. Saccheri-Legendre theorem	1
h. Properties of Euclidean geometry	6
i. Euclidean geometry	4
j. Activities using dynamic geometry software	4
Total	<u>38</u>

Method

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

8. Methods of Assessment

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