

Syllabus
Math 01.525 Modern Geometry

CATALOG DESCRIPTION:

Math 01.525 Modern Geometry 3 s.h.

This course provides an overview of the field of geometry by studying selected geometries in depth, both Euclidean and non-Euclidean. Inductive exploration and the axiomatic method, as well as synthetic and algebraic approaches to problems, are emphasized. Unless recommended by the advisor, this course should not be chosen if a similar course has been part of the student's undergraduate program.

OBJECTIVES:

In probably no other area of secondary school mathematics has the high school mathematics teacher been less prepared for today's secondary programs by her/his undergraduate major than in geometry. It is the purpose of this course to help overcome this deficiency and to acquaint the student with the concepts and spirit of modern geometries.

CONTENT:

1. Axiomatic Method

- 1.1 Inductive and deductive reasoning
- 1.2 Axiomatic systems
- 1.3 Consistency and independence
- 1.4 Completeness
- 1.5 Finite geometries

2. (Optional) Incidence Geometry and Convexity

3. Transformational Geometry

- 3.1 Rigid motions and isometries
- 3.2 Congruence
- 3.3 Similarity transformations

4. Polygonal Regions and Area Measure

5. Geometry of Three Dimensions

6. Ruler and Compass Constructions

7. Non-Euclidean Geometries

7.1 Hyperbolic geometry

7.2 Elliptic geometry

POSSIBLE TEXT:

Greenberg, Marvin Jay. Euclidean and Non-Euclidean Geometries: Development and History. San Francisco: W. H. Freeman, Inc., 1980.