

Marshall University

College of Science

Mathematics Department

MTH 401/501: Structure of Modern Geometry

Course catalog description

Informal development of geometry with an exploration of probability and statistics. Recommended for pre-service middle school teachers and for elementary and secondary in-service teachers. May not be used for a 5-Adult (or 5-12) mathematics specialization. May not be used for any degree offered by the Department of Mathematics.

Credit hours

3 hours

Prerequisites

Math 401: a grade of C or higher in MTH 127 or MTH 130.

List of topics

- **Basic Constructions**
 - Compass and Straightedge
 - Computer generated
- **Axiomatic Systems**
 - Undefined terms
 - Criteria for a good definition
 - Properties of axioms or postulates
 - Theorems: Conditional statements, Biconditional statements, Hypothesis, Conclusion, Proof
- **Key Concepts and Terms from Two Dimensions**
- **Geometry in Three Dimensions**
- **Analytic Geometry**
- **Transformations**
 - Congruency

- Similarity
- Tessellations
- **Measurement**
- **Connections**
 - Trigonometry
 - Probability
 - Statistics

Course objectives

- Provide opportunities for prospective middle school mathematics teachers to explore concepts from primarily Euclidean geometry both synthetically and analytically.
- Prepare students to mathematically model situations and creatively solve problems for which they may never have seen examples.
- Prepare students to decide when and what technology is appropriate to solve a problem.
- Provide opportunities for students to communicate mathematical ideas in written and oral forms.
- Provide opportunities for students to read and interpret mathematical ideas independently.
- Provide a historical perspective for the geometry concepts addressed in class.
- Model a variety of pedagogical strategies that can be used to introduce geometric concepts.

Suggested textbooks

- John K. Beem, *Geometry Connections*
- Discovering Geometry: An Investigative Approach, Michael Serra

Last updated

December 2016