

Office of Academic Affairs
Tarleton State University

Master Course Syllabus Outline

Department: Mathematics

Course Prefix/Number: MAED 520

Official Course Title: Teaching and Learning Geometry

Master Syllabus Approved by Department on: 10/1/2007

I. Catalog Description (50 words; brief synopsis of course content, emphases)

This course focuses on important geometric concepts of Euclidean and non-Euclidean geometry. The course activities highlight the importance of building conceptual understanding for students by incorporating concrete models and appropriate technology.

II. Prerequisites?

3 hours of undergraduate geometry

III. Expanded Course Description (150 words; primary course content, intended student level and role(s) course is to play in the curriculum.

This course is intended for the classroom teacher or content specialist to deepen their conceptual understanding of geometry. It is also intended to bring the classroom teacher up to date on the new technologies that are available to aid them in the teaching of geometry. The content is needed for the successful completion of the new Master Mathematics Teacher certification. In addition, the course serves as a component of a specialization in mathematics education for the M.Ed. through the Department of Curriculum & Instruction or as a component of a support field in mathematics education for the M.S. in Mathematics.

MAED 520 focuses on important geometric concepts of Euclidean and non-Euclidean geometry. The course activities highlight the importance of building conceptual understanding for students by incorporating concrete models and appropriate technology. Topics will include Euclidean geometry of the triangle, polygons, and circle and parallels; transformational geometry; projective geometry; and non-Euclidean geometries such as spherical geometry and/or hyperbolic geometry.

IV. Intended Student Learning Outcomes? Required; **knowledge outcomes** (what students who successfully complete the course will be expected to know). Optional; **skill outcomes** (what students who successfully complete the course will be able to do). Optional; **value outcomes** (what students who successfully complete the course will value or appreciate).

Knowledge Outcomes:

Upon completion of this course, the student will be expected to:

1. Understand the mathematical concepts within the content.
2. Understand the learning theory and pedagogy related to the content.
3. Make informed decisions about choices of activities and assessment.
4. Use technology appropriate to the content.

And, as recommended by the National Council of Teachers of Mathematics (NCTM) in the Principles and Standards for School Mathematics (2000),

5. Problem Solving:

- a. Build new mathematical knowledge through problem solving.

- b. Solve problems that arise in mathematics and in other contexts.
 - c. Apply and adapt a variety of appropriate strategies to solve problems.
 - d. Monitor and reflect on the process of mathematical problem solving.
6. Reasoning and Proof:
- a. Recognize reasoning and proof as fundamental aspects of mathematics.
 - b. Make and investigate mathematical conjectures.
 - c. Develop and evaluate mathematical arguments and proofs.
 - d. Select and use various types of reasoning and methods of proof.
7. Communication:
- a. Organize and consolidate their mathematical thinking through communication.
 - b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
 - c. Analyze and evaluate the mathematical thinking and strategies of others.
 - d. Use the language of mathematics to express mathematical ideas precisely.
8. Connections:
- a. Recognize and use connections among mathematical ideas.
 - b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
 - c. Recognize and apply mathematics in contexts outside of mathematics.
9. Representation:
- a. Create and use representations to organize, record, and communicate mathematical ideas.
 - b. Select, apply, and translate among mathematical representations to solve problems.
 - c. Use representations to model and interpret physical, social, and mathematical phenomena.

V. Unless otherwise stipulated in this master syllabus by the department, the following items are subject to faculty discretion as described in each faculty member's individual course outline/syllabus:

a) Course Requirements? (grading/evaluation procedures; class attendance policy; term papers, projects, field assignments; examinations; class participation, etc.)

b) Required Text(s)?

c) Bibliography?

Department Head Signature/Date:

_____/_____/_____