Course Proposal: Modify Course

This proposal will change the following elements of the course. **Course Description, Prerequisites** 

- 1. Course prefix and number: MTE 550
- 2. Effective Term/Year: FALL 2013
- 3. CIP CODE/10 digit program code: 13131100 No Change
- 4. Short Course Title: Seminar in Geometry

Modified Short Course Title:

5. What is the primary reason you are modifying this course?

# This modified course description more accurately represents the course content and the function of the course in the proposed consolidated graduate major.

6. Enter course description exactly as it now appears in the general/graduate bulletin.

Concepts of Euclidean and non-Euclidean geometry with emphasis on deductive and inductive reasoning, discovery and proof, congruence and similarity, and creative thinking about quantitative, spatial, and logical situations. Special attention will be given to the implementation of geometry and measurement into the elementary curriculum.

Enter modified course description exactly as it will appear in the general/graduate bulletin?

Concepts of Euclidean geometry with emphasis on deductive and inductive reasoning, discovery and justification, congruence and similarity, and creative thinking about quantitative, spatial, and logical situations. Special attention will be given to the implementation of geometry and measurement into the elementary and middle school curricula.

7. Current Prerequisites:

### At least 6 hours of undergraduate mathematics

Modified Course Prerequisites:

### At least 6 hours of undergraduate mathematics or consent of instructor.

- 8. College: College of Science and Mathematics
- 9. Department Teaching Course: Mathematics and Statistics

10a. Instruction Type: Lecture No Change

10b. Credit Hours: No ChangeCurrent - Maximum: 3 Minimum: 3 Maximum Hours counted toward degree: 3Modified- Maximum: Minimum: Maximum Hours counted toward degree:

11a. Second Instruction Type: ns

11b. Second Credit Hours:Current - Maximum: Minimum: Maximum Hours counted toward degree:Modified- Maximum: Minimum: Maximum Hours counted toward degree:

12. Maximum contact hours each week fall semester: **No Change** Lecture: **3** Lab: Other:

13. May this course be taken more than one time each semester: No

### 14. Grade Type: Regular: A-F No Change

15. Describe the place of the modified course within your current curriculum. Will it be elective or required? Part of a major or a minor? (Enter NA if no change is being made.)

We are proposing a consolidation of existing graduate majors, School Mathematics Teaching: Middle Level and School Mathematics Teaching: Secondary Level, into a single major in School Mathematics Teaching with a 24 credit hour core and emphases in middle or secondary levels. This course is currently required for the middle level major and there is no change in the placement of the course as it will be required in the new consolidated major with emphasis on middle level.

16. How does the modified course differ from similar courses being offered at Stephen F. Austin? (Enter NA if no change is being made.) **NA** 

17. Syllabus: Course Learning Goals

List course objectives; describe what students who complete the course will know or be able to do. (Enter NA if no change is being made.) **NA** 

18. Syllabus: Course Outline

List the topics that the modified course will cover and indicate the approximate proposed amount of time to be devoted to each, either by percent of course time or number of weeks. Please indicate which topics will be required in all sections of the course and which may vary. (Enter NA if no change is being made.) **NA** 

19. Syllabus: Modified Textbook/Assigned Reading Materials for course. See attached syllabus.

20. Any Other Information

Dept. Chair	Date:	
College Curriculum Chair	Date:	
College Dean	Date:	
Grad Dean/Univ Curr Chair	Date:	

STEPHEN F. AUSTIN STATE UNIVERSITY



#### **Department of Mathematics and Statistics**

MTE 550 – Seminar in Geometry Course Syllabus

**Course Description**: Concepts of Euclidean geometry with emphasis on deductive and inductive reasoning, discovery and justification, congruence and similarity, and creative thinking about quantitative, spatial, and logical situations. Special attention will be given to the implementation of geometry and measurement into the elementary and middle school curricula.

#### Credit hours: 3

Course Prerequisites: At least six hours of undergraduate mathematics or consent of instructor

#### **Course Outline:**

#### • Geometric Figures: Definitions, Properties, and Relationships

- Use manipulatives and appropriate technology to investigate and illustrate geometric relationships.
- Describe shape in terms of dimension, direction, orientation, perspective, and relationships.
- Analyze and solve problems involving one-, two-, and three-dimensional objects (e.g., lines, angles, circles, polygons, cylinders, cones, pyramids, prisms, and spheres).
- Analyze the relationship among three-dimensional objects and related two-dimensional representations (e.g., perspective, projections, cross sections, nets) and use these representations to solve problems.
- Investigate and explore geometric concepts and properties using technology.
- Use logical reasoning to investigate, analyze, and prove geometric relationships within the axiomatic structure of Euclidean geometry.

### • Geometry and Measurement

- Develop, explain, and use formulas to find length, perimeter, area, and volume of geometric objects.
- Explain and illustrate the use of numbers and units of measurement for quantities such as length, perimeter, area, volume, and temperature.
- Develop, justify, and use conversions within and between different measurement systems.
- Identify attributes to be measured, quantify the attributes by selecting and using appropriate units, and communicate information about the attributes using the unit measure.
- Apply measurement concepts and dimensional analysis to derive units and formulas for a variety of situations, including average rates of change of one variable with respect to another.

### • Geometry of Congruence, Similarity, and Transformations

- Develop, justify, and perform geometric constructions using compass/straightedge, reflection devices, and other appropriate technology.
- Use translations, rotations, reflections, dilations, and contractions to illustrate similarities, congruencies, and symmetries of figures.
- Use symmetry to describe tessellations and show how they can be used to illustrate concepts, properties, and relationships.

### • Geometry and Measurement in the Classroom

- Relate geometry to algebra by using the Cartesian coordinate system and use this relationship to solve problems.
- Communicate the vertical alignment of geometry and measurement across the grade levels.
- o Demonstrate an understanding of the methods, uses, and results of Euclidean geometry.

## 30%

Approximate time spent

#### www.sfasu.edu

20%

20%

30%

• Illustrate axiomatic systems and their components, such as undefined terms, defined terms, theorems, examples, and counter-examples.

**Student Learning Outcomes (SLO):** At the end of MTE 550, the successful student will be able to:

Use spatial reasoning to investigate concepts such as direction, orientation, perspective, shape, and structure. [PLO: 1, 2]

- 1. Use mathematical reasoning to develop, generalize, justify, and prove geometric relationships. [PLO: 3, 5]
- 2. Make connections among geometric and measurement ideas, number concepts, and algebraic structures. [PLO: 1, 4, 5]
- 3. Analyze the properties of two- and three-dimensional figures. [PLO: 1, 3]
- 4. Demonstrate understanding of transformational geometry and relate algebra to geometry and trigonometry using the Cartesian coordinate system. [PLO: 2, 4)]
- 5. Demonstrate understanding of the geometric relationships and axiomatic structure of Euclidean geometry. [PLO: 1, 4]
- 6. Make appropriate connections from MTE 550 to the elementary and middle level mathematics classroom. [PLO: 1, 2, 3, 4, 5, 6]

**<u>Program Learning Outcomes (PLO)</u>**: Students graduating from SFASU with an M.S. degree and a major in school mathematics teaching will demonstrate:

- 1. Conceptual understanding and procedural fluency necessary for teaching the core areas of school mathematics (number/operation (N&O), patterns/algebra (P&A), geometry/measurement (G&M), and probability/statistics (P&S)). [Concepts & Skills]
- 2. Competences in using various mathematical tools (including technology) to formulate, represent, and solve problems. (N&O tools, P&A tools, G&M tools, and P&S tools applied to basic and multi-step computational and application problems) [*Problem Solving*]
- 3. The ability to use mathematical reasoning to develop conjectures, design sound arguments, and analyze student thinking. (pattern recognition/conjecture development, examples/non-examples, deductive/inductive reasoning, argument analysis) [*Critical Thinking*]
- 4. An understanding of the development and connectedness of mathematical ideas historically, between content areas, and across grade levels. [*Connections*]
- 5. Effective communication of mathematical ideas in oral, visual, and written forms. [Communication]
- 6. Leadership skills in facilitating collaboration, mentoring teachers, making appropriate instructional decisions, and delivering professional development. [*Leadership*]

*Date of document: 11/01/2012*