Course Proposal: **Modify Course**

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

1. Course prefix and number: **MTE 554**

2. Effective Term/Year: **FALL 2013**

3. CIP CODE/10 digit program code: **13131100 No Change**

4. Short Course Title: **Seminar in Algebra**

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.

Real and complex numbers, field properties, patterns, relations, and functions, solutions to equations and inequalities, sequences and series, and mathematical induction. Students will be required to have a graphics calculator.

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

Real and complex numbers, field properties, patterns, relations, and functions, solutions to equations and inequalities, and sequences and series. Special attention will be given to the implementation of algebraic concepts into the elementary and middle level curricula. Students will be required to have a graphics calculator.

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 Change**
Current - Maximum: **3** Minimum: **3** Maximum Hours counted toward degree: **3**
Modified- 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 554 – Seminar in Algebra
Course Syllabus

Course Description: Real and complex numbers, field properties, patterns, relations, and functions, solutions to equations and inequalities, and sequences and series. Special attention will be given to the implementation of algebraic concepts into the elementary and middle level curricula. Students will be required to have a graphics calculator.

Credit hours: 3

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

Course Outline: Approximate time spent

- **Review of Algebra** 25%
  - Work with real numbers and demonstrate, explain, and model how some situations that have no solution in the whole, integer, or rational number systems have solutions in the real number system.
  - Work with complex numbers and demonstrate, explain, and model how some problems have no solutions in various subsets of the real number system but may have solutions in the complex number system.
  - Extend and generalize the operations of rational numbers to include exponents, their operations, their properties, and their application to the real numbers.
  - Use deductive reasoning to simplify and justify algebraic processes.
- **Functions, Graphs and Transformations** 25%
  - Use inductive reasoning to identify and generalize patterns using concrete models, geometric figures, tables, graphs, and algebraic expressions.
  - Use transformations to illustrate properties of functions and relations and to solve problems.
  - Describe and predict the effects of transformations on the shape and location of graphs of functions, and relations.
  - Describe rational, radical, absolute value and piecewise functions algebraically and graphically and analyze their algebraic and graphical properties to model and solve problems using a variety of methods, including technology.
- **Equations and Inequalities** 30%
  - Use tables, graphs, and algebraic techniques to solve linear equations.
  - Give appropriate justification of the manipulation of algebraic expressions and equations in one variable.
  - Use tables, graphs, algebraic techniques, and appropriate technology to solve linear and nonlinear equations, inequalities, and systems.
  - Give appropriate justification of the manipulation of algebraic expressions, equations, and inequalities.
  - Use matrices to solve systems of linear equations.
- **Algebraic Reasoning to the Classroom** 20%
  - Communicate the vertical alignment of algebraic reasoning across the grade levels.
  - Integrate concepts from algebra, relations, functions, algebraic reasoning, and technology in other disciplines.
  - Evaluate the appropriateness of materials, instructional strategies, terminology, and technology for the appropriate developmental level.

Student Learning Outcomes (SLO): At the end of MTE 554, the successful student will be able to:

1. Think critically and reason about mathematical ideas. [PLO: 1, 2, 3]
2. View algebra as an application of logic to a system of axioms and definitions. [PLO: 1, 3, 4]
3. Communicate effectively about algebraic ideas, conveying detailed information with clarity and accuracy. [PLO: 1, 3, 4, 5]
4. Demonstrate an appreciation for the real-world applications of algebra, particularly in the areas of functions. [PLO: 2, 3, 4, 5]
5. Demonstrate appropriate algebraic vocabulary and procedural fluency. [PLO: 1, 3, 5, 6]
6. Demonstrate an understanding of how patterns, relations, functions, algebraic reasoning, and analysis are connected between and across all grade levels. [PLO: 1, 4, 5, 6]

Program Learning Outcomes (PLO): 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