Course Proposal: **Modify Course**

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

1. Course prefix and number: **MTE 570**

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

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

4. Short Course Title: **Logic and Proof**

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.

A study of formal logic, set theory, properties of relations and functions, and the basic structure of different forms of proof. Emphasis on mathematical reasoning and communication.

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

A study of formal logic, set theory, properties of relations and functions, and the basic structure of different forms of proof. Emphasis on mathematical reasoning and communication. Special attention will be given to the implementation of these concepts into the middle and secondary school curricula.

7. Current Prerequisites:

MTE 567 or the equivalent and graduate standing

Modified Course Prerequisites:

MTE 554 and MTE 552, or equivalent

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 both the middle level and secondary level majors and there is no change in the placement of the course. It is one of the 24 credit hour core courses required in the new consolidated major.

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 570 – Logic and Proof
Course Syllabus

Course Description: A study of formal logic, set theory, properties of relations and functions, and the basic structure of different forms of proof. Emphasis on mathematical reasoning and communication. Special attention will be given to the implementation of these concepts into the middle and secondary school curricula.

Credit Hours: 3

Course Prerequisites: MTE 554 and MTE 552, or equivalent

Course Outline: Approximate time spent

- Logic — 20%
  - Statements
  - Logical operators
  - Conditional statements
  - Truth tables
  - Valid and invalid arguments
- Structure of proof — 20%
  - Deductive and inductive reasoning
  - Direct/indirect proofs
- Sets — 20%
  - Basic definitions
  - Definitions and properties of set operations
  - Venn diagrams
- Relations and functions — 20%
  - Basic properties
  - Composition
  - Equivalence relations
  - Applications to set cardinality
- Connections to the secondary classroom — 20%

Student Learning Outcomes (SLO): At the end of MTE 570, successful students will be able to:

1. Give examples/non-examples of statements. [PLO 1,3,5]
2. State the converse, inverse, and contrapositive of a statement along with the statement's negation. [PLO 1,2,3,5,6]
3. Demonstrate an understanding of the truth values of compound statements. [PLO 1,2,3,5]
4. Determine the truth table associated with a statement and interpret the results. [PLO 1,2]
5. Explain the difference between inductive and deductive reasoning and give examples of each that are applicable to the secondary mathematics classroom. [PLO 1,2,3,4,5,6]
6. Use deductive and inductive reasoning to determine the correctness of proofs. [PLO 1,2,3,4,5]
7. Prove conjectures about sets, relations, and functions directly or indirectly, as appropriate. [PLO 1,2,3,4,5]
8. Use Venn diagrams to determine validity of an argument. [PLO 1,2,3]

9. Demonstrate a basic understanding of the properties of set operations and cardinality as well as the properties of relations and functions, including equivalence relations. [PLO 1,2,4,5]
10. Connect the content of MTE 570 to the middle and secondary mathematics classroom. [PLO 1,2,3,4,5,6]

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. Competency 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*]

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