Course Proposal: **Modify Course**

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

1. Course prefix and number: **MTE 568**

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

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

4. Short Course Title: **Topics in Advanced Calculus**

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.

Infinite series, sequences, power series, partial derivatives, multi-variable calculus using appropriate technology.

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

Infinite series, sequences, power series, partial derivatives, multi-variable calculus using appropriate technology. Special attention will be given to the implementation of these concepts to the high school curricula.

7. Current Prerequisites:

MTE 567 or the equivalent and graduate standing

Modified Course Prerequisites:

MTE 566 and MTE 570

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 secondary level emphasis and there is no change in the placement of the course.

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: _____

MTE 568 – Topics in Advanced Calculus
Course Syllabus

Course Description: Infinite series, sequences, power series, partial derivatives, multi-variable calculus using appropriate technology. Special attention will be given to the implementation of these concepts to the high school curricula.

Credit Hours: 3

Course Prerequisites: MTE 566 and MTE 570

Course Outline: Approximate time spent

- Sequences and series 30%
  - Sequences – convergence and divergence
  - Series – tests for convergence
  - Series approximations with Taylor polynomials
- Functions of many variables 30%
  - Definitions, domain/range, surfaces, level curves
  - Continuity
  - Limits
- Derivatives and integrals of multivariate functions 30%
  - Partial derivatives/implicit differentiation
  - Chain rule
  - Iterated integrals
  - Monte Carlo Method
- Connections to the secondary classroom 10%

Student Learning Outcomes (SLO): At the end of MTE 568, successful students will be able to:

1. Determine whether or not a sequence converges or diverges. [PLO 1,2]
2. Determine what tests to apply to evaluate whether or not a series converges or diverges. [PLO 1,2,3]
3. Approximate series using Taylor polynomials and determine the associated radius of convergence when applicable. [PLO 1,2]
4. Define functions of many variables and determine the associated domain/range. [PLO 1,2,5]
5. Determine the continuity of multivariate functions. [PLO 1,2]
6. Calculate limits of multivariate functions. [PLO 1,2]
7. Connect partial differentiation to the chain rule. [PLO 1,2,3,4]
8. Evaluate double and triple integrals. [PLO 1,2]
9. Explain how the Monte Carlo Method can be used to approximate an integral. [PLO 1,2]
10. Connect the content of MTE 568 to the 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. 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*]

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