

Course Proposal: **Modify Course**

This proposal will change the following elements of the course.

Course Description

1. Course prefix and number: **MTE 584**
2. Effective Term/Year: **FALL 2013**
3. CIP CODE/10 digit program code: **13131100 No Change**
4. Short Course Title: **Modern Algebra and Number Theory**

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.

An introduction to the study of algebraic systems and number theory with topics to include groups, rings, fields, properties of natural numbers.

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

An introduction to the study of algebraic systems and number theory with topics to include groups, rings, fields, properties of natural numbers. Special attention will be given to the implementation of these concepts into the middle and high school curricula.

7. Current Prerequisites:

MTE 570

Modified Course Prerequisites:

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: _____



MTE 584 - Modern Algebra and Number Theory Course Syllabus

Course Description: An introduction to the study of algebraic systems and number theory with topics to include groups, rings, fields, properties of natural numbers. Special attention will be given to the implementation of these concepts into the middle and high school curricula.

Credit Hours: 3

Course Prerequisites: MTE 570

| <u>Course Outline:</u> | <u>Approximate time spent</u> |
|-----------------------------------------------------|-------------------------------|
| • Binary operations | 10% |
| • Groups | 20% |
| ○ Fundamental properties | |
| ○ Subgroups | |
| ○ Isomorphisms | |
| • Rings | 20% |
| ○ Elementary properties | |
| ○ Subrings | |
| ○ Integral domains | |
| ○ Fields | |
| • Number theory | 30% |
| ○ Divisibility properties of integers | |
| ○ Division algorithm | |
| ○ Euclidean algorithm | |
| ○ Fundamental Theorem of Arithmetic | |
| • Connections to the middle and secondary classroom | 20% |

Student Learning Outcomes (SLO): At the end of MTE 584, successful students will be able to:

1. Define and identify binary operations. [PLO 1,2,3,5]
2. Define groups, subgroups, and isomorphisms and identify and apply the associated fundamental properties in proofs. [PLO 1,2,3,5]
3. Provide examples/nonexamples of groups that satisfy given properties. [PLO 1,2,3,4,5]
4. Define rings, subrings, integral domains, and fields, and identify and apply the associated elementary properties in proofs. [PLO 1,2,3,4,5]
5. Prove that division by zero is undefined and identify specific pitfalls connected to the secondary mathematics classroom. [PLO 1,2,3,4,5,6]
6. Explain the division algorithm, Euclidean algorithm, and Fundamental Theorem of Arithmetic, and provide examples of how each is applied. [PLO 1,2,3,4,5]
7. Connect the content of MTE 584 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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