### Course Proposal: Modify Course

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

- 1. Course prefix and number: MTE 580
- 2. Effective Term/Year: FALL 2013
- 3. CIP CODE/10 digit program code: 13131100 No Change
- 4. Short Course Title: Statistical Reasoning

Modified Short Course Title: Probability Theory & Statistical Inference

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 random variables, probability distributions, functions of random variables, convergence concepts, and statistical inference.

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

An intermediate study of the probability necessary for statistical investigations, statistical inference including study of naturally numeric as well as categorical data. Special attention will be given to the existence and implementation of these concepts in the high school classroom.

7. Current Prerequisites: MTE 578

Modified Course Prerequisites: MTE 562 and MTE 570

## 8. College: College of Science and Mathematics

Department Teaching Course: Mathematics and Statistics
 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 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:



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

# MTE 580 Probability Theory & Statistical Inference Course Syllabus

<u>Course Description</u>: An intermediate study of the probability necessary for statistical investigations, statistical inference including study of naturally numeric as well as categorical data. Special attention will be given to the existence and implementation of these concepts in the high school classroom.

#### Credit Hours: 3

#### Course Prerequisites: MTE 562 and MTE 570

Course Outline:	Approximate time spent
<ul> <li>Language of Experimentation (sample space, sample point, event, etc.)</li> <li>Axioms of Probability and Additional Rules and Definitions used in</li> </ul>	5%
<ul> <li>probability (complement rule, addition rule, conditional probability, multipl</li> <li>Counting in Equally Likely Sample Spaces (fundamental counting principle)</li> </ul>	ication rule)  10% le,
permutations, combinations, etc.)	5%
Random Variables and Their Summary (expectation, variance, standard)	deviation) 5%
Popular Discrete Probability Models (binomial, geometric, Poisson)	10%
Popular Continuous Probability Models (uniform, exponential, normal)	10%
Central Limit Theorem	5%
<ul> <li>Sampling, Types of Data, Statistical Experiments</li> </ul>	5%
Descriptive Statistics	10%
Inference for naturally numeric data: Confidence Intervals and Hypothes	is Tests 15%
Categorical data analysis	5%
Connections to the Secondary Classroom	15%

Student Learning Outcomes (SLO): At the end of MTE 580, successful students will be able to:

- 1. Apply knowledge of designing, conducting, analyzing, and interpreting statistical experiments to investigate real-world problems. [PLO 1,2,3,4,5]
- 2. Analyze and interpret statistical information and recognize misleading as well as valid uses of statistics. [PLO 1,2,3,4,5]
- 3. Properly interpret the concepts of expected value, variance, and standard deviation of random variables in the context of physical processes. [PLO 1,2,3,4,5]
- 4. Demonstrate an understanding of the popular discrete and continuous probability models and describe differences in when they should be applied in nature. [PLO 1,2,3,4,5]
- 5. Demonstrate an understanding of sampling and summary statistics that are used in data collection. [PLO 1,2,3,4,5]
- 6. Identify the role of the central limit theorem as it pertains to statistical inference. [PLO 1,2,3,4,5]
- 7. Interpret and apply confidence intervals for characterisitcs of populations. [PLO 1,2,3,4,5]
- 8. Apply the principles of hypothesis testing to analyze both naturally numeric and cateorical data. [PLO 1,2,3,4,5]
- 9. Provide examples/nonexamples from statistics that are appropriate to the secondary 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]
- 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 multistep 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*]