MTE 562 Class Policy

2020 / Spring 2020
MTE 562.600
Probability and Statistical Reasoning (online)

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Office Hours: 9-10:45 MWF
Class meeting time and place: Online

Course Description:
Descriptive statistics, probability, random variables, binomial and normal distributions, and inferential thinking. Special attention will be given to the existence and implementation of these concepts in the middle and high school classroom.

Text and Materials:
Discovering Statistics by Hawkes and Marsh, 2nd edition

Course Requirements:
Homework and Exams

Course outline: Approximate time spent

☐ Descriptive Statistics 20%
 o Recognize and use appropriate graphical displays and descriptive statistics for categorical and naturally numeric data.
 o Investigate and answer questions by collecting, organizing, and displaying data from real world situations.
 o Communicate the results of a statistical investigation using appropriate language.
 o Investigate real-world problems by designing, administering, analyzing and interpreting surveys.
 o Investigate real-world problems by designing, conducting, analyzing, and interpreting statistical experiments.
 o Organize, display, and interpret data in a variety of formats (e.g., tables, frequency tallies, box plots, stem-and-leaf plots, histograms) and discuss the advantages, disadvantages, and appropriateness of the representation.
 o Develop and justify concepts based on summary statistics such as measures of central tendency (e.g., mean, median, mode) measures of dispersion (e.g., range, interquartile range, variance, standard deviation) and various percentiles. Additionally, use these measures to describe a set of data.
 o Explore, describe, and analyze bivariate data using techniques such as scatter plots and lines of best fit, including the use of technology.

☐ Inferential Thinking 30%
 o Make inferences about a population using the binomial distribution.
 o Describe and apply the characteristics of a well-designed and well-conducted survey or experiment.
 o Explain and use probability language to make observations and draw conclusions from univariate data and to describe the level of confidence in the conclusion, including the appropriate use of technology.
o Identify and understand the selection of a measurement scale (i.e., nominal, ordinal, interval, ratio) used to answer research questions and analyze data.
o Describe and analyze bivariate data using various techniques (e.g., scatterplots, regression lines, outliers, residual analysis and correlation coefficients), including the appropriate use of technology.
o Analyze and interpret statistical information from the media, such as the results of polls and surveys, and recognize valid and misleading uses of statistics.

□ Probability  
- Use the concepts and principles of probability to describe the outcome of simple and compound events, including constructing sample spaces to model situations.
o Explore concepts of probability through data collection, experiments, and simulations.
o Generate, simulate, and use probability models to represent a situation.
o Explain and use probability language to make observations and draw conclusions.
o Calculate probabilities using the axioms of probability and related theorems and concepts such as the complement rule, addition rule, conditional probability, multiplication rules, and independence.
o Apply concepts and properties of discrete and continuous random variables to model and solve a variety of problems involving probability and probability distributions.

□ Probability and Statistics to the classroom  
- Demonstrate an understanding of how probability and statistics are developmental and connected across and between grade levels;
o Communicate the vertical alignment of probability and statistics across the grade levels.
o Communicate with students the importance of using statistical inference in decision making.
o Recognize that assumptions are made when solving problems and assist middle level students in identifying and evaluating those assumptions.
o Plan classroom activities that emphasize how technology (e.g., spreadsheets, statistical software) affects the use of mathematics in various careers.

Grading Policy: The final average will be computed using the following weights:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawkes Assignments</td>
<td>12%</td>
</tr>
<tr>
<td>Online Participation</td>
<td>8%</td>
</tr>
<tr>
<td>TEXTEAM Project</td>
<td>20%</td>
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<tr>
<td>Exam I</td>
<td>20%</td>
</tr>
<tr>
<td>Exam II</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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</tbody>
</table>

Statistics 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]

**Student Learning Outcomes (SLO):** At the end of MTE 562, a student who has studied and learned the material should be able to:

1. Demonstrate understanding of the theory of probability and its relationship to sampling and Inferential thinking. [PLO: 1, 2, 3, 5]
2. Design experiments and surveys to answer questions and solve problems. [PLO: 1, 2, 3, 4, 5]
3. Demonstrate understanding in the use of graphical and numerical techniques to explore data, characterize patterns, and describe departures from patterns. [PLO: 1, 2, 3, 5]
4. Demonstrate understanding of inferential thinking and how it is used in making and evaluating predictions. [PLO: 1, 3, 4, 5, 6]
5. Recognize common misuses of probability and statistics. [PLO: 1, 3, 5, 6]
6. Model, construct, and solve probability and statistics problems, including real world applications when appropriate. [PLO: 1, 2, 4, 5, 6]
7. Make appropriate connections from probability and statistics to the middle level mathematics classroom. [PLO: 1, 4, 6]

**Attendance Policy:**
Participation is expected.

**Academic Integrity (A-9.1):**
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

**Definition of Academic Dishonesty**
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at [http://www.sfasu.edu/policies/academic_integrity.asp](http://www.sfasu.edu/policies/academic_integrity.asp)

**Withheld Grades Semester Grades Policy (A-54):**
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.
Students with Disabilities:
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

Acceptable Student Behavior
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.