Math 108  Introduction to Statistics

Fall 2017

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About the course

Grading

There will be several components to your grade:

quizzes:  Roughly 12 worth 10 points, I will drop your lowest two. 100 points total
Exams:  There will be three exams each counting 100 points.
Final Exam:  The final exam is worth 200 points and is comprehensive.

A--- 540 - 600 points
B--- 480 - 539 points
C--- 420 - 479 points
D--- 360 – 419 points
F--- below 360 points

General Policies

The university policies on attendance and cheating as described in the student handbook will be followed. A quick summary: Come to class and don’t cheat.

Learning Goals

These sound a little intimidating, but they boil down to learning some math and how to use it.

1. Abstract a problem into a symbolic or mathematical model or framework.
Statistics is a mathematical framework for collecting, organizing, and interpreting data. There are three main topics in our introductory statistics class; descriptive statistics, probability, and inferential statistics. A statistical study involves identifying a question, designing a method of
collecting meaningful data, analyzing, and drawing sound conclusions from this analysis. A typical statistics class would spend at least some time on each of these steps.

2. **Interpret such a model in terms of a real world construct.**
   Statistics texts are very big on this topic. Every text has numerous examples drawn from the natural and social sciences, engineering, medicine and many other fields of study. Students in a statistic class will learn to take the information from the problem, perform appropriate calculations, draw conclusions from the calculations and interpret the results in the original context.

3. **Reason from precisely stated principles using deductive methods and draw valid conclusions.**
   Probability theory starts with axioms, and so this section of the course involves reasoning from those axioms. For example, given information about a population, we ask students to determine the probability a random sample will turn out a certain way. Hypothesis testing and related topics (Type I, II errors and the like) are also examples of deductive reasoning. A highly simplified version of the typical hypothesis test is as follows: given a hypothesis to test, calculate a test statistic from a data sample, and based on the value of this test statistic the student decides whether or not to reject the hypothesis. This glosses over the reasoning needed to choose the appropriate test statistic, but it is a prime example of deductive reasoning in this course.

4. **Recognize, manipulate and reason from or about abstract patterns.**
   Mathematics is the science of patterns and so every course we teach is really all about recognizing, manipulating, and reasoning from patterns. In statistics, descriptive statistics and regression are all about identifying patterns. For example, the main goal of descriptive statistics is to attempt to identify information about the distribution of a set of data. Is it skewed? Is it symmetric? Are there outliers? Does it look normally distributed? Linear regression tries to determine the strength of a linear relationship between two variables. For both of these topics, one generally starts with a plot of the data to help identify any obvious features.