University of South Carolina

Carolina Core

STATISTICS 110
INTRODUCTION TO STATISTICAL REASONING

BULLETIN INFORMATION
STAT 110 - Introduction to Statistical Reasoning (3 credit hours)
Course Description:
A course in statistical literacy. Topics include data sources and sampling, concepts of experimental design, graphical and numerical data description, measuring association for continuous and categorical variables, introduction to probability and statistical inference, and use of appropriate software.

SAMPLE COURSE OVERVIEW
TBA

ITEMIZED LEARNING OUTCOMES
Upon successful completion of Statistics 110, students will be able to:
1. Critically evaluate claims based on statistical reasoning from survey and experimental results and understand the basic principles of statistical design of experiments.
2. Understand, interpret, and evaluate statistical reasoning from data using basic statistical terms, descriptive statistics, and charts and graphs, including using appropriate software.
3. Understand, describe, and utilize simple principles of probability, including the normal curve, and their application to social and physical phenomena.
4. Obtain and interpret confidence intervals in simple settings and understand their relationship to sample size and variability.
5. Demonstrate understanding of the concept of hypothesis testing and that statistical significance does not always imply importance.
6. Recognize and evaluate the relationship between two variables through linear regression and correlation and be able to explain why correlation does not imply causation.

SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS
1. *Statistics: Concepts and Controversies* (7th Edition) by David S. Moore and William I. Notz, W.H. Freeman and Company, 2010 (ISBN: 978-1-4292-2991-3)

2. iClicker: The i-Clicker electronic response system will be used in class daily (ISBN: 0716779390)

3. Calculator and Computer: Each student will need a calculator (one that can take a square root and raise a number to a power) and access to the internet to complete

homework assignments and print off notes and readings. Computers are located throughout the campus. A computer account through the College of Arts and Sciences using the MATH/STAT (MS) domain will be set up for you. Two MS labs are available in LeConte, rooms 124 and 303A. Check these locations for hours. Through this account, you will be able to access the internet but will not be able to print.

4. Statistical software (such as Minitab, R, and SAS), Excel and/or applets will be demonstrated in class throughout the semester for implementing the methods covered. Any of these required for homework sets are available in the MS labs. \

SAMPLE ASSIGNMENTS AND/OR EXAM

1. **Homework and Class Participation**: Homework covering the concepts taught in the class will be posted in Blackboard regularly throughout the semester. Students will submit their answers online. A date and time for closing each assignment will be announced in class and appear on each assignment. No late assignments will be accepted. You may discuss homework with other students, but each student must submit their assignment independently.
   a. We will also be using a "clicker system" to record responses during class. Each student will receive a point for responding to the first question and an additional point for each additional correctly answered question. iClicker points will be recorded in the grade book of Blackboard.
2. **Exams**: Dates for the three in-class exams are listed on the schedule attached to this syllabus. All work on the exams must be independent. Missed exams will be assigned a score of "0"
3. **Final Exam**: Date and time of the comprehensive final exam for this course is listed on the schedule attached to this syllabus. All work on the final exam must be independent. If the score on the final exam is higher than the score of the lowest hour exam, then it will be used to replace the hour exam score in addition to being used as the final exam score.

SAMPLE COURSE OUTLINE WITH TIMELINE OF TOPICS, READINGS/ASSIGNMENTS, EXAMS/PROJECTS

Class 1:   Introduction
                      Policies and Motivation

Class 2:   Chapter 1
                      Where Do Data Come From?

Class 3:   Chapter 2
                      Samples, Good and Bad

Class 4:   Chapter 2
                      Samples, Good and Bad

Class 5:   Chapter 3
What Do Samples Tell Us?

Class 6:   Chapter 3
What Do Samples Tell Us?

Class 7:   Chapter 4
Sample Surveys in the Real World

Class 8:   Chapter 4
Sample Surveys in the Real World

Class 9:   Chapter 5
Experiments, Good and Bad

Class 10:   Chapter 5
Experiments, Good and Bad

Class 11:   Chapter 6
Experiments in the Real World

Class 12:   Chapter 8
Measuring

Class 13:   Wrap-Up / Review for Exam 1

Class 14:   Exam 1

Class 15:   Chapter 10
Graphs, Good and Bad

Class 16:   Chapter 11
Displaying Distributions with Graphs

Class 17:   Chapter 12
Describing Distributions with Numbers

Class 18:   Chapter 12
Describing Distributions with Numbers

Class 19:   Chapter 12
Describing Distributions with Numbers

Class 20:   Chapter 13

Normal Distributions

Class 21: Chapter 13
Normal Distributions

Class 22: Chapter 13
Normal Distributions

Class 23: Chapter 17
Thinking About Chance

Class 24: Chapter 17
Thinking About Chance

Class 25: Wrap-Up / Review for Exam 2

Class 26: Exam 2

Class 27: Chapter 18
Probability Models

Class 28: Chapter 18
Probability Models

Class 29: Chapter 19
Simulation

Class 30: Chapter 19
Simulation

Class 31: Chapter 20
The House Edge: Expected Values

Class 32: Chapter 20
The House Edge: Expected Values

Class 33: Chapter 21
What is a Confidence Interval?

Class 34: Chapter 22
What is a Test of Significance?

Class 35: Chapter 22
What is a Test of Significance?

Class 36:   Chapter 23
               Use and Abuse of Statistical Inference

Class 37:   Wrap-Up / Review for Exam 3

Class 38:   Exam 3

Class 39:   Chapter 14
               Scatterplots and Correlation

Class 40:   Chapter 15
               Regression, Prediction, and Causation

Class 41:   Chapter 15
               Regression, Prediction, and Causation**

Class 40:   Wrap-Up / Review for Final

Final Exam according to university schedule

**Odds ratio as measure of association for categorical data also covered