Statistics in an Online World

HNRS 240 / Fall 2019

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Office Hours: 1:10PM-2:10 PM, Monday, Wednesday Friday, and by appointment

Meeting Time: 10:50-11:50 AM, Monday, Wednesday, Friday

Meeting Place: New Hall 103

Required Texts: *OpenIntro Statistics Fourth Edition* by David Diez, Mine Cetinkaya-Rundel,, Christopher D Barr
You can find the book using the URL: https://www.openintro.org/stat/textbook.php

Supplementary Reading:

- *Mathematical Statistics with Applications* by Wackerly, Mendenhall and Scheaffer (Chapter 15 provided by instructor)
- "College students' social networking experiences on Facebook" by Pempek, Tiffany A., Yevdokiya A. Yermolayeva, and Sandra L. Calvert. *Journal of Applied Developmental Psychology* 30.3 (2009): 227-238.
- EasyWriter (Ed. 6), by Lunsford, Andrea A.

Course Objective: The objective of this course is to explore probability and statistics through social media, smartphone use, and online retailers. The focus of this course will be asking questions and then developing the statistical techniques necessary to answer those questions. Armed with probability theory and statistical techniques we will determine how to summarize, analyze, and communicate key features of a data set. As applications, we will investigate how to quantify and improve the effectiveness of technology including websites and social media, how to use statistics to help businesses improve their presence on Facebook, and how online retailers and social media sites use consumer data.

Learning Outcomes:

1. Students will be able to use the methodologies of statistics to
    a. Investigate a topic of interest and make decisions based on the results.
    b. Design and carry out a simple statistical experiment.
    c. Critique news stories and journal articles that include statistical information. In the critique students will recognize variability and its consequences, identify potential sources of bias and both proper and improper cause and effect inference.
2. Students will be able to articulate the importance and limitations of using data and statistical methods in decision making.
3. Students will be able to write about course topics clearly and effectively.
4. Students will be able to interpret quantitative information related to the course topic.
5. Students will be able to connect course content to communities beyond the classroom.

Course Topics:

- Descriptive Statistics
- Graphical Methods
- Correlation and Regression
- Estimation
- Elementary Probability
- Test of Hypothesis (z-tests, t-tests and Chi-square test)
- Non-parametric Statistics
- Confidence Intervals
- Analysis of Variance

Homework: Homework will be assigned most days and instructions for each assignment can be found on our Inquire page.

Quizzes and Tests: There will be a quiz or test most weeks during the semester. Both will assess students understanding of material covered in class, take home readings, and homework assignments. The tests will be on

Friday, September 13th
Friday, October 4th
Friday, November 1st
Friday, November 22nd

Project: Due Monday, December 2nd In this project you will play the role of a member of a consulting team working with a local business or organization. You goal will be to help them understand how to improve their reach to constituents on Facebook. This project will be completed throughout the semester as you work towards presenting your business partner with a polished report that explains your statistical findings. Your first job will be to contact the organization and understand what goals they have for the impact of their Facebook page and what questions they have about how users are interacting with their page. You will then determine how to answer those questions using statistical methods and meet with another group to discuss your plan. Next your team will request relevant data from your business partner and analyze the data. The final project will be a report to your business partner that clearly articulates your statistical findings and their practical meanings. Before submitting your project to your business partner, you will have a peer review with another group to ensure your report is thoughtful and understandable. Finally you will give an oral presentation to the class on your findings.

Final Exam: The final exam will be cumulative and will be on December 10th at 8:30AM.

Grading: Grades will be assigned based on written assignments, quizzes, tests, and a final exam as follows,

Tests	45%
Homework/Quizzes	20%
Project	20%
Final Exam	15%

Grades will be determined based on the following:

A	> 93	B	83 – 86.9	C	73 – 76.9	D	63 – 66.9
A-	90 – 93	B-	80 – 82.9	C-	70 – 72.9	D-	60 – 62.9
B+	87 – 89.9	C+	77 – 79.9	D+	67 – 69.9	F	< 60

Attendance: Attendance is required and expected and is crucial to be successful in this course. An absence that is not discussed with the instructor prior to class is considered unexcused. Regardless of whether the absence is excused or not, you are responsible for all the material covered in class.

Missed Test: I will not give make-up tests. If you miss a test and have discussed it with me before the class takes the test, I will use your final exam grade for replacement.

Make-up Work: No make-up work will be accepted. Any excused work will be replaced by the final exam.

Expected Hours of Work: This course expects you to spend at least 12 hours of work each week inside and outside of class.

Technology: Scientific calculators and the statistical program Minitab Express will be used throughout the semester in the classroom and on assignments. Cell phones are expected to be turned off before entering the class. There is no appropriate reason for having a cell phone out in class. Computers will be used in the classroom exclusively for academic purposes.

Each student is required to rent Minitab Express for the semester. The cost is $30 for 6 months and you can download the software from www.minitab.com/express. **There are two separate versions: MAC and PC. Be sure to pick the correct version; there are no refunds!**

Academic Integrity System: The Roanoke College Academic Integrity System applies to all graded work in this course. Students are responsible for understanding and adhering to the Academic Integrity System. Among other things the Academic Integrity System prohibits giving or receiving unauthorized aid, assistance, or unfair advantage on academic work. Please note that having a phone or unauthorized electronic device out during a test is an academic integrity violation.