

Statistics in an Online World

HNRS 240 / Fall 2015

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Office Hours: 12-1 PM, Monday, Wednesday Friday,
11:00-12:00 AM, Thursday and by appointment

Meeting Time: 12:00-1:00 PM, Monday, Wednesday, Friday

Meeting Place: New Hall 106

Required Texts:

- *Essential Statistics* by David S. Moore
- *A Writer's Reference*, RC custom edition by Diana Hacker

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.

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 daily and graded for completeness and correctness.

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, January 30th
- Friday, February 20th
- Friday, March 20th
- Friday, April 17th

Assignments and Projects:

Project 1: Due Monday, September 14th . What’s in a tweet? In the first project of the year we will investigate how to use Twitter to collect raw data and use Minitab for exploratory data analysis.

Project 2: Due Monday, December 7th In this project you will play the role of a member of a consulting team working with a local business or organization. Your 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 16th at 2PM.

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

Tests	50%
Homework/Quizzes	15%
Projects	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 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.

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.

The Writing Center @ Roanoke College, located on the Lower Level of Fintel Library, offers writing tutorials focused on written and oral communication for students working on writing assignments/projects in any field. Writers at all levels of competence may visit the Writing Center at any point in their process, from brainstorming to drafting to editing, to talk with trained peer tutors in informal, one-on-one sessions. The Writing Center is open Sunday through Thursday from 4 to 9 pm. Simply stop in, or schedule an appointment by going to www.roanoke.edu/writingcenter, where our schedule of writing workshops and creative writing playshops is also posted. Questions? Email writingcenter@roanoke.edu or call 375-4949. Like our Facebook page for updates!

Subject Tutoring is a CRLA Nationally Certified Program located on the lower-level of Fintel library in room 005. Subject Tutoring offers individual appointments in 30-minute intervals for Lab Sciences, Modern Languages, Math & CPSC, Social Sciences, and Business & Economics. Hours are Sunday - Thursday 4 p.m. - 9 p.m. For a list of tutorials or to make an appointment, go to www.roanoke.edu/tutoring.

The Office of Disability Support Services, located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library, provides reasonable accommodations to students with identified disabilities. Reasonable accommodations are provided based on the diagnosed disability and the recommendations of the professional evaluator. In order to be considered for disability services, students must identify themselves to the Office of Disability Support Services. Students requesting accommodations are required to provide specific current documentation of their disabilities. Please contact Rick Robers, M.A., Coordinator of Disability Support Services, at 540-375-2247 or e-mail robers@roanoke.edu.

If you are on record with the College's Office of Disability Support Services as having academic or physical needs requiring accommodations, please schedule an appointment with Mr. Robers as soon as possible. You need to discuss your accommodations with him before they can be implemented. Also, please note that arrangements for extended time on exams, testing, and quizzes in a distraction-reduced environment must be made at least one week *before every exam*.