Statistics in an Online World
HNRS 240 / Fall 2024

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Office Hours: 11:00-12:00PM, Tuesday, Thursday, and by appointment. Please send me an email to schedule an appointment if you need to meet at another time.

Zoom Link: https://roanoke-edu.zoom.us/j/5403752449

Meeting Time: 1:10-2:10PM, Monday, Wednesday, Friday.

Meeting Place: Lucas 010

Required Texts: *OpenIntro Statistics Fourth Edition* by David Diez, Mine Cetinkaya-Rundel, Christopher D Barr
I would recommend buying a physical copy but you can download the electronic copy for free! You can find the book using the URL: https://www.openintro.org/stat/textbook.php

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: We will have daily HW on www.myopenmath.com. Each day there will be homework due the following class. Register at myopenmath to set up an account. Course ID: 244908. Enrollment key: RCHNRS.

Quizzes: We will have short quizzes occasionally to help prepare for the tests.

Labs: We will have serval labs throughout the semester that will focus on learning statistical computing. The labs will be completed in Minitab. You can access the software as a web application using your Roanoke College login through the following URL: https://forms.roanoke.edu/minitab-license

Tests: Tests will assess students' understanding of the material covered in class, take-home readings, and homework assignments. The tests will be on

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Friday, September 20th
Wednesday, October 9th
Wednesday, November 6th
Wednesday, December 4th

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Project: Due Friday, December 6th - In this project, you will play the role of a member of a consulting team working with the organization Deaf Dogs Rock. Your goal will be to help them understand how to improve their interaction with their followers on Facebook. This project will be completed throughout the semester as you work towards creating a polished report that explains your statistical findings to the leadership of Deaf Dogs Rock.

Final Exam: The final exam will be cumulative and will be Wednesday, December 11th at 2PM.

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

Tests	50%
Homework/ Labs/Quizzes	20%
Project	15%
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 before 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: If you have to miss a test and have discussed it with me before the class takes the test, we can work together to re-schedule the test up to two days after the scheduled date. If it is not possible to take the test in that time period, I will replace that test grade with your final exam grade.

Make-up Work: No make-up work will be accepted. Any excused work will be replaced by the final exam. If an assignment is not turned in before the deadline and you have not contacted me about the assignment, it is considered unexcused.

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

Technology: We will be using Minitab for our statistical computing. You can access the web application for free using your Roanoke College email. https://app.minitab.com/

We will be collecting data using the mobile application Classroom Stats throughout the semester. Please download this free app onto your phone. It is available for Android and iOS and you can easily find it in the app store.

Academic Integrity System: Students are expected to adhere to the Academic Integrity policies of Roanoke College. All work submitted for a grade is to be your own work! I encourage collaboration on homework but when you write up your solutions you should never be looking at someone else's work. Note that looking at or using your cell phone during a test or quiz is considered a violation of Academic Integrity regardless of your purpose or intent in doing so. If you use generative AI in any way on an assignment, you need to specify exactly how you used it, or it will be considered an Academic Integrity Violation.

Schedule: This is the intended schedule but could change. Please check Inquire for any updates or changes.

Day	Date	Topic
W	28-Aug	Introduction
F	30-Aug	Chapter 1: Intro to Data
M	2-Sep	Chapter 1: Intro to Data
W	4-Sep	Chapter 2.1: Numerical Data
F	6-Sep	Chapter 2.1: Numerical Data
M	9-Sep	Chapter 2.2: Categorical Data
W	11-Sep	Lab #1
F	13-Sep	Chapter 3.1: Probability
M	16-Sep	Chapter 3.2: Conditional Probability
W	18-Sep	Review
F	20-Sep	Test 1
M	23-Sep	Chapter 4.1: The Normal Distribution
W	25-Sep	Chapter 4.1: The Normal Distribution
F	27-Sep	Chapter 4.3: The Binomial Distribution
M	30-Sep	Chapter 5.1 Point Estimates
W	2-Oct	Chapter 5.2 Confidence Intervals Proportion
F	4-Oct	Chapter 5.2 Confidence Intervals Proportion
M	7-Oct	Review
W	9-Oct	Test 2
F	11-Oct	Chapter 5.3 Hypothesis Testing Proportion
M	14-Oct	Spring Break
W	16-Oct	Spring Break
F	18-Oct	Spring Break
M	21-Oct	Chapter 5.3 Hypothesis Testing Proportion
W	23-Oct	Chapter 6.1 - Inferences for a Single Proportion
F	25-Oct	Chapter 6.2 Difference in Proportions
M	28-Oct	Chapter 6.3 Goodness of Fit
W	30-Oct	Chapter 6.4: Test for Independence
F	1-Nov	Lab #2 – Categorical Variable Analysis
M	4-Nov	Review
W	6-Nov	Test 3
F	8-Nov	Chapter 7.1 One-Sample Means
M	11-Nov	Chapter 7.1 One-Sample Means
W	13-Nov	Chapter 7.2 Paired Data
F	15-Nov	Chapter 7.3 Difference of Two Means
M	18-Nov	Chapter 7.5 ANOVA
W	20-Nov	Lab #3 – Quantitative Response Analysis
F	22-Nov	Chapter: 8.1 Linear Regression
M	25-Nov	Chapter: 8.2 Least Squares
M	2-Dec	Project Day
W	4-Dec	Test 4
F	6-Dec	Review
W	11-Dec	Exam 2PM