Statistical Methods I - Online
STAT 210 / Fall 2020

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Office Hours: 1:10-2:10 PM, Monday, Wednesday Friday, 12:00-1:00 PM, Thursday, and by appointment. All office hours will be conducted on Zoom. Please send me an email to schedule an appointment. You can email me to set up an appointment at a different time. **Zoom Link: https://roanoke-edu.zoom.us/j/5403752449**

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

Meeting Place: Olin 230

Required Texts: *OpenIntro Statistics Fourth Edition* by David Diez, Mine Cetinkaya-Rundel, Christopher D Barr
I would recommend buying a physical copy buy 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 understand how to use statistical methods to describe data and make statistical inferences. We will start by learning how to collect data and design experiments. Next, we will focus describing data using graphical and numerical methods. Building our descriptive techniques, we will learn probability theory to understand how to make statistical inferences. Though out the course we will focus on statistical computing and clearly articulating our results.

Intended Learning Outcomes: By the end of this course, students will be able to …
…understand how to design an experiment and collect data.
…describe the key features of a data set using graphical and numerical methods.
…understand probability and how it relates to statistical inference.
…understand statistical inference and its limitations.
…clearly state a research question and pick an appropriate statistical method.
…use statistical software to organize and analyze data.
…articulate statistical methods and results to an audience of experts and non-experts.

Content:

- Producing Data
- Designing Experiment
- Graphical Methods (Histograms, Dot Plots, Pie Charts, Bar Charts, Box Plots, Stem and Leaf Plots, Scatterplots)
- Numerical Methods (Mean, Median, Standard Deviation, 5-Number Summary)
- Correlation and Linear Regression (OLS)
- Probability Models and Random Variables
- Probability Rules
- The Binomial Distribution
- The Central Limit Theorem
- Inferences for 1 and 2 Sample Proportions (z-tests)
- Inferences for 1 and 2 Sample Means (t-tests)
- Chi-Square Test
- ANOVA
- Simulation

INQ 240: You cannot get credit for this course if you have taken INQ 240 as this course covers the same material. If you are in MCSP and have taken INQ 240, you need to take STAT 220 to fulfill your statistics requirement.

Structure of the course: We will be meeting through live Zoom sessions and through prerecorded videos. See Inquire to find out if we are meeting live – it will always be posted at least a day in advance.

Homework: There will be reading assignments, problems assigned, and reflections. You can find all of them and their due date on Inquire

Labs: We will have serval labs throughout the semester that will focus learning statistical computing using R.

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

Friday, September 11th
Wednesday, September 30th
Wednesday, October 21st
Friday, November 13th

Final Exam: The final exam will be cumulative and will be on November 20th at 1PM.

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

Tests	60%
Homework	10%
Labs	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 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 programs R and RStudio 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.

R Download: https://www.r-project.org/
RStudio Download: https://rstudio.com/products/rstudio/download/

We will be collecting data using the mobile application Classroom Stats though out 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! No electronic devices other than calculators can be taken out during any class or testing period (this includes cell phones) unless written consent is given by the professor (e.g. Mathematica may be allowed for some tests). 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.

Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4 pm – 9 pm, Sunday – Thursday. We are a Level II Internationally Certified Training Center through the College Reading and Learning Association (CRLA). Subject Tutors are friendly, highly-trained Roanoke College students who offer free, one-on-one tutorials in a variety of general education and major courses such as: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, INQ 250, and Social Sciences (see all available subjects at www.roanoke.edu/tutoring). Tutoring sessions are available in-person or online in 30 or 60-minute appointments (please specify if you prefer to meet with a tutor online or in-person when you make your appointment). All in-person appointments will maintain at least 6 feet of physical distance, desks will be cleaned between appointments, and masks must be worn in all indoor, public spaces. In the event that all classes go online this semester, Subject Tutoring will remain available online, too. Schedule an appointment at www.roanoke.edu/tutoring or contact us at 540-375-2590 or subject_tutoring@roanoke.edu. We hope to see you soon!

Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in **Fintel Library**. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Laura Leonard, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Laura Leonard at your earliest convenience to schedule an appointment.

Schedule: This could change during this semester, but I will always let you know ahead of time.

	Week	Day	Date	STAT 210
Online	Week 1	1	19-Aug	Introduction
		2	21-Aug	Chapter 1: Intro to Data
	Week 2	3	24-Aug	Chapter 1: Intro to Data
		4	26-Aug	Chapter 2.1: Numerical Data
		5	28-Aug	Chapter 2.1: Numerical Data
	Week 3	6	31-Aug	Chapter 2.2: Categorical Data
		7	2-Sep	R Lab: Summarizing Data
		8	4-Sep	Chapter 3.1: Probability
In-Person	Week 4	9	7-Sep	Chapter 3.2: Conditional Probability
		10	9-Sep	Review
		11	11-Sep	Test 1
	Week 5	12	14-Sep	Chapter 4.1: The Normal Distribution
		13	16-Sep	Chapter 4.1: The Normal Distribution
		14	18-Sep	Chapter 4.3: The Binomial Distribution
	Week 6	15	21-Sep	Chapter 5.1 Point estimates
		16	23-Sep	Chapter 5.2 Confidence intervals proportion
		17	25-Sep	Chapter 5.2 Confidence intervals proportion
	Week 7	18	28-Sep	Review
		19	30-Sep	Test 2
		20	2-Oct	Chapter 5.3 Hypothesis Testing Proportion
	Week 8	21	5-Oct	Chapter 5.3 Hypothesis Testing Proportion
		22	7-Oct	Chapter 6.1 - Inferences for a Single Proportion
		23	9-Oct	Chapter 6.2 Difference in proportions
	Week 9	24	12-Oct	Chapter 6.3 Goodness of Fit
		25	14-Oct	Chapter 6.4: Test for Independence
		26	16-Oct	R Lab: Inference for Categorical Data
	Week 10	27	19-Oct	Review
		28	21-Oct	Test 3
		29	23-Oct	Chapter 7.1 One-sample means

	Week 11	30	26-Oct	Chapter 7.1 One-sample means
		31	28-Oct	Chapter 7.2 Paired Data
		32	30-Oct	Chapter 7.3 Difference of 2 means
	Week 12	33	2-Nov	Chapter 7.5 ANOVA
		34	4-Nov	R Lab: Inference for Numerical Data
		35	6-Nov	Chapter: 8.1 Linear Regression
	Week 13	36	9-Nov	Chapter: 8.2 Least Squares
		37	11-Nov	R Lab: Regression
		38	13-Nov	Test 4
	last day	39	16-Nov	Review
		Exam	19-Nov	Exam 8am