

Spring 2016

INQ 240 Statistical Reasoning : Here's to Your Health!

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Office Hours: MWF 9am - noon; TTh 11:45 -1pm

**Note: Students who have completed Stat 202 may not take this course. Students must receive a C or better in this course or Math 111 to declare a major in Business Administration.**

Course Description: Statistical Reasoning: Students will gain an understanding of how decision making is accomplished using modern statistical techniques. Topics include descriptive statistics, graphical methods, elementary probability, estimation, statistical inference, linear correlation, and regression.

**Specific Area of Inquiry:** Students will apply the techniques of data analysis to data sets and statistical studies that deal with health related issues.

Intended Learning Outcomes By the end of this course, students will be able to

- ... use the methodologies of statistics to investigate a topic of interest and make decisions based on the results.
- ... use the methodologies of statistics to design and carry out a simple statistical experiment.
- ... use the methodologies of statistics to 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.
- ... articulate the importance and limitations of using data and statistical methods in decision making.
- ... write clearly and effectively about health topics using the concepts and language of statistics.
- ... interpret quantitative information related to health statistics.

Course Materials

Primary Statistics Text: *Understandable Statistics Concepts and Methods*, 11<sup>th</sup> edition, Brase and Brase

Supplementary Reading: *News and Numbers- A Guide to reporting Statistical Claims and Controversies in Health and Other Fields*, Victor Cohn and Lewis Cope, any edition

Writing Handbook: *A Writer's Reference*, Diana Hacker, Roanoke College Edition

New York Times on-line Health Section

Los Angeles Times on-line Health Section

Various magazines and newspapers available in Fintel Library

Health Datasets from STARS: Creation of Statistical Resources from Real Datasets website, and the WHO Website, among others

Minitab statistical software package

Scientific/graphing calculator, preferably a TI-83 or TI-84

Test Schedule Tests are closed book. Calculators are required.

	Block 9	Block 10
Test 1	Thurs. Feb. 11	Thurs. Feb. 11
Test 2	Thurs. Mar. 3	Thurs. Mar. 3
Test 3	Thurs. Apr. 7	Thurs. Apr. 7
Final Exam	Fri. Apr. 29, 8:30 am	Thurs. Apr. 28, 8:30 am

**Please do not ask me to reschedule your exam just because you want to leave school early.**

If illness or family emergency causes you to miss a test, notify me promptly. You'll be expected to take the test as soon as possible, preferably within 48 hours.

Classroom policies Cell phones must be turned off and put away prior to entering the classroom. In the unlikely event that you need to turn on your cell phone during class, you must have permission of the instructor to do so. Otherwise, anyone using a cell phone for any reason during class will be asked by name to shut it off. The only electronic device that may be used in the classroom is a calculator (cell phone calculators not allowed). Use of laptops may be permitted occasionally, but only for specific assignments. Other electronic distractions are prohibited.

Special Assignments There should be about **seven** of these including:

Writing Assignments: There will be two or three assignments concerning the use of health statistics in the news. These are aimed at developing a healthy skepticism about what is reported in health articles and the skills to find the underlying information. Another writing assignment will be a project based upon an analysis of health data using Minitab.

Minitab assignments: There will be three or four assignments in which the students will use Minitab to display statistics, simulate processes, and perform tests upon data sets. The students will write an interpretation of their results as part of the assignment.

Statistical Study: (Small Group Assignment) Groups will design and carry out a simple study related to a health issue.

- Write a “scientific” report of findings.
- Poster for in-class gallery walk

Public Service Announcement: (Small Group Assignment) Groups will produce a video in the style of a public service announcement regarding a health issue. The message of the announcement must be supported by solid statistical research. The research must be mentioned in the video and justified in written form.

Daily Homework: You will have practice problems from the primary text and assigned readings from supplementary text. You will also analyze additional health related datasets. From time to time you will have a quiz on the assignments and the reading. Quiz grades will be averaged with the daily homework. **Late daily homework MUST be submitted by the class period after the due date. You may use this grace period only twice. You are expected to spend 12 hours per week working for this class (3 hours in class, 9+ hours outside of class).**

MCSP Lecture Requirement: The Math, Computer Science and Physics department offers a series of discussions that appeal to a broad range of interests related to these fields of study. These sessions will engage the community to think about ongoing research, novel applications and other issues that face our disciplines. Dates and times will be announced later and will appear on Inquire. **You must attend one of these lectures and fill out a response form. This form must be submitted within one week of the lecture.**

#### Academic Integrity

Students are expected to follow the integrity policy detailed in the handbook *Academic Integrity at Roanoke College*. Additionally, if you are ever uncertain as to how the College’s policy pertains to any assignment or exam in this course, please ask me for clarification. **Tests, Quizzes, Writing and Minitab assignments: All work that a student submits for a grade must be solely the work of that student unless I have given explicit permission for students to work together. This work must be pledged.**

**Daily homework: In the case of daily assignments taken from the textbook, I encourage you to work together. Please note that this is the EXCEPTION to the rule of not collaborating with each other.**

#### Grading Policy

Homework /Quizzes average	10%	Course Averages:		
Tests (15% each)	45%	A 93-100	B- 80-82	D+ 67-69
Special assignments average	25%	A- 90-92	C+ 77-79	D 63-66
Final Exam	20%	B+ 87-89	C 73-76	D- 60-62
		B 83-86	C- 70-72	F below 60

Attendance Policy If you miss **THREE** classes after you add this course, you may be dropped from it OR have 1.5 points deducted from your final grade for every subsequent class missed. Be aware that a DF on your transcript counts as an F and lowers your GPA. If indulgence in alcohol causes you to miss more than one class, the number for AA is 343-6857.

**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, Business & Economics. Hours are Sunday - Thursday 4 p.m. - 9 p.m. There is also walk-in tutoring available. For a list of tutorials or to make an appointment, go to [www.roanoke.edu/tutoring](http://www.roanoke.edu/tutoring).

**The Writing Center @ Roanoke College**, located in Room 15 on the Lower Level of Fintel Library, offers writing tutorials 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, and talk with trained peer writing 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](http://www.roanoke.edu/writingcenter), where our schedule of writing workshops and creative writing playshops is also posted. Questions? Email [writingcenter@roanoke.edu](mailto:writingcenter@roanoke.edu) or call 375-4949. You can also Like our page on Facebook! **YOU ARE REQUIRED TO VISIT THE WRITING CENTER AT LEAST ONCE DURING THIS SEMESTER.**

**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 Dr. Bill Tenbrunsel, Director of the Center for Learning & Teaching, at 540-375-2247 or e-mail [tenbruns@roanoke.edu](mailto:tenbruns@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 Dr. Tenbrunsel 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 with the Center for Learning & Teaching at least 2 business days (M-F) *before every exam*.

### Tentative Course Schedule Spring 2016

<b>Question 1:</b> How do we convey health information and data in an unbiased and informative way?	
Week 1	Chapter 1 Getting Started Chapter 2 Organizing Data
Week 2	Chapter 2 Organizing Data ; Chapter 9 Linear correlation and Regression Chapter 3 Averages and Variation
Week 3	Chapter 3 Averages and Variation <b>Question 2:</b> How accurate is the reporting of health topics? Chapter 4 Elementary Probability Theory
Week 4	Review <b>Test 1</b> Thursday February 11 for Blocks 9 and 10
Week 5	Chapter 4 Elementary Probability Theory Chapter 5 The Binomial Probability Distribution
Week 6	Chapter 5 The Binomial Probability Distribution Chapter 6 Normal Curves and Sampling Distributions
Week 7	Review <b>Test 2</b> Thursday March 3 for Blocks 9 and 10
<b>Spring Break</b>	
Week 8	Chapter 6 Normal Curves and Sampling Distributions
Week 9	Chapter 7 Estimation Chapter 8 Hypothesis Testing
Week 10	Chapter 8 Hypothesis Testing
Week 11	review <b>Test 3</b> Thursday April 7 for Blocks 9 and 10
<b>Question 3:</b> Can we use data and statistical techniques to determine health trends and follow disease outbreaks?	
Week 12	Chapter 9 Correlation and Regression, hypothesis testing <b>Question 4:</b> What health conditions are independent of others? Chapter 10 Chi-Squared and F distributions
<b>Question 4:</b> What health conditions are independent of others?	
Week 13	Chapter 10 Chi-Squared and F distributions Review for final
Thurs. Apr. 28 <b>Block 10 Final exam 8:30 -11:30</b> Yes, it is comprehensive	
Fri. Apr. 29 <b>Block 9 Final exam 8:30-11:30</b> Yes, it is comprehensive	