

Fall 2021

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

Prof. Claire Staniunas

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Office Hours: MWF 9:40am – 10:40am and noon to 1pm; TTh 10:10-11:30am ; other times as needed

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*, 11th edition, Brase and Brase

Writing Handbook: *Easy Writer*, by Andrea Lunsford or some other writer's guide

Various magazines and newspapers available in Fintel Library or online

Health Datasets the CDC website, and the WHO Website, among others

Minitab statistical software package, available on campus; Microsoft Excel

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

Flipped Classroom You may be used to attending a lecture, working on homework problems, and then having a few (if any!) of your questions answered during the next class period before moving on to the next lecture. We will move the lecture part of this process to **before** class, reserving class time for your questions and working problems. The lecture for each class period will be posted on our Inquire page, along with a few practice problems. In order to be prepared for class you must watch the lecture and work on the problems beforehand.

-come to class prepared

-bring your laptops, as we may need them in ANY class.

Grading Policy

		Course Averages:			
Mastery score	60%	A 93-100	B- 80-82	D+ 67-69	
Special assignments average	20%	A- 90-92	C+ 77-79	D 63-66	
Class worksheets average	10%	B+ 87-89	C 73-76	D- 60-62	
Graded problems average	10%	B 83-86	C- 70-72	F below 60	

Testing Policy : We will use mastery-based testing rather than points-based testing . You will only receive credit for answers that demonstrate that you completely understand (have mastered) a topic. BUT you will get many chances to prove mastery throughout the semester with no penalty for previous attempts.

-The course has been summarized into 16 topics

-Your mastery of questions on these topics is assessed through the working of problems each on Mastery days

-Each problem is graded as “mastered” or “not mastered”

-Once you have mastered a topic, you need not attempt it again

-There is no penalty for multiple attempts to achieve mastery

-Mastery means you understand and can demonstrate all fundamentals of the topic and are proficient at the level desired for the course.

-Missed class on Mastery day? You may attempt those topics on the next Mastery day.

-Your overall mastery test grade is determined by the number of topics you have mastered:

#mastered	Mastery grade	#mastered	Mastery grade
16	100	8	60
15	95	7	55
14	90	6	50
13	85	5	45
12	80	4	40
11	75	3	35
10	70	2	30
9	65	1	25

Special Assignments There should be about **five or six** of these including:

Writing Assignments: There will be 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 or Excel.

Minitab assignments: There will be assignments in which the students will use Minitab or Excel 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: Individuals or Groups will design and carry out a simple study related to a health issue and write an interpretation.

Participation: You are expected to prepare for every class by watching the video lectures and working the practice problems. You are expected to attend every class (bring your laptop!) and work in class to the best of your ability. If you are sick or have been told by Health Services NOT to come to class, please notify me.

Graded problems MUST be submitted by the beginning of class on the due date. Assignments submitted after the keys have been posted will receive a grade of 0.

You are expected to spend 12 hours per week working for this class (3 hours in class, 9+ hours outside of class). You may gain extra credit by attending one of the MCSP colloquia and completing a response form about what you learned. A link to the schedule will be posted on the top pane of our Inquire page.

Academic Integrity

Students are expected to follow the integrity policy detailed in the handbook *Academic Integrity at Roanoke College*. See https://www.roanoke.edu/inside/a-z_index/academic_affairs/academic_integrity.

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. **Mastery Tests:** All work that a student submits for a grade must be *solely* the work of that student.

Special Assignments and graded problems: All work that a student submits must be solely the work of that student, unless I have given explicit instructions otherwise. In the case of writing assignments, you MAY seek help from the Writing Center.

Practice problems and classwork: In the case of daily assignments taken from the textbook and classwork I encourage you to work together. Please note that this is the EXCEPTION to the rule of not collaborating with each other.

Attendance Policy If you are healthy, you are expected to be in the classroom during class. If you miss **THREE** classes after you add this course, you, your advisor and the registrar will be notified that you are in danger of being dropped from the course. I may drop you if you miss a fourth class. Be aware that a DF on your transcript counts as an F and lowers your GPA. If you miss a week of class, I must report your absence to the Registrar's office. **Exceptions:** If you have a temperature of 100.4 or higher or other COVID symptoms, don't come to class. Call Health Services IMMEDIATELY. Do not come to class or go to any public area on campus. In order for your absence to be excused, you must give Health Services permission to notify me that you have consulted them about COVID symptoms. If Health Services informs you that you should isolate and not attend class for multiple days, inform me so that we can make a plan to keep you current in the course. All absences caused by consultation with Health Services about coronavirus symptoms or isolation ordered by Health Services will be excused but you will need to do the work and graded assignments even if we extend a deadline for you.

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 Becky Harman, 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 Becky Harman at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4-9 PM, Sunday-Thursday. Subject Tutors are highly trained, current students who offer free, one-on-one (and small group) tutorials in over 80 courses taught at Roanoke College, including: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, and Social Sciences. Check out all available subjects and schedule 30- or 60-minute appointments at www.roanoke.edu/tutoring. If you have a question, feel free to stop by, or contact us at subject_tutoring@roanoke.edu or 540-375-2590. See you soon!

Please have Subject Tutoring notify me when you attend a session. These count as class participation.

The Writing Center @ Roanoke College, located on the Lower Level of Fintel Library (Room 15), offers free tutorials focused on writing projects and oral presentations for students working in any field. Writers and presenters at all levels of competence may visit the Writing Center at any point in their process—including brainstorming, drafting, organizing, editing, or polishing presentation skills—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 at www.roanoke.edu/writingcenter. Questions? Email writingcenter@roanoke.edu or call 540-375-4949.

YOU ARE REQUIRED TO VISIT THE WRITING CENTER AT LEAST ONCE DURING THIS SEMESTER.

Special classroom policies for Fall 2021

The College has issued a mask mandate for the start of the semester that requires masks to be worn in indoor common spaces such as our classroom. You must wear a mask in this class. If you arrive without a mask, you will not be allowed to stay and may lose credit for attendance or in-class work. The Bookstore sells masks if you need to make a quick purchase. If the mandate is extended, you will be required to continue to wear a mask.

Courtesy: We will treat each other with respect at all times. If I offend you, it is unintentional, but call me on it anyway so that I can avoid doing it in the future.

I will honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. Please address me as Mrs. Staniunas or Mrs. S.

Tentative Course Schedule Fall 2021

Question 1: How do we convey health information and data in an unbiased and informative way?	
Week 1	Introduction Chapter 1 Getting Started
Week 2	Chapter 2 Organizing Data
Question 2: Can we use data and statistical techniques to determine health trends and follow disease outbreaks?	
Week 3	Mastery Day on Monday September 13 Chapter 9 Linear Correlation and Regression Chapter 3 Averages and Variation
Week 4	Chapter 3 Averages and Variation Mastery Day on Friday Sept 24
Question 3: How accurate is the reporting of health topics?	
Week 5	Chapter 4 Elementary Probability Theory
Week 6	Chapter 5 The Binomial Probability Distribution Mastery Day on Friday Oct 8
Week 7	Chapter 6 Normal Curves and Sampling Distributions
FALL BREAK	
Week 8	Chapter 6 Normal Curves and Sampling Distributions Begin Chapter 7
Week 9	Chapter 7 Confidence Intervals Mastery Day on Friday Nov 5
Week 10	Chapter 8 Hypothesis Testing
Week 11	Chapter 8 Hypothesis testing Mastery day on Friday Nov 19
Question 4: What health conditions are independent of others?	
Week 12	Special topic on Monday, then THANKSGIVING BREAK
Week 13	Chapter 10 Chi-Squared and F distributions
Week 14	Mastery day on Monday Dec 6 Review for Final Mastery
Final mastery for block 1 (8:30 class) is 8:30 – 11:30am Friday Dec 17	
Final mastery for block 3 (10:50 class) is 8:30 – 11:30am Tuesday Dec 14	
Final mastery for block 5 (1:10 class) is 2 – 5pm Wednesday Dec 15	