INQ 240 Statistical Reasoning : Here's to Your Health!
Prof. Claire Staniunas
Office: 161-D Trexler Hall
Phone: 375- 2010
Email: staniuna@roanoke.edu
Office Hours: (in person) MWF 9:30am – 11:30am; (on Zoom) TW 6:30-7:30pm ; 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 use Zoom 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
Participation 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 <u>demonstrate</u> all fundamentals of the topic and are proficient at the level desired for the course.

-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. When we are holding class in person, you are expected to be in the classroom. If you are sick or have been told by Health Services NOT to come to class, please attend, using Zoom. And if you are too ill to look at a computer, please get medical attention and get well soon.

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*. 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. **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.

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. Otherwise, please attend via Zoom. 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 you miss a week of class, I must report your absence to the Registrar's office.

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.

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.

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

Special classroom policies for Fall 2020
a. Face coverings/masks must be worn over the mouth and nose by all students and instructors in classrooms and hallways of academic buildings. By wearing face coverings, we protect our college community and its most vulnerable members. Students who come to class without a face mask that is being worn properly will be asked to leave and will be readmitted only after they are wearing one.
b. During the times when the college is forced to suspend in-person attendance, this class will continue to meet via Zoom at our regular time. You will need internet connectivity. If you have technology challenges, I need you to email me as soon as possible so that we can discuss how you can keep up. I will continue to have office hours at my regular times via Zoom. While on Zoom, please keep your video ON(part of your participation!) and your microphone MUTED, unless you are speaking.
c. Corridors may be crowded, especially before class. Please wait outside the building (weather permitting) until 5 minutes before your class begins.

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 2020

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 Aug 31**
              Chapter 9 Linear Correlation and Regression
              Chapter 3 Averages and Variation

Week 4   Chapter 3 Averages and Variation   Chapter 4 Elementary Probability Theory
Question 3: How accurate is the reporting of health topics?
Week 5   Chapter 4 Elementary Probability Theory   **Mastery Day on Friday   Sept 18**
Week 6   Chapter 5 The Binomial Probability Distribution
Week 7   Chapter 6 Normal Curves and Sampling Distributions
Week 8 **Mastery Day on Monday Oct 5**   Chapter 6 Normal Curves and Sampling Distributions
Week 9 Chapter 7 Confidence Intervals
Week 10 **Mastery day on Monday Oct 19**   Chapter 8   Hypothesis Testing
Week 11   Chapter 8 Hypothesis testing

Week 12 **Mastery day on Monday Nov 2**
  Question 4: What health conditions are independent of others?
               Chapter 9 hypothesis tests concerning linear correlation
               Chapter 10 Chi-Squared and F distributions

Week 13 Chapter 10 Chi-Squared and F distributions   **Mastery day on Friday   Nov 13**
Week 14 Review and final mastery Final mastery for block 4 (noon class) is 8am –noon Thursday Nov 19 Final mastery for block 5 (1:10 class) is   1 – 5pm Saturday Nov 21 Final mastery for block 6 (2:20 class) is   1 – 5pm Friday Nov 20