

Fall 2022

## INQ 240 Statistical Reasoning : Here’s to Your Health!

Instructor: Claire Staniunas

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.

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Student Hours: MWF 9:40am – 10:40am and 12 to 1pm;  
TTh 11:45 – 1pm ; other times as needed

**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.

### **Course Materials**

Primary Statistics Text: *Understandable Statistics Concepts and Methods*, 12<sup>th</sup> 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

### **Grading Policy**

Mastery score 60%

Special assignments average 30%

Class worksheets average 10%

Grades will be assigned thus:

A 93-100	B- 80-82	D+ 67-69
A- 90-92	C+ 77-79	D 63-66
B+ 87-89	C 73-76	D- 60-62
B 83-86	C- 70-72	F under 60

**Late work submission policy** Class worksheets are due and will be collected at the end of class. Graded problem sets and Special assignments *must* be submitted no later than 24 hours after the due date. They will not be accepted later than that.

**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 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

Do NOT expect to attempt mastery topics on days other than mastery days. See the schedule.

You are expected to spend 12 hours per week working for this class ( 3 hours in class, 9<sup>+</sup> hours outside of class).

### **Academic Integrity**

Students are expected to follow the integrity policy detailed in the handbook *Academic Integrity at Roanoke College*.

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:** 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 Policies:**

The usual course policy for absences is:

You will be working on material during class and submitting it at the end of class. If you miss class, you will have a zero for the day’s work. Therefore, you are *expected* to attend *every*

class. **If you have more than three absences, you may be dropped from the course.** If you miss three classes, you will receive a warning by e-mail that you are in danger of being dropped. If you miss a fourth class, you may receive another e-mail saying that you have been dropped. In that case, the grade you receive will reflect your course standing at the time, either DP or DF.

**BUT:**

If you are sick, especially if you have a fever, 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. 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.**

Masks Wear a mask in class if you have been exposed to Covid, or have just recovered from Covid (the CDC says wear it for 5 days after recovery). It's OK to wear a mask if you have a cold or don't want to risk infecting a family member with whatever virus is making the rounds.

**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](http://www.roanoke.edu/writingcenter). Questions? Email [writingcenter@roanoke.edu](mailto:writingcenter@roanoke.edu) or call 540-375-4949.

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

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 2022

<b>Question 1:</b> How do we convey health information and data in an unbiased and informative way?	
Week 1	Introduction
Week 2	Chapter 1 Getting Started Chapter 2 Organizing Data 2.1,2.2,2.3
Week 3	Chapter 9 Linear Correlation and Regression Chapter 3 Averages and Variation 3.1 <b>Mastery Day on Thursday Sept. 15</b>
<b>Question 2:</b> Can we use data and statistical techniques to determine health trends and follow disease outbreaks?	
Week 4	Chapter 3 Averages and Variation 3.2,3.3 Chapter 4 Elementary Probability Theory 4.1, 4.2
<b>Question 3:</b> How accurate is the reporting of health topics?	
Week 5	Chapter 4 Elementary Probability Theory 4.2b , 4.3 Chapter 5 Binomial Probability Distribution 5.1 <b>Mastery Day on Thursday Sept. 29</b>
Week 6	Chapter 5 Binomial Probability Distribution 5.2,5.3 Chapter 6 Normal Curves 6.1,6.2
Week 7	Chapter 6 Normal Curves and Sampling Distributions 6.3 <b>Mastery Day on Thursday Oct. 13</b>
<b>FALL BREAK</b>	
Week 8	Chapter 6 Normal Curves and Sampling Distributions 6.4,6.5 Begin Chapter 7 Confidence Intervals 7.1, 7.2
Week 9	Chapter 7 Confidence Intervals 7.2,7.3 <b>Mastery Day on Thursday Nov. 3</b>
Week 10	Chapter 8 Hypothesis Testing 8.1,8.3,8.2
Week 11	Chapter 8 Hypothesis testing 8.5a,8.5b <b>Mastery day on Thursday Nov. 17</b>
Week 12	Special topics on Tuesday THANKSGIVING BREAK
<b>Question 4:</b> What health conditions are independent of others?	
Week 13	Chapter 10 Chi-Squared and F distributions 10.1,10.5
Week 14	<b>Mastery day on Tuesday Dec. 6</b> review Thursday
<b>Final mastery 8:30 class: Mon. Dec. 12, 8:30am</b>	
<b>Final mastery 10:10 class: Thurs. Dec. 15, 8:30am</b>	

**How to succeed in our 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. In **this** class you are expected to:

-**Watch** the lecture **before** class. The video will be posted on our Inquire page with some practice problems.

-**Work** the practice problems **before** class.

-**Note** which problems are giving you trouble and **ask** about them during class.

-**Work** on class worksheets during class and turn them in at the end of class.

-**Bring** your laptops, as we may need them in any class.

-**Come to student hours** before the next class if you need more help. Do not wait until just before Mastery day.

**Special Assignments** There should be about **eight** 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.

*Graded problem sets:* I will give a few of these to help you develop necessary skills.

*Statistical Study:* Individuals or Groups will design and carry out a simple study related to a health issue and write an interpretation.

**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.

**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](mailto:aes@roanoke.edu) 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: Math 111 and INQ 240, among others. Check out all available subjects and schedule 30- or 60-minute appointments at [www.roanoke.edu/tutoring](http://www.roanoke.edu/tutoring). If you have a question, feel free to stop by, or contact us at [subject\\_tutoring@roanoke.edu](mailto:subject_tutoring@roanoke.edu) or 540-375-2590. See you soon!