

Spring 2024

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

Instructor: C. M. 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 10:50am – 1pm;

TTh 11:45 – 12:30pm ; 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 20%

Daily grade average\* 20%

\*A daily grade includes preparation and classwork.

Preparation: watching the class video before 5:30 am on the day of class (25 points), trying the textbook problems before class and submitting them at the beginning of class (25 points). Classwork: working on and submitting the class worksheet (50 points).

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. Special

**assignments *must* be submitted no later than 24 hours after the due date. Exceptions to this might be made in extraordinary circumstances.**

**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 topic is graded as “mastered” or “not mastered”

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

-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 score is determined by the number of topics you have mastered:

#mastered	Mastery score	#mastered	Mastery score
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+ 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:

Attendance will be taken at the beginning of every class meeting. If you arrive late, it is your responsibility to make sure you are not marked absent in my grade book. Your fourth and each additional absence will result in a 2-point reduction in your final course grade. College athletes, please come see me as soon as you know the schedule of your games—let's hope that no more than three of them conflict with class times. If you should have an emergency that requires you to miss a large portion of the course, please notify me ASAP. I do not distinguish between excused and unexcused absences, so save your freebies for the times you are really sick: you are feverish, contagious, vomiting, hospitalized, etc.

### **Tentative Course Schedule Spring 2024**

<b>Question 1:</b> 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
<b>Question 2:</b> Can we use data and statistical techniques to determine health trends and follow disease outbreaks?
Week 3 Chapter 9 Linear Correlation and Regression Begin Chapter 3 <b>Mastery Day on Friday Feb 2</b>
Week 4 Chapter 3 Averages and Variation begin Chapter 4
<b>Question 3:</b> How accurate is the reporting of health topics?
Week 5 Chapter 4 Elementary Probability Theory <b>Mastery Day on Friday Feb 16</b>
Week 6 Chapter 5 The Binomial Probability Distribution
Week 7 Chapter 6 Normal Curves and Sampling Distributions <b>Mastery Day on Friday Mar 1</b>
<b>SPRING BREAK</b>
Week 8 Chapter 6 Normal Curves and Sampling Distributions, Begin Chapter 7
Week 9 Chapter 7 Confidence Intervals <b>Mastery Day on Friday Mar 22</b>
Week 10 Chapter 8 Hypothesis Testing
Week 11 Chapter 8 Hypothesis testing
<b>Question 4:</b> What health conditions are independent of others?

Week 12 <b>Mastery Day on Monday Apr 8</b> Special topic day Chapter 10 Chi-Squared test
Week 13 Chapter 10 ANOVA Topic 16 <b>Mastery day on Friday Apr 19</b>
Week 14 Review for Final Mastery <b>Tuesday April 23 we will have class</b>
<b>Final mastery for block 1 (8:30 class) is Tue Apr 30 2-5pm</b>
<b>Final mastery for block 2 (9:40 class) is Thur Apr 25 8:30 – 11:30am</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. Hand them in at the beginning of 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. Please work in groups of 3 or 4.
- 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 **seven** 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 Dustin Persinger, 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.

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.