



INQ 240 - A5 Statistical Reasoning : Here's to Your Health ! SPRING 2024

Start Date January 17, 2024

End Date: April 25, 2024

Class Meetings:

Block 7A, Monday, Wednesday 2:20 - 3:50 pm
Olin Hall, Room 231

Contacting your Instructor : Naomi Clements

Office : Trexler Hall, 266E

Office Hours: Tuesday, Thursday, 1 pm - 3 pm, and by appointment

Email: clements@roanoke.edu

The best way to contact me is by email. I will return your email within 24 hours.

Math, Computer Science, Physics Department Office:

Office: Trexler Hall, Room 270

Campus Safety: (540) 375-2310

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

Course Textbook: Title: *Statistics Informed Decisions Using Data Fourth Edition*
Author: Michael Sullivan III Publisher: Pearson
ISBN # 0-32175727-0

Additional Course Materials:

Various magazine and newspaper articles 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**

CAS calculators, computers, cell phones, math help websites and online calculators may not be used on proctored events such as quizzes, tests, and/or exams.

Teaching Methods: The course material will be divided into 4 units with a test at the end of each unit. Class time will consist of explanation, questioning, demonstration, individual and group work, and student question and answer time. Every effort will be made to answer all student questions.

Expected Student Work Policy: It is highly recommended that students take notes in class. Templates of notes presented in class will be available on the class website on Inquire. These templates include the explanation given in class and space for you to write the examples worked in class. These notes will help study, and help you when you are working on homework. Students are expected to spend at least 12 hours of work each week inside and outside of class, 3 hours in class, and 9 hours outside of class. Students should prepare for class by completing homework for the previous week, writing assignments, and reading the Chapter Sections to be studied in the week ahead.

Grading Policy: The final course grade will be determined by a weighted average with the following values:

In-Class Work/Homework	40%
4 Writing Assignments	10%
4 Unit Tests	40%
Final Exam	10%

Grading Scale

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

Homework: Practice is essential to learning new skills. Learning by practicing and reviewing is the purpose of in class work/homework. Homework will be assigned for each section of the book we study. In Class Work/Homework is due on Wednesday of each week for the chapter sections covered in class the previous week. For you to keep up with the coursework in class work/homework should be done on time. Late in class work/homework will be accepted until the Monday following the original due date, with a 5 point reduction in the grade. If several students are turning in class work/homework in late each week, the acceptance of late homework will be ended. You may receive assistance from me with in class work/homework during my office hours, work with classmates, or receive assistance from tutors in the Subject Tutoring Center. The tutors in the Subject Tutoring Center are not allowed to help with homework. They may help you learn by working through questions in the book that are similar to your homework questions.

For credit to be received on in class work/homework, important information given in the question, the entry you made into your calculator, and your answer must be written in your own hand. In class work/homework must be legible with questions in order, answers circled, and with a blank space between the questions. If you miss class on a Wednesday due to illness, and you may turn it in on the following Friday with no reduction in the grade.

Writing Assignments: There will be four writing assignments on various health-related statistical topics. More specific instructions will be given for each one when it is assigned. The written assignments should be your own work. You may ask others to read your work and provide feedback on whether your writing is clear, or if they see grammar or similar mistakes. Everyone's writing is improved by such feedback. **BUT** do not let others write for you or correct your errors. That would undermine your learning and integrity, and is a violation of Academic Integrity in this course.

Tests: You may make up one Unit Test missed due to illness if you notify me of your absence before the test, and if the test is made up within one week of the original test date. You may retake one unit test during my office hours for a better grade if it is done within one week of the original test date. The Final Exam may not be made up. Students should make every effort to take care of personal needs before a test begins so they don't need to leave the classroom during a test. Athletes who will miss a test due to an out of town game or meet must make arrangements to take the test before the test day.

You may not use your own books, notes, scratch paper or other aids during Unit Tests or the Final Exam. The instructor may provide formulas for the Unit Tests and the Final Exam. Approved calculators may be used but not shared between students. Also, please note that arrangements for extended time on testing in a distraction-reduced environment must be made at least one week *before every test*.

Attendance: Attendance will be taken during every class. Your attendance in all class sessions is **essential** for your success in this course. It is your responsibility to read the text, study the notes I provide, and complete assignments for any class you miss. You are responsible for the material covered as well as all announcements or changes in the schedule made in your absence.

Classroom Policies: Open and mutually respectful communication of varied opinions, beliefs, and perspectives during classroom or online discussion encourages the free exchange of ideas that is essential to higher learning and to the ability to learn from each other. I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

I will gladly 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.

Cell phones must be turned off prior to entering the classroom. Laptops may be used for note-taking during regular class sessions. The use of laptops or any other electronic device during an exam is strictly prohibited. Any use of such devices during a quiz or exam will be considered a breach of academic integrity.

Academic Integrity is a foundational value of Roanoke College and students are expected to behave as responsible members of the college community and to be honest and ethical in their academic work. Guidelines for academic integrity, as well as forms of academic dishonesty are 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.

Additional Information: Each student is responsible for being aware of the information contained in the [Roanoke College Catalog](#), the [Student Handbook](#), and the [Academic Calendar](#). All information may be viewed on the [Roanoke College website](#).

Course Withdrawal: The last day to submit a Pass/Fail or Audit form is Tuesday, January 23, 2024. The last day to drop a course before a "W" will be recorded on your transcript is Tuesday, April 9, 2024. The last day to drop a course unless withdrawing from the college is Tuesday, April 9, 2024. A course is considered officially dropped only if the DROP form is accepted by the Registrar's office.

Syllabus Changes: Occasionally, changes to the syllabus may be necessary. Students will be notified of any changes to the syllabus in writing. The Grading Policy will not be changed.

College Services:

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.

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!

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 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 Dustin Persinger at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

Student Health & Counseling Services supports students through in-person health appointments, in-person counseling, 24/7 telehealth (TimelyCare), Therapy Assistance Online, as well as resources related to general wellness, LGBTQ+, sexual assault, substance abuse, and suicide prevention. Unmet health needs can negatively impact your performance in this course. Student Health & Counseling Services can help. Please see <https://www.roanoke.edu/shcs> for more information and to access services.

**Tentative Schedule INQ 240 - A5 Statistical Reasoning : To Your Health
Monday, Wednesday 2:20 - 3:50 pm, Olin 231**

Week	Date	Chapter Sections to be Studied
1	January 17	1.1 Introduction to Statistics 1.2 Observational vs Experimental Design 1.3 Simple Random Sampling
2	January 22, 24	1.4 Other Sampling Methods 1.5 Bias in Sampling 1.6 The Design of Experiments 2.1 Organizing Qualitative Data 2.2 Organizing Quantitative Data
3	January 29, 31	2.3 Additional Display of Quantitative Data 2.4 Graphical Misrepresentations of Data Review of Unit 1 Test on Unit 1
4	February 5, 7	3.1 Measures of Central Tendency 3.2 Measures of Dispersion 3.3 Measure of Central Tendency and Dispersion from Grouped Data 3.4 Measures of Position and Outliers 3.5 The Five-Number Summary and Boxplots
5	February 12, 14	4.1 Scatter Diagrams and Correlation 4.2 Least-Squares Regression 4.3 Diagnostics on the Least Squares Regression Line 4.4 Contingency Tables and Association
6	February 19, 21	5.1 Probability Rules 5.2 The Addition Rule and Complements 5.3 Independence and the Multiplication Rule
7	February 26, 28	5.4 Conditional Probability and the General Multiplication Rule Review Unit 2 Test on Unit 2
8	March 4, 6	Spring Break
9	March 11, 13	6.1 Discrete Random Variables 6.2 The Binomial Probability Distribution 7.1 Properties of the Normal Distribution 7.2 Applications of the Normal Distribution
10	March 18, 20	8.1 Distribution of the Sample Mean 7.3 Assessing Normality 7.4 The Normal Approximation to the Binomial Probability Distribution

Review of Unit 3

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| 11 | March 25, 27 | Test on Unit 3
9.1 Estimating a Population Proportion
9.2 Estimating a Population Mean
9.3 Estimating a Population Standard Deviation |
| 12 | April 1, 3 | 10.1 The Language of Hypothesis Testing
10.2 Hypothesis Tests for a Population Proportion
10.3 Hypothesis Tests for a Population Mean
10.4 Hypothesis Test for a Population Standard Deviation |
| 13 | April 8, 10 | 11.1 Inference about Two Population Proportions
11.2 Inference about Two Means: Dependent Samples
11.3 Inference about Two Means: Independent Samples
11.4 Inference about Two Population Standard Deviations |
| 14 | April 15, 17 | Review of Unit 4
Test on Unit 4 |
| 15 | April 22 | Review for Final Exam |
| 16 | Finals Week, Final Exam for INQ 240 - A5, Thursday, April 25, 2 - 5 pm | |