ROANOKE COLLEGE

INQ 240 – B3   Statistical Reasoning : Here's to Your Health !
Fall 2025

Start Date: August 27, 2025
End Date: December 12, 2025

Class Meetings:

Block 4, Monday, Wednesday, Friday, 12:00 pm – 1:00 pm, Lucas 217

Contacting your Instructor :   Naomi Clements
Office: Trexler 180
Office Hours: Mon., Wed., Fri., 11 am – 12 pm, Wed. 2 – 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: 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
A link to a PDF is available on the class website.

Additional Course Materials:

Various magazine and newspaper articles available in Fintel Library or online,
health datasets on the CDC the WHO Websites, among others, Microsoft Excel, available on
computers in the library, **and a TI-83 or TI-84 Scientific/Graphing calculator**

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 and Learning Methods: The course material will be divided into 3 units with a test at the end of each unit. Class time will consist of explanation, a time for questions and answers, and working on assignments. Every effort will be made to answer all student questions. Students should prepare for class by reading the book and notes for each section before the material is presented in class. **If necessary, due to illness of the instructor, or an outbreak of a highly infectious illness, class may be conducted by zoom.**

Expected Student Work Policy: It is highly recommended that students take notes in class and review those notes before completing assignments. Notes presented in class will be available on the class website on Inquire. Students are expected to spend at least 9 - 15 hours of work each week inside and outside of class, 3 hours in class, and 3 - 6 hours outside of class. This time should include completing In Class/Homework assignments, writing assignments, and reading the notes and 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/Homework Assignments	34%
4 Writing Assignments	16%
3 Unit Tests	36%
Final Exam	14%

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		

In Class/Homework Assignments: Practice is essential to learning new skills. In Class/Homework Assignments will help you practice what you are learning. There will be one or two In Class/Homework assignments each week. Due dates are included in the tentative schedule presented on pages 5 and 6. For you to keep up with the coursework assignments should be done on time. Late In Class/Homework will be accepted until the Unit test on the material included in the assignment. If several students are turning assignments in late, the acceptance of late assignments will be ended.

Part of every assignment will be done in class. To complete assignments, you may work with classmates, tutors in the Subject Tutoring Center, or with me during office hours. In Class/Homework assignments will be available on the class website. **Since part of each assignment will be done in class, students should print each assignment, and bring it to class to work on in class the week before it is due. All work should be done on the printed assignments.**

If you prefer to write assignments on your own paper, questions must be written in order, the work must be legible, with a blank space between each questions and with answers circled. Assignments written on paper torn from a spiral notebook will not be accepted with ragged edges.

To receive credit for In Class/Homework, the statistics given in the question, the calculator entry, and your answer must be written legibly in your own hand.

Writing Assignments: There will be four writing assignments on various topics. 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 grammatical errors. Everyone's writing is improved by such feedback. However, the written assignments should be your own work. Using artificial intelligence, or having someone write a paper for you, or copying the work of someone else is a violation of the Academic Integrity policies of the college.

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. The Final Exam may not be made up. If your Final Exam score is higher than a previous test score, it will replace that test score. If you miss a test, the grade on that test will be zero and our Final Exam will replace that test score.

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 or testing in a distraction-reduced environment must be made at least one week *before every test*.

One extra credit point may be earned for each unit test by volunteering to read in class at least once a week every week we are studying that unit.

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 should be turned off prior to entering the classroom. Laptops should not be used during class sessions unless you have an academic accommodation. The use of laptops or any other electronic device during an exam is not allowed. 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, since a central goal of this course is to help you become independent and critical thinkers, artificial intelligence should not be used for any of the work for this course. 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 Wednesday, September 3, 2025. The last day to drop a course before a "W" will be recorded on your transcript is Tuesday, September 9, 2025 at 4 pm. The last day to drop a course unless withdrawing from the college is Friday, November 21, 2025. 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:

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 on the first floor of the **Bank Building**. 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 540-375-2248 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. The testing center, also located on the first floor of the Bank Building, can be reached at 540-375-2247.

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 – B3 Statistical Reasoning : To Your Health

Week   Dates   Unit and Chapter Sections to be Studied

Unit 1 Data Collection and Organizing and Summarizing Data

1   August 27, 29   Course Syllabus, Class Website
1.1 Introduction to Statistics
1.2 Observational vs Experimental Design

Assignments 1 and 2 due Monday, Sept 1.

2   Sept 1 – 5   1.3 Simple Random Sampling
1.4 Other Sampling Methods
1.5 Bias in Sampling
1.6 The Design of Experiments

Assignments 3 and 4 due Monday, Sept 8.

3   Sept 8 – 12   2.1 Organizing Qualitative Data
2.2 Organizing Quantitative Data
2.3 Additional Displays of Quantitative Data
2.4 Graphical Misrepresentations of Data

Writing Assignment 1 and Assignment 5 due Monday, Sept 15.

4   Sept 15 - 19   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

Writing Assignment 2 and Assignment 6 due Monday, Sept 22.
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5   Sept 22 – 26   3.5 The Five-Number Summary and Boxplots
4.1 Scatter Diagrams and Correlation
4.2 Least-Squares Regression
4.4 Contingency Tables and Association

Assignment 7 due Mon, Sept 29.

6   Sept 29 – Oct 3   **Test on Unit 1**

Unit 2 Probability and Probability Distributions
5.1 Probability Rules
5.2 The Addition Rule and Complements
5.3   Independent of Events and the Multiplication Rule
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Assignments 8 and 9 due Monday, Oct 6.

7   October 6 – 10   5.4 Conditional Probability and the General Multiplication Rule
6.1 Discrete Random Variables
6.2 The Binomial Probability Distribution

Writing Assignment 3 and Assignment 10 due Monday, October 20.

Week	Dates	Unit and Chapter Sections to be Studied

8   October 13 - 17   Fall Break

9   October 20 – 24   7.1 Properties of the Uniform and Normal Distributions
    7.2 Applications of the Normal Distribution
    8.1 Distribution of the Sample Mean
    8.2 Distribution of the Sample Proportion

Assignment 11 due on Monday, October 27.

10   October 27 – 31   7.3 Assessing Normality
    7.4 Normal Approximation for the Binomial
    Review of Unit 2

Assignments 12 and 13 due on Monday, November 3.

11   November 3 – 7   Test on Unit 2

    Unit 3   Inference: From Samples to Population

    9.1 Estimating a Population Proportion
    9.2 Estimating a Population Mean
    9.3 Estimating a Population Standard Deviation

Assignment 14 and Writing Assignment 4 due on Monday, November 10.

12   November 10 – 14   10.1 The Language of Hypothesis Testing
    10.2 Hypothesis Test for a Population Proportion
    10.3 Hypothesis Test for a Population Mean
    10.4 Hypothesis Test for a Population Standard Deviation

Assignment 15 due Monday, November 17.

13   November 17 - 21   11.1 Inference about Two Population Proportions
    11.2 Inference about Two Means: Dependent Samples
    11.3 Inference about Two Means: Independent Samples

Assignment 16 due Monday, November 24

14   November 24   Review of Unit 3

Assignment 17, Review of Unit 3 due Wednesday, December 3.

15   December 1 - 5   Review of Unit 3
    Test on Unit 3
    Review for the Final Exam

Assignment 18, Review for the Final Exam due Friday, December 12.

16   December 8 – 12   Final Exam Week

Final Exam for INQ 240 C   Block 4 Exam, Friday, December 12, 2 – 5 pm