ROANOKE COLLEGE

INQ 240 - B4 Statistical Reasoning : Here's to Your Health !

Fall 2024

Start Date: August 27, 2024
End Date: December 13, 2024

Class Meetings:
Block 7A, Monday, Wednesday 2:20 - 3:50 pm, Trexler 263

Contacting your Instructor : Naomi Clements
Office Hours: Monday, Wednesday, 1 - 2 pm, and by appointment, Fintel Library, upper level for the first two weeks of class, then lower level, near or in Room 50.
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 will 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 12 hours of work each week inside and outside of class, 3 hours in class, and 9 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. A tentative schedule is presented on page 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, important information 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 AI when not allowed by the assignment directions, 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 your 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*.

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. 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, 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 4, 2024. The last day to drop a course before a "W" will be recorded on your transcript is Tuesday, September 10, 2024. The last day to drop a course unless withdrawing from the college is Tuesday, November 22, 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, Trexler 263

Week	Date	Chapter Sections to be Studied
1	August 28	Course Syllabus, Class Website 1.1 Introduction to Statistics 1.2 Observational vs Experimental Design
2	September 2, 4	1.3 Simple Random Sampling 1.4 Other Sampling Methods 1.5 Bias in Sampling 1.6 The Design of Experiments
3	September 9, 11	2.1 Organizing Qualitative Data 2.2 Organizing Quantitative Data 2.3 Additional Displays of Quantitative Data 2.4 Graphical Misrepresentations of Data
4	September 16, 18	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
5	September 23, 25	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
6	September 30 October 2	Test on Unit 1 5.1 Probability Rules 5.2 The Addition Rule and Complements
7	October 7, 9	5.3 Independence and the Multiplication Rule 5.4 Conditional Probability and the General Multiplication Rule 5.5 Counting Techniques
8	October 14, 16	Fall Break
9	October 21, 23	6.1 Discrete Random Variables 6.2 The Binomial Probability Distribution 7.1 Properties of the Normal Distribution
10	October 28, 30	7.2 Applications of the Normal Distribution 8.1 Distribution of the Sample Mean 7.3 Assessing Normality 7.4 Normal Approximation for the Binomial

11	November 4, 6	Review of Unit 2 Test on Unit 2
12	November 11, 13	9.1 Estimating a Population Proportion 9.2 Estimating a Population Mean 9.3 Estimating a Population Standard Deviation 10.1 The Language of Hypothesis Testing
13	November 18, 20	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 11.1 Inference about Two Population Proportions
14	November 25	11.2 Inference about Two Means: Dependent Samples 11.3 Inference about Two Means: Independent Samples
	November 27	Thanksgiving Break
15	December 2, 4	Review of Unit 3 Test on Unit 3
16	**December 9 - 13**	**Finals Week,**

Final Exam for INQ 240 - B4, Tuesday, December 10, 2024, 2 - 5 pm

Tentative Schedule for Unit 1 Assignments

Assignment	**Due Date**
Assignment 1 Vocabulary Exercise	Wed, Sept 4
Assignment 2 1.1, 1.2, 1.3	Mon, Sept 9
Assignment 3 Vocabulary Exercise	Mon, Sept 9
Assignment 4 1.4, 1.5, 1.6	Mon, Sept 9
Writing Assignment 1	Wed, Sept 11
Assignment 5 2.1, 2.2, 2.3, 2.4	Mon, Sept 16
Writing Assignment 2	Wed, Sept 18
Assignment 6 3.1, 3.2, 3.3, 3.4, 3.5	Mon, Sept 30
Assignment 7 4.1, 4.2, 4.	Mon, Sept 30
Writing Assignment 3	Wed, Oct 9