

INQ 240 : Statistical Reasoning - Here's To Your Health

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Office Hours Monday noon – 1 pm and 2:15 – 3:15 pm, Tuesday 11:45 am – 1 pm, Wednesday 10 – 10:45 am and noon – 1 pm, Friday noon – 1 pm, or by appointment. Office hours will be held online via Zoom using my personal Zoom ID.

Course Description This course is an introduction to statistical reasoning and basic statistics techniques focusing on the examples and data sets dealing with health related issues. You will learn how to collect, organize and present data and study quantitative measures which will allow you to draw conclusions and make inferences from the data. Some probability will be discussed as a precursor to the “inferential” statistics.

Learning Outcomes By the end of this course, successful 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
- articulate the importance and limitations of using data and statistical methods in decision making
- express themselves clearly and effectively in writing using the concepts and language of statistics
- articulate the importance of the methodologies of statistics for understanding health related issues

Course Materials Textbooks: *Essential Statistics* Moore, Technology: Calculator (should be capable of taking square roots, cannot be a cell phone or computer), Minitab statistical software package (available via RCRC)

Important Dates We will have four in-class tests and a final exam. Each test will focus on the material learned since the last test, but will (necessarily) contain previous material. The final will be comprehensive. **If you have a conflict with one of these dates please email me ASAP.**

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|-------------------|------------------------------------|
| Test 1 | Tuesday 2/8, in class |
| Test 2 | Thursday 3/3, in class |
| Test 3 | Thursday 3/31, in class |
| Test 4 | Tuesday 4/19, in class |
| Final Exam | Monday 5/2, 8:30 – 11:30 am |

Course Grades The final course grade is determined in the following way:

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|--|------------|
| Homework/Co-Curricular Activity | 32% |
| Writing Assignments 24% Tests (8% each) | 32% |
| Final Exam | 12% |

A grade scale will be determined after final grades are computed, but will be no worse than the scale given below. Attendance and class participation will be considered when determining marginal grades.

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|----|--------|----|-------|----|-------|----|-------|---|------|
| | | B+ | 88-89 | C+ | 78-79 | D+ | 68-69 | | |
| A | 92-100 | B | 82-87 | C | 72-77 | D | 62-67 | F | 0-59 |
| A- | 90-91 | B- | 80-81 | C- | 70-71 | D- | 60-61 | | |

Homework You will have a graded homework assignment due by 10:10 am each Tuesday and Thursday. Submit your homework as a PDF or Word file using the link on our Inquire page. (There are several apps which allow you to scan to PDF using your phone.) **Late homework will not be accepted.** I am happy to help with these problems, but you **may not** work on them with anyone else.

Co-Curricular Activity The MCSP department and Roanoke College offer many opportunities to engage with mathematical ideas outside of classes. Members of this class are encouraged to attend many of these activities, however attending at least one is mandatory. Examples include MCSP Conversation Series talks and student research showcases - if you're unsure if a given activity makes sense for this purpose, please email me to ask. Within one week of attendance you must submit a brief response to the activity. Your response will count as one homework 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.

Daily Problems After each section I will assign some problems from the book for practice. These will not be collected (the answers are in the back of the book), and they are your chance to make sure you understand the material and to get help if you realize you need it.

Attendance Policy Class attendance is expected. However, if you have a temperature of 100.4 or higher or other coronavirus symptoms, don't come to class. Call Health Services IMMEDIATELY. In order for coronavirus related absences to be excused, you must give Health Services permission to notify me that you have consulted them about coronavirus symptoms. All absences caused by consultation with Health Services about coronavirus symptoms will be excused. **If your absence is not coronavirus related and you have not discussed it with me beforehand, you will be unable to make up any work missed. Whatever the reason, if you have to miss class, you are responsible for learning all material covered that day.** If Health Services informs you that you should isolate and this impacts your ability to attend class, inform me so that we can make a plan to keep you current in the course.

Expected Work Policy This course expects you to spend at least 12 hours of work each week inside and outside of class.

Extra Resources To get extra help with writing issues, take advantage of the writing center in Fintel Library. Subject tutoring is also available. Both of these services can be accessed online.

Special Needs If you have a disability that may require an accommodation in this course, please provide me with your documentation within the first 2 weeks of the semester. I must have your documentation at least 48 hours prior to any accommodation made. (Check with the Center for Learning and Teaching for their scheduling guidelines.)

Academic Integrity I expect all of you to follow the Academic Integrity policies of Roanoke College. All graded work should be your own work! If you ever have questions about how these policies apply to our class please contact me. Any violations of our AI policies will automatically be turned over to the Academic Integrity Council.

Pandemic Planning If college policies change due to the pandemic, I will distribute an updated syllabus. I will email you our new plan and post details on Inquire. You should email me with any questions or challenges that arise.

Course Schedule

The following schedule is approximate and subject to change except for the test dates. It should give you an idea of the timing of the topics covered and assignments.

| Day | Date | Topic | Assignments |
|-----|------|--|---------------------------|
| Tu | J 18 | Intro / Chapter 1: Picturing Distributions with Graphs | |
| Th | J 20 | Chapter 2: Describing Distributions with Numbers | |
| Tu | J 25 | Chapter 3: Normal Distributions | Writing 1 Assigned |
| Th | J 27 | Chapter 4: Scatterplots and Correlation | |
| Tu | F 1 | Chapter 5: Regression | |
| Th | F 3 | Chapter 5 / Review | Writing 1 Due |
| Tu | F 8 | Test 1 | |
| Th | F 10 | Chapter 7: Sampling / Chapter 8: Experiments | |
| Tu | F 15 | Chapter 9: Introducing Probability | Writing 2 Assigned |

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|---------------------|------------|---|---------------------------|
| Th | F 17 | Chapter 11: General Rules of Probability | |
| Tu | F 22 | Chapter 10: Sampling Distribution | Writing 2 Due |
| Th | F 24 | Chapter 12: Binomial Distributions | |
| Tu | M 1 | Which probability tool to use? / Review | |
| Th | M 3 | Test 2 | |
| Spring Break | | | |
| Tu | M 15 | Introduction to Statistical Inference | |
| Th | M 17 | Chapter 16: Inference about a Population Mean | |
| Tu | M 22 | Chapter 17: Two-Sample Problems | Writing 3 Assigned |
| Th | M 24 | Chapter 18: Inference about a Population Proportion | |
| Tu | M 29 | Chapter 19: Comparing Two Proportions | Writing 3 Due |
| Th | M 31 | Test 3 | |
| Tu | A 5 | Chapter 21: Two Categorical Variables | |
| Th | A 7 | Chapter 21: The Chi-Square Test | Writing 4 Assigned |
| Tu | A 12 | Chapter 22: Inference for Regression | |
| Th | A 14 | Chapter 23: One-Way Analysis of Variance | Writing 4 Due |
| Tu | A 19 | Test 4 | |
| Th | A 21 | Review | |
| Mon | M 2 | Final Exam 8:30 - 11:30 am | |