

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

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Student Help Hours / Office Hours Monday and Wednesday 10 - 10:45 am, Wednesday and Friday noon - 1 pm, or by appointment. (No need for an appointment if you come during office hours)

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 Textbook: *OpenIntro Statistics 4th edition*, Diez, Rundel, Barr (PDF available on Inquire)
Technology: Calculator (should be capable of taking square roots, cannot be a cell phone or computer)

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.

Test 1	Monday 9/22, in class
Test 2	Friday 10/10, in class
Test 3	Wednesday 11/5, in class
Test 4	Wednesday 12/3, in class
Final Exam (1:10 am section)	Wednesday 12/10, 2 – 5 pm
Final Exam (2:20 am section)	Tuesday 12/9, 2 – 5 pm

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

Homework	24%
Writing & Reading Assignments (6% each)	24%
Tests (10% each)	40%
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.

		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		

Attendance Policy Class attendance is expected because doing well in this class is hard if you aren't here to work on the material with us. However, life happens and sometimes you have to miss. If you know in advance you're going to miss class, make sure you turn in any work due that day (Inquire makes this easy!). Let me know if you need help learning the material we're going to cover, whether that means getting connected with someone who will share their notes or coming to office hours with questions. If you

are going to miss a test, let me know as soon as you can so we can figure out how to handle that. If you don't know in advance (because sometimes life happens unexpectedly), talk with me as soon as you can about what you can make up and how to get caught up. I will be as generous as I can while still keeping the class fair for all students.

Homework I will assign a graded homework problem each day. Submit your homework in class OR via Inquire as a PDF or Word file. (Picture files may not allow me to give you comments, so copy/paste pictures into Word or get a PDF scanner app on your phone.) These problems are due at 9:40 am the morning of the next class so you can ask questions about them before we start new material. **Since I can't accept homework turned in after we've discussed it in class, late homework will usually not be accepted.** If you are unable to complete the homework on time for some reason, please contact me about that as soon as you can so we figure out how to handle the situation. I am happy to help with these problems, but you **may not** work on them with anyone else.

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

Writing & Reading Assignments There will be four assignments to help you practice writing and reading about various health-related statistical topics. (See schedule for due dates.) More specific instructions will be given for each one when it is assigned.

Mask Policy Anyone is welcome to wear a mask for some or all of the semester. **If you feel sick and plan to come to class, please wear a mask over your nose and mouth!** (The rest of the class thanks you in advance.)

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

Extra Resources Subject tutoring and writing help are available Sunday - Thursday from 4 - 9 pm at the Dr. Sandee McGlaun Writing Center and Subject Tutoring (in the lower level of Fintel Library). Stop by or schedule an appointment through Navigate ("Schedule an Appointment" → "Writing Center and Subject Tutoring" → "Writing Support" or "Course Tutoring" → preferred date and tutor.) Contact subject_tutoring@roanoke.edu or 540-375-2590 for more information.

Artificial Intelligence If you want to use generative artificial intelligence resources on a graded assignment, you will need to discuss it with me in advance. I may or may not agree depending on the assignment and your intended use. (You are welcome to use whatever resources you like on all ungraded work or to help study for tests.)

Accommodations If you get any academic accommodations in this course, please let me know and provide your documentation as soon as you can - preferably within the first 2 weeks of the semester. (Check with the Center for Teaching and Learning 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 Academic Integrity policies will automatically be turned over to the Academic Integrity Council.

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
W	A 27	Introduction	
F	A 29	1.2: Data Basics	
M	S 1	1.3: Sampling	
W	S 3	1.4: Experiments	Paper 1 assigned
F	S 5	2.1: Numerical Data	
M	S 8	2.1	
W	S 10	2.2: Categorical Data	Paper 1 due
F	S 12	2.2	
M	S 15	3.1: Probability	
W	S 17	3.2: Conditional Probability	
F	S 19	Minitab Work Day	Paper 2 assigned
M	S 22	Test 1	
W	S 24	4.1: Normal Distributions	
F	S 26	4.1	
M	S 29	4.3: Binomial Distributions	Paper 2 due
W	O 1	5.1: Point Estimates	
F	O 3	5.2: Confidence Intervals (proportion)	
M	O 6	5.2	
W	O 8	Intro to Hypothesis Testing	
F	O 10	Test 2	
Fall Break			
M	O 20	5.3: Hypothesis Testing (proportion)	
W	O 22	6.1: Inferences for one proportion	
F	O 24	6.2: Difference in proportions	
M	O 27	6.2	Paper 3 assigned
W	O 29	6.3: Goodness of Fit	
F	O 31	6.4: Chi-Square Test	
M	N 3	Statistical Inference Review	Paper 3 due
W	N 5	Test 5	
F	N 7	7.1: One-Sample Means	
M	N 10	7.1	
W	N 12	7.2: Paired Data	
F	N 14	7.3: Difference of Means	
M	N 17	7.5: ANOVA	
W	N 19	7.5	Paper 4 assigned
F	N 21	8.1: Linear Regression	
M	N 24	8.2: Least Squares	
Thanksgiving Break			
M	D 1	Statistical Inference Review	Paper 4 due
W	D 3	Test 6	
F	D 5	Review	
Tu	D 10	10:50 section's Final Exam 8:30 – 11:30 am	
W	D 11	9:40 section' s Final Exam 8:30 – 11:30 am	