

INQ 240D, Fall 2015: Statistics and Food

Instructor	Maggie Rahmoeller Email: rahmoeller@roanoke.edu	Phone: (540) 375-2505 Office: Trexler 270J
Class Meetings	M/W/F 2:20PM-3:20PM LIFE 301	
Office Hours	M/W/F 9-10AM T/H 10-11AM Or by appointment (just shoot me an email!)	
Course Description	Do you like food? Are you interested in issues concerning topics such as food industry, personal dietary choices, food marketing, and food shortages? In this course, you will learn how statistical methods are used to provide arguments for such issues and explanations for patterns that arise in the US today. And of course, food will be involved. You will read and reflect on articles involving food, use and create data sets concerning food, and even do a little bit of cooking! Materials needed for cooking and other projects will be included, free of charge.	
Course Information	This is a course in learning how to obtain and interpret results obtained from sets of data by using techniques of statistics. This class will introduce to you the methods of collecting, organizing, and presenting data. You will also study various quantitative measures for data and will study how to draw conclusions and make inferences from that data. Some probability will also be discussed as a precursor to the "inferential" statistics.	
Intended Learning Outcomes	By the end of this course, successful students will be able to: <ul style="list-style-type: none">• 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 about course topics clearly and effectively, and• interpret quantitative information related to the course topic.	
Required Materials	Textbook: <i>Essential Statistics</i> , by David Moore, W.H. Freeman Reference Book: <i>A Writer's Reference</i> by Diana Hacker, RC Edition Calculators: Any scientific calculator to perform arithmetic calculations (and square roots) Technology: Minitab Statistical Software Package and Excel are provided on college lab computers Other: Other readings will be provided as needed	

Course Grades The following table lists the weights for the various forms of assessment for this class.

Quizzes & Homework	15%	Tests	30%
Projects	35%	Final Exam	20%

A grade scale will be determined after final grades are computed, but will be no worse than the scale given below:

		B+	87-89	C+	77-79	D+	67-69		
A	93-100	B	83-86	C	73-76	D	63-66	F	0-59
A-	90-92	B-	80-82	C-	70-72	D-	60-62		

Homework Notebook Homework is assigned regularly in this class and will be routine problems from the main textbook that serve as good examples to use in class to reinforce certain topics. Homework will not be collected, but rather you will be required to keep your homework solutions in a **dedicated** binder for this class. One day each week will be dedicated to a wrap-up of the week's topics along with a discussion of homework problems (if students bring questions they have). You are, of course, always welcome to come by my office for help on the homework! Completing homework and doing problems is the best way to become familiar with the material!

As a "reward" for completing the homework, you will be allowed to use your homework notebook during most quizzes (unless announced by the instructor the class period before, using your homework notebook is fair game for a quiz). Your homework notebook must not have any materials other than the homework that you have worked on, and the contents of your homework notebook should be in your own handwriting (and original, not photocopied)! They are subject to inspection at any time.

Homework I may assign additional homework that will be graded.

Quizzes There will be weekly quizzes in this class, given at the end of class on the "wrap-up" day. Generally these quizzes will have two problems, one each from the roughly two chapters that we discuss during the previous two days. Remember, you will most often be able to use your homework notebook during these quizzes.

Reading Daily reading of assigned sections from our textbook is expected. You should come to class prepared to discuss the material that you have read. You can find an approximate list of sections assigned for any given few weeks on the last page of this syllabus, but reading will also be announced in class and posted on Inquire. Readings from other sources will be assigned as appropriate.

Tests There will be three tests this semester; the tests will focus primarily on the statistics content of this course, but will emphasize critical thinking and writing! Homework and class notes are absolutely the best sources of review! The tests will not be designed to be cumulative, but as with any course involving mathematics, material from previous tests can be thought of as a prerequisite for future tests.

Other Assignments There will be three major projects in this class that are designed to allow some freedom for you to explore the connection between statistics and food in the US.

The first of these assignments will be early in the semester. The form will be a paper (roughly 4 pages) focusing on critiquing the use of descriptive statistics in published articles and reports about a food topic of your choice.

The second of these assignments will culminate after fall break, but will involve some of your time for a month during the semester. You will work in small groups to conduct a cooking experiment and use statistical methods to determine significant findings. For example, if your group has access to an oven, you could use statistics to determine whether the amount of a leavening agent in biscuit dough affects the height of the biscuit. If your group only has access to a microwave, you could instead use statistics to determine whether the flavor of microwave popcorn affects the number of unpopped kernels, for example. This project will culminate in a formal written report.

The third assignment will be due towards the end of the semester. We will use monthly data consisting of US average prices of specific food items for the past several years and methods of inferential statistics to "predict" future prices in class. You will write a paper reflecting upon assigned readings and the proper use of inferential statistics.

Final Exam **The final exam will be comprehensive and given during the scheduled time for the final exam for Block 6, i.e. Tuesday, Dec 15 from 2-5PM.** As with the tests, it will also emphasize critical thinking and writing. The best way to review for the final is to review your performance on the four tests; focus on material that you did not master the first time around, and review the topics that you did master.

MCSP Conversation Series The Department of Mathematics, Computer Science and Physics offers a series of discussions that appeal to a broad range of interests related to these fields of study. These co-curricular sessions will engage the community to think about ongoing research, novel applications and other issues that face our discipline. Members of this class are invited to be involved with all of these meetings; however participation in **at least one** of these sessions is mandatory. After attending, students will submit a one page paper reflecting on the discussion. This should **not** simply be a regurgitation of the content, but rather a personal contemplation of the experience. This reaction paper will be counted as a quiz.

Attendance & Make-Up Work Attendance is critical to the understanding of the material in the course; it is both required and expected. Any absence that is not discussed with the instructor prior to the missed class is considered unexcused. When absent, excused or unexcused, you are responsible for all material covered in class. **You will not be allowed to make up any work missed due to an unexcused absence.** Unexcused absences may result in the lowering of the final grade.

Disability Support Services Students with disabilities should visit the Disabilities Support Services office in the Goode-Pasfield Center for Learning and Teaching (375-2247), located on the main floor of Fintel Library. Ms. Barbara Awbrey, the Coordinator of Disability Support Services, will need documentation of your disability. Students who qualify for accommodations will be given a printed accommodation request form to be given to instructors. Accommodations will not be given without the request form. I will be happy to answer questions and/or discuss your accommodations during my office hours.

Academic Integrity **Students are expected to adhere to the Academic Integrity policies of Roanoke College. All work submitted for a grade is to be your own work! No electronic devices other than calculators can be taken out during any class or testing period (this includes cell phones; please turn them off before class). Note that looking at or using your cell phone during a test or quiz is considered a violation of Academic Integrity regardless of your purpose or intent in doing so.**

Subject Tutoring Subject Tutoring is a CRLA Nationally Certified Program located on the lower level of Fintel Library in room 005. Subject Tutoring offers individual appointments in 30-minute intervals for Lab Sciences, Modern Languages, Math and CPSC, Social Sciences, Business and Economics. Hours are Sunday - Thursday 4 p.m. - 9 p.m. For a list of tutorials or to make an appointment, go to www.roanoke.edu/tutoring.

Writing Center Roanoke College's Writing Center, located on the lower level of Fintel Library, is a place where writers working in any academic discipline, at any level of competence, at any stage of the writing process meet with trained peer writing consultants in informal, one-on-one tutoring sessions focused on written and oral communication. Tutoring is free. The Writing Center is open Sunday through Thursday from 4 to 9 p.m. starting Monday, January 21st. You may simply stop in, or schedule an appointment ahead of time by going to Quicklinks → Center for Learning and Teaching → Writing Center and looking for the Tutoring Schedule link. Email questions to the Writing Center at writingcenter@roanoke.edu or call 375-4949. Also, be on the lookout for Writing Workshops, Creative Writing Playshops, and Grammar Crammers.

Course Schedule The following schedule is approximate and subject to change. This mainly lists the statistics topics to be covered, project time lines, tests, and quizzes. Other readings will be assigned when appropriate, and will more or less be tied to specific projects. Homework problems to work on for your homework binder are listed with each section.

Question 1: How do we properly convey food information and data in an unbiased and informative way?			
Wed	Sept 2	Chapter 1	Picturing Distributions with Graphs Homework: C1 #19, 20, 25-28
Fri	Sept 4	Chapter 2 No In-Class Meeting	Describing Distributions with Numbers Homework: C2 #20, 29, 31, 34, 35 Project 1 Assigned
Mon	Sept 7	Chapter 3	The Normal Distributions Homework: C3 #22, 26, 27, 29, 31, 32, 36
Question 2: Can we use data and statistical techniques to predict the food prices?			
Wed	Sept 9	Chapter 4	Scatterplots and Correlation Homework: C4 #19, 29, 31, 32
Fri	Sept 11		Wrap-Up, Quiz 1
Mon	Sept 14	Chapter 5	Regression; Project 1 Due Homework: C5 #23ab, 24, 25, 28, 38, 39, 41
Wed	Sept 16	Chapters 7, 8	Producing Data: Sampling and Experiments Homework: C7 #20, 28, 38; C8 #25, 33, 38a
Fri	Sept 18		Wrap-Up, Quiz 2
Mon	Sept 21		Review for Test 1
Wed	Sept 23		Test 1: Chapters 1-5, 7, 8
Question 3: How accurate, overall, are predictions of local media?			
Fri	Sept 25	Chapter 9	Introducing Probability Homework: C9 #25, 29, 31, 32, 35, 37, 41, 42, 44, 47
Mon	Sep 28	Chapter 10	Sampling Distributions Homework: C10 #17, 19, 20, 21, 24, 28, 31, 32
Wed	Sep 30	Chapter 11	General Rules of Probability Homework: C11 #23, 24, 25a, 27, 34, 35, 39, 41, 42
Fri	Oct 2		Wrap-Up, Quiz 3, Project 2 Assigned
Mon	Oct 5	Chapter 12	Binomial Distributions Homework: C12 #20, 21, 27, 32, 33, 38
Wed	Oct 7	Chapter 13	Introduction to Inference, Project 2 Topic Due Homework: C13 #27, 29, 31, 33, 35
Fri	Oct 9		Wrap-Up, Quiz 4
Mon	Oct 12	Chapter 13	Introduction to Inference, Project 2 Supply List Due Homework: C13 #27, 29, 31, 33, 35
Wed	Oct 14		Review for Test 2
Fri	Oct 16		Test 2: Chapters 9-13
Fall Break			
Mon	Oct 26	Chapter 14	Thinking about Inference Homework: C14 #23, 26, 33
Wed	Oct 28	Chapter 16	Inference about a Population Mean Homework: C16 #25, 27bc (use $x = 1.1182$, $s = 0.0438$), #28b (use $x = 12.83$, $s = 4.65$)
Fri	Oct 30		Wrap-Up, Quiz 5
Mon	Nov 2	Chapter 17	Two-Sample Problems, Project 2 Data Due Homework: C17 #20, 21 (use $s = 21$ and $s = 33.2$ respectively), #22, 25
Wed	Nov 4	Chapter 18	Inference about a Population Proportion Homework: C18 #20, 21b, 27, 29a, 32, 34, 36, 37
Fri	Nov 6		Wrap-Up, Quiz 6

Mon	Nov 9	Chapter 19	Comparing Two Proportions
Wed	Nov 11	Chapter 19	Comparing Two Proportions Homework: C19 #14b, 15a, 19, 27
Fri	Nov 13		Wrap-Up, Quiz 7; Project 2 Due
Question 4: What aspects of food are independent of other aspects?			
Mon	Nov 16	Chapter 21	Two Categorical Variables: Chi-Square Test Homework: C21 #1ab, 2a, 4, 5, 6bc, 9, 29b
Wed	Nov 18	Chapter 21	Two Categorical Variables: Chi-Square Test Homework: C21 #12, 13, 15, 16
Fri	Nov 20		Review for Test 3; Project 3 Assigned
Mon	Nov 23		Test 3: Chapters 14, 16-19, 21
Thanksgiving Break			
Mon	Nov 30	Chapter 22	Inference for Regression
Wed	Dec 2	Chapter 22	Inference for Regression Homework: C22 # 15, 16, 19, 22, 23, 27, 33
Fri	Dec 4		Wrap-Up, Quiz 8
Mon	Dec 7	Chapter 23	One-Way Analysis of Variance Homework: C23 #25, 26
Wed	Dec 9		Review for Final Exam
Fri	Dec 11		Review for Final Exam; Project 3 Due
Tues	Dec 15		Final Exam: 2:00 PM - 5:00 PM

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