INQ 240-C, Spring 2018: Statistics and Food

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Class Meetings
INQ240-C
MWF   2:20-3:20PM   Trexler 263

Office Hours
MWF: 9AM-10AM
Thurs: 9AM-10:30AM
Or email me to meet at a different time!

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, and use and create data sets concerning food.

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:

• 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: *Introductory Statistics*, by Barbara Illowsky, Susan Dean, etc; free, online text from OpenStax: https://cnx.org/contents/30189442-6998-4686-ac05-ed152b91b9de
Technology: Minitab Express ($30, download 6-month rental from www.onthehub.com/minitab)
Reference Book: *A Writer's Reference* by Diana Hacker, RC Edition OR *Easy Writer*, 6e, by Lunsford
Calculators: Any scientific calculator to perform calculations
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.

Project 1 & 2	10%	Activities & Homework	5%
Project 3	10%	Mastery Topics	75%

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		

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. Work missed due to either an unexcused or excused absence can only be made up when arrangements are made in advance of the absence.

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

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 schedule for the sections we will cover on the last page of this syllabus. Readings from other sources will be assigned as appropriate.

Homework

Homework will be assigned almost every class period, and graded on completeness. Completeness includes using complete sentences, restating each problem in your answers, and explaining your answers.

Projects

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 2-3 pages) focusing on critiquing the use of descriptive statistics in an assigned article and discussing potential bias and other issues in the described study.

For the second assignment, we will use data to dabble with regression topics that extend past what we cover in class.

The final assignment will take much of the rest of the semester. This will consist of a survey with reflection, reading and reflecting on an article concerning food studies, data collection and analysis, and a culminating paper.

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! Note that any electronic devices used during exams must be first okayed by your instructor (me), and used only in an appropriate manner, which is decided by your instructor (me).

Tests

We will use **Mastery-Based Testing** rather than **Points-Based Testing**. Masterybased testing is very different from what you are used to - do not hesitate to ask me questions!

Description: You will only receive credit for answers that demonstrate you completely understand (have mastered) a topic. But you will get MANY chances to display mastery throughout the semester with NO PENALTY for earlier attempts.

- The course has been summarized by 16 topics.

- Your mastery of questions on these topics is assessed through the working of problems each week and during the final exam period.

- Each problem submitted is graded as either "Mastered" or "Not Mastered". A grade of Mastery indicates that you have demonstrated full understanding of the concept being tested and further work on the topic is unnecessary.

- Once you have mastered a topic, you need not attempt it again.

- There is no penalty for multiple attempts taken to achieve mastery.

- **Mastery does not mean perfect!** It means you understand and can demonstrate all fundamentals of the topic and are proficient at the level desired for the course you do not need to study the topic further.

Your overall test grade is determined by the number of topics you have mastered:

# Mastered	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Mastery Grade	100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25

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 **within a week** reflecting on the discussion. This should **not** simply be a regurgitation of the content, but rather a **personal contemplation of the experience**. This does not have to be a formal paper. This reflection paper will be counted as a homework assignment.

MCSP Tea

Our department offers a weekly tea time for students and faculty - stop by the MCSP Study Lounge (Trexler 271) for tea and cookies on Thursdays from 2:30PM to 3:30PM. Come meet other students as well as chat with the MCSP faculty members in a casual setting! We commonly play card games!

Accessible Education Services	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 Dr. Sue Brown, Director of Academic Services and Acting Coordinator of Accessible Education Services, at 540-375-2247 or by e-mail at sbrown@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 Dr. Brown at your earliest convenience to schedule an appointment.
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 is located on the Lower Level of Fintel Library and offers writing tutorials focused on written and oral communication for students working on writing assignments/projects in any field. Writers at all levels of competence may visit the Writing Center at any point in their process, from brainstorming to drafting to editing, 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 by going to www.roanoke.edu/writingcenter, where our schedule of writing workshops and creative writing playshops is also posted. Questions? Email writingcenter@roanoke.edu or call 375-4949. Like our Facebook page for updates!

Course Schedule The following schedule is approximate and subject to change.

Mon	Jan 15		Intro
Wed	Jan 17	Topic 1 - Section 1.4	Experimental vs Observational Studies
Fri	Jan 19	Topic 1	Experimental vs Observational Studies **Project 1 assigned**
Mon	Jan 22	Topic 2 - Section 1.1-1.3	Data Collection
Wed	Jan 24	Topic 3 - Ch 2	Visual & Descriptive Statistics
Fri	Jan 26	Topic 3	Visual & Descriptive Statistics
Mon	Jan 29	Topic 4 - Ch 12	Scatterplots & Regression **Project 1 due**
Wed	Jan 31	Topic 4	Scatterplots & Regression
Fri	Feb 2	Mastery Op	Topics 1-4 **Project 2 assigned**
Mon	Feb 5	Topic 5 - Ch 3	Probability
Wed	Feb 7	Topic 5	Probability
Fri	Feb 9	Mastery Op & Topic 5	Topics 1-5 & Probability
Mon	Feb 12	Topic 6 - Sections 4.1 & 4.3	Binomial Distribution **Project 2 due**
Wed	Feb 14	Topic 6 & Topic 7 - Section 5.1 & Ch 6	Binomial & Normal Distributions
Fri	Feb 16	Mastery Op & Topic 7	Topics 1-6 & Normal Distribution
Mon	Feb 19	Topic 7 & Topic 8 - Ch 2 & 7	Normal Distribution & Central Limit Theorem
Wed	Feb 21	Topic 8	Central Limit Theorem
Fri	Feb 23	Master Op	Topics 1-8
Mon	Feb 26		Intro to Inference
Wed	Feb 28	Topic 9 - Ch 8	Confidence Intervals
Fri	Mar 2	Mastery Op & Topic 9	Topics 1-8 & Confidence Intervals **Project 3 - Part I assigned**
		Spring Break	
Mon	Mar 12	Topic 10 - Ch 9	Hypothesis Tests for 1 Mean
Wed	Mar 14	Topic 10	Hypothesis Tests for 1 Mean **Project 3 - Part II assigned**
Fri	Mar 16	Mastery Op & Topic 11 - Ch 9	Topics 1-10 & Hypothesis Test for 1 Proportion
Mon	Mar 19	Topic 11	Hypothesis Test for 1 Proportion
Wed	Mar 21	Topic 12 - Ch 10	Hypothesis Test for 2 Means
Fri	Mar 23	Mastery Op & Topic 13 - Ch 10	Topics 1-12 & Hypothesis Test for 2 Proportions
Mon	Mar 26	Topics 10-13	Group Work
Wed	Mar 28	Mastery Op	Topics 1-13
Fri	Mar 30		**No Class!!**
Mon	Apr 2	Topic 14 - Ch 11	Chi-Square Tests
Wed	Apr 4	Topic 14	Chi-Square Tests
Fri	Apr 6	Mastery Op	Topics 1-14
Mon	Apr 9	Topic 15	Choosing an Appropriate Hypothesis Test **Project 3 due**

Wed	Apr 11	Topic 15		Choosing an Appropriate Hypothesis Test
Fri	Apr 13			**No Class!!**
Mon	Apr 16	Topic 16 - Ch 13		ANOVA
Wed	Apr 18	Topic 16		ANOVA
Fri	Apr 20	Mastery Op		Topics 1-16
Mon	Apr 23			**Review**
Tues	**May 1**	**Mastery Op**		**2-5PM, Topics 1-16**

Notes for when reading textbook:

- Always read introductions for chapters.

- For Topic 2, ignore pg 20-21 (stratified/cluster/systematic sampling). And for section 1.3, read pg 28-35 (frequency) only.

- For Topic 3, ignore line graphs, frequency polygons, time series, calculating mean of grouped frequency tables, and calculating standard deviation.

- For Topic 4, skip section 4 and in section 6, ignore numerical identification of outlier (pg 694).

- For Topic 8, in chapter 2 only read section 5, pg 105-106 (Law of Large #'s & Mean Sampling Distribution). For chapter 7, only read section 1 and 3 (pg 405).

- For Topic 9, in chapter 8 skip pg 451 and 463 (calculating sample size n) and pg 460 ("Plus 4" confidence intervals for p).

- For Topics 10 and 11, skip section 2.

- For Topics 12 and 13, skip sections 2 and 4.

- For Topic 14, skip sections 4 & 6 and in section 5, skip homogeneity.

- For Topic 16, skip section 4.