INQ 240 D, Spring 2019: Statistical Reasoning: Statistics and Public Opinion

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Class Meetings

Mondays, Wednesdays, and Fridays: 10:50 AM – 11:50 AM in Miller 214

Office Hours

In an effort to be more available to students while also acknowledging that meetings occur in my schedule that are outside of my direct control, rather than specify office hours specifically, I have chosen to use the "You Can Book Me" online scheduling tool so that you can schedule an appointment whenever, and your appointment will be put on my schedule (this online tool uses my live availability). Note that I am *generally* on campus all weekdays from 9 AM to 2 PM and you are still welcome to stop by without an appointment, but I may or may not be able to meet at any given time. You can access the online scheduler at:

- drtaylorofficehours.youcanbook.me

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,
- design and carry out a simple statistical experiment,
- 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: *Introduction to the Practice of Statistics*, by Moore, McCabe, and Craig, Ninth Edition, W.H. Freeman
Reference Book: *A Writer's Reference* by Diana Hacker, RC Edition or *Easy Writer* by Andrea A. Lunsford, 6th Edition
Calculators: Any scientific calculator to perform arithmetic calculations (and square roots)
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	15%
Projects	20%
Tests	44%
Final Exam	21%

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. Time will be set aside most days for 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). In addition, you will be allowed to reference and use your homework notebook during the **last 20 minutes** of each test and for a 40 minute period during the final exam.

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.

Quizzes

There will be weekly quizzes in this class, generally on Fridays; the exact day for a quiz will be announced in class at least the day before the quiz. These quizzes are designed to cover the material discussed in class since the last quiz was given. Remember, you will most often be able to use your homework notebook during these quizzes.

Tests

There will be four 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. Remember, you will be allowed to use your homework notebook during the final 20 minutes of each test!

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 public opinion research.
The first of these assignments will occur near the conclusion of Chapter 3. For this assignment, you will be given two press releases of recently conducted public opinion polls and asked to find a third press release of your own choosing. You will be asked to summarize the information presented in these press releases using appropriate graphical displays and write a critique of the methodology and results of each press release as well as addressing potential issues of bias and variability in the polls.

The second of these assignments will ask you to write a press release of your own! Early in the semester, as a class, we will decide on one question of interest that we would like to ask citizens of the Commonwealth of Virginia, and this question will be asked on a poll conducted by the Institute for Policy and Opinion Research on its February telephone poll. Using this data, along with other questions asked, you will write a press release while using methods of statistical inference.

The last of these assignments will be the most involved; using the data collected in

February, you will be asked to do some statistical analysis of your own to write a paper that examines the data in detail. For example, you will look at how different subgroups of the population responded to our class-designed question and how responses to that question connect to other questions on the survey. You will be specifically asked to address the topics of variability, bias, and limitations in your paper.

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 will be announced in class and posted on Inquire. Readings from other sources will be assigned as appropriate.

Final Exam

The final exam will be comprehensive and given during the scheduled time for the final exam for Block 3. 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. Remember that you will be able to use your homework notebook during 40 minutes in the middle of the final exam.

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 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 communicated 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.**

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.

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.

Mon	Jan 14	1.1, 1.2	Data and Displaying Distributions with Graphs
Wed	Jan 16		**No Class**
Fri	Jan 18		**No Class**
Mon	Jan 21	1.3	Describing Distributions with Numbers
Wed	Jan 23	1.4	Density Curves and Normal Distributions
Fri	Jan 25	1.4	Density Curves and Normal Distributions
Mon	Jan 28	2.1, 2.2, 2.3	Relationships, Scatterplots, and Correlation
Wed	Jan 30	2.4	Least-Squares Regression
Fri	Feb 1	2.5, 2.7	Cautions about Correlation, Regression, and Causation
Mon	Feb 4	3.1, 3.2	Sources of Data and Design of Experiments

Wed	Feb 6	3.3	Sampling Design **Review for Test 1**
Fri	Feb 8		**Test 1**
Mon	Feb 11	3.4, 4.1, 4.2	Ethics, Randomness, and Probability Models **Project 1 Assigned**
Wed	Feb 13	4.3	Random Variables
Fri	Feb 15	4.4	Means and Variances of Random Variables
Mon	Feb 18	5.1	Toward Statistical Inference
Wed	Feb 20	5.2	The Sampling Distribution of a Sample Mean
Fri	Feb 22	5.3	Sampling Distributions for Counts and Proportions
Mon	Feb 25	6.1	Estimating with Confidence
Wed	Feb 27		**Review for Test 2**
Fri	Mar 1		**Test 2, Project 1 Due**
			Spring Break
Mon	Mar 11	6.2	Tests of Significance
Wed	Mar 13	6.3, 6.4	Use and Abuse of Tests and Power and Inference as a Decision
Fri	Mar 15	8.1	Inference for a Single Proportion
Mon	Mar 18	8.2	Comparing Two Proportions **Project 2 Assigned**
Wed	Mar 20	7.1	Inference for the Mean of a Population
Fri	Mar 22	7.2, 7.3	Comparing Two Means and Additional Topics on Inference
Mon	Mar 25	2.6	Data Analysis for Two-Way Tables
Wed	Mar 27	9.1	Inference for Two-Way Tables **Review for Test 3**
Fri	Mar 29		**Test 3**
Mon	Apr 1	9.1	Inference for Two-Way Tables
Wed	Apr 3	9.2	Goodness of Fit **Project 2 Due**
Fri	Apr 5	12.1	Inference for One-Way Analysis of Variance **Project 3 Assigned**
Mon	Apr 8		Weighting: Correcting for Representativeness
Wed	Apr 10		Raking: Iterative Proportional Fitting
Fri	Apr 12		**No Class**
Mon	Apr 15		**Review for Test 4**
Wed	Apr 17		**Test 4**
Fri	Apr 19		**No Class: Good Friday**
Mon	Apr 22		**Review for Final Exam** **Project 3 Due**
Mon	Apr 29		**Final Exam: 8:30 AM – 11:30 AM**