Applied Statistics

Math 111

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by appointment
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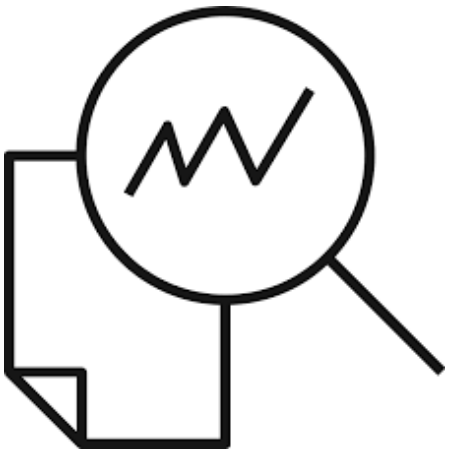

Course Description:

In this introductory statistics course students will learn to collect data, summarize data, analyze data, and draw conclusions from data. The course will cover key concepts of inferential statistics, namely estimation and hypothesis testing. Students will learn traditional methods for statistical inference as well as modern resampling and randomization methods. Confidence intervals will be constructed for estimating population means and proportions from sample data. Hypothesis testing procedures will be conducted using sample data to test statements regarding population means and proportions. In addition, relationships between two variables will be investigated using correlation analysis and simple linear regression models. Real data sets from a variety of disciplines will be used to illustrate the wide applicability of statistics. Students will use statistical software throughout the course to perform a variety of different statistical procedures.

Learning Outcomes: By the end of the term, students will be able to do the following:

- Think Critically. Students will use critical thinking and mathematical reasoning skills to solve real-world statistical problems.
- Calculate. Students will summarize data graphically and numerically.
- Apply. Students will apply estimation, hypothesis testing, and regression methods to solve real-world statistical problems.
- Interpret. Students will draw meaningful interpretations from the results obtained from statistical computations.
- Use Technology. Student will use *Statkey* statistical software to enhance their statistical thinking and understanding and to solve application problems in statistics.
- Communicate. Students will communicate in written and oral forms insights gained from statistical data analysis.

Prerequisites: A basic knowledge of algebra is required.

Text: *Unlocking the Power of Data*, 2nd Edition, Robin Lock, Patti Lock, Kari Lock Morgan, Eric Lock, and Dennis Lock, John Wiley & Sons.

A couple of things:

1) You will need computer access each class period.
2) You will need access to the text each class period.
3) Make sure to have a way to save and access your work on the lab computers outside of the lab.

Course Requirements and Grading:

Grading:

93.0% - 100% = A	67.0% - 69.9% = D+
90.0% - 92.9% = A-	63.0% - 66.9% = D
87.0% - 89.9% = B+	60.0% - 62.9% = D-
83.0% - 86.9% = B	<60% = F

Assignments -	20%
Chapter Tests -	50%
Final Exam -	20%
Quizzes -	10%

Chapter Tests: There will be a test after each chapter. The tests may be either in- or outside-of-class tests. The chapter tests will be a combination of multiple-choice, short-answer, and computational questions. The exams focus on assessing your interpretation and understanding of the course material. You will be provided with preparation sheet before each exam.

Make-up exams will only be given in the case of a) extreme circumstances and b) prior approval by the instructor. In regard to exams, students may not seek assistance from another student or from class materials, unless specified by the instructor.

In-Class Quizzes: Each class meeting will begin with a short quiz covering material both from the previous class meeting as well as assigned readings. You may consult your book or your notes for this quiz. The quiz will be administered through canvas and will only be open for the first 5 minutes of class.

Homework/In-class Assignments: Your assignments will help to illuminate certain portions of the material that will be discussed during. We may not get to every portion of the material necessary for the homework, but you will still be responsible for the material necessary to complete the assignments.

There will be two types of homework assignments: computational problems and short R projects. You will submit these via Canvas by the beginning of the following class. For short R projects, a student group will be responsible for collecting data for the rest of the class. At the beginning of the next class, another group will also be required to demonstrate how they completed the project as well as demonstrate something new and interesting they learned how to do in R. Assignments are due at the *start* of class; after that, it's late. Late assignments can only earn maximum half credit.

When completing the homework and in-lab assignments, students are expected to observe the regulations for academic integrity as spelled out in the Honor Code of Rhodes College. In regard to this work, you will benefit the most if you complete the assignments on your own. However, while there will be times when collaborative efforts are expressly forbidden, you may seek assistance from classmates unless told otherwise for a specific assignment. *But, let it be said that all students must turn in their own, separate assignments and any work that isn't deemed to be a serious, independent effort by a student will be counted as a zero*.

Also, it is a violation of the honor code to use or consult homework assignments, lab work, or any other work from previous offerings of this course.

Final Exam: The final exam will be cumulative and cover material previously tested on as well as any additional material covered between the final chapter test and final exam.

Additional Issues:

Attendance:

Formal attendance will be taken in each class. Being more than 5-minutes late will constitute an absence. Missing more than 3 class meetings may result in deductions from your final grade, with 1.5 percentage points lost for every class missed over 3. Should you have to miss a class meeting, you are responsible for any material/assignments given in class. Absence for college-related events must be communicated to me prior to the absence. I will discuss problematic absences with you before making any grade deductions.

Course Website on Canvas:

The course website can be accessed using the Canvas online course system. Canvas will be an important portal for you to access course information.

- I'll post learning objectives and questions that will serve as useful study guides;
- I'll post practice material and example videos;
- You'll use it to take the quizzes;
- I'll post class notes before each class meeting. These notes provide the structure and major terms for each section and are not meant to replace the class lecture, nor are they copies of the Powerpoint slides.
- Should the class have to move to remote teaching for any length of time, we'll use the Canvas webpage as our main access point for the course.

Academic Integrity:

As in all courses at Rhodes, students are expected to act honorably in pursuit of our mutual educational objectives. Thus, honor code violations (e.g., cheating, plagiarism) will not be tolerated. All work for this course is to be completed in accordance with Rhodes' Honor Code. Students are expected to be familiar with the requirements of the Code and to conduct themselves accordingly in all classroom matters.

Students with Disabilities:

All efforts will be made to accommodate students with documented disabilities. Please meet with me at the beginning of the semester so that appropriate arrangements can be made.

Classroom Etiquette:

Throughout the course, students are expected to show respect for other students, the instructor, and the college. Behaviors that detract from the learning environment of the classroom are not acceptable. You are expected to come to class prepared, arriving on time and staying through the whole class. You should be respectful of other students and the instructor by being attentive, refraining from talking with your classmates, and raising your hand to ask a question or comment (though questions and comments are, of course, welcome).

Classroom Climate:

The Psychology Department at Rhodes College is committed to creating an academic climate that is safe, respectful, and appreciative of all students, staff, and faculty regardless of race, ethnicity, sexual orientation, gender identity, age, size, socioeconomic background, religion, spirituality, physical ability, mental ability, or any other aspect of one's identity. We believe that a climate of mutual respect allows us to ask difficult questions and to participate in honest discussions about difficult issues, even in the context of strong disagreement. Creating this kind of open, honest, and respectful climate is our mutual responsibility.

Also, please see information on the college's website regarding the college's Sexual Misconduct Disclosure policy.

If the course schedule does not reflect a religious holiday or observance for you, please speak with the instructor about possible accommodations.

Course Schedule

Date	Topic	Reading
Jan..	----------	
11	Orientation and Overview	
13	Data	1.1
16	NO CLASS	
18	Sampling	1.2
20	Methods	1.3
23	TEST Ch 1	
25	Variables	2.1-2.3
27	Describing Variables	2.4-2.5
30	Visualizing Variables	2.6-2.7
Feb.	----------	
1	TEST Ch 2	
3	Distributions	3.1-3.2
6	Confidence Intervals	3.3
8	Bootstrapping	3.4
10	TEST Ch 3	
13	Hypothesis Tests	4.1-4.2
15	Significance	4.3-4.4
17	Testing	4.5
20	TEST Ch 4	
22	Normal Distributions	5.1
24	Testing with Normal Distributions	5.2
27	TEST Ch 5	
Mar.	----------	
1	Testing: Proportions	6.1
3	Testing: Means	6.2
6	Testing: Differences in Proportions	6.3
8	Testing: Differences in Means	6.4-6.5
10	TEST: Ch 6	
13	NO CLASS	
15	NO CLASS	
17	NO CLASS	
20	Chi Square	7.1
22		7.2
24	TEST: Ch 7	
27	ANOVA	8.1
29		8.1

31	Inference using ANOVA	8.2
Apr.	----------	
3		8.2
5	TEST: Ch 8	
7	NO CLASS	
10	Regression	9.1
12	Regression Significance	9.2
14	Regression Intervals	9.3
17	TEST: Ch 9	
19	Multiple Regression	10.1-10.2
21		10.3
24	TEST: Ch 10	
26	Review for Final Exam	
28	RHODES SYMPOSIUM	
May	----------	
3	FINAL EXAM – 530p	