THIS IS A DRAFT VERSION OF THE SYLLABUS; THE FINAL COURSE SYLLABUS MAY BE MODIFIED SLIGHTLY.

RUTGERS UNIVERSITY

QUANTITATIVE METHODS 830:200:B2   SUMMER 2019
LOCATION: Tillett Hall 207 **DAYS/TIMES**: M, T, W, Th 11:00 AM – 1:35 PM

Instructor: Dr. Rachel Rubinstein
Office: Tillett Hall 303
Office Hours: TBD
Email: rachel.rubinstein@rutgers.edu

Textbook: **Basic Statistical Analysis (9th Edition)**. Sprinthall, R. C. (2012). Needham Hts., MA: Allyn & Bacon. *Note: Do not purchase an earlier edition, and do not purchase the customized softcover version. Page numbers and/or problems differ.* **You will need the book for every class and for exams.**

Goals:
1. Understand the logic of null hypothesis testing
2. Identify the appropriate statistical test for various research designs, execute null hypothesis tests, and describe results in layperson's terms
3. Read, understand, and evaluate statistical results used in publish research and communicate clearly about these findings
4. Think critically about media reported statistics and be able to identify potentially misleading reports

In addition, this course has been certified as satisfying both Quantitative and Formal Reasoning Learning Outcome Goals (QQ and QR) of the SAS Core Curriculum. Specifically, students will be able to:
a) Formulate, evaluate, and communicate conclusions and inferences from quantitative information (QQ)
b) Apply effective and efficient mathematical or other formal processes to reason and to solve problems

Assessment

Exam 1	15%
Exam 2	15%
Exam 3	15%
Comprehensive final exam	20%
Classwork	15%
Homework	10%
Class presentation	10%
Total	100%

Course Requirements:

Three unit exams. Each of these will consist of two parts administered separately. One part will be conceptual (no calculations, multiple-choice objective questions); the other will be computational (calculating the appropriate statistics, determining whether or not to reject the null hypothesis, and describing results in layperson's terminology). For the computational portion of the exams you will need your book and will be permitted to bring one 8.5 x 11 sheet of paper with any formulas or notes on it. Only calculators are permitted – no other electronic devices may be used on the computational portion. You may not use graphing calculators or other calculators that can store equations.

Comprehensive final exam. This will be similar in structure to the unit exams (so, part will be conceptual multiple choice and part will be computational), but will cover material from the whole course.

 Classwork assignments. You will be doing computational assignments in each class. You will turn them in for credit. Obviously, if you're not there, you can't get the credit for in-class assignments. You can miss one with no penalty, but you will subsequently lose points for missing classwork.

Homework assignments. There will be a few homework assignments throughout the course of the class that will be due on the day of the review session before each unit exam. On these homework assignments, I will not tell you which test to use—these are meant as a low-stakes way to practice for the exam. For these assignments, for each problem, you will receive no credit if you leave it blank, half credit if you show your work but have an incorrect response, and full credit if you get the answer correct. We will review the assignment in the review session after you turn it in.

Presentation. You will be responsible for a group presentation of a journal article that outlines its purpose, hypotheses, statistical tests, and conclusions. You will be graded both by me and by your classmates on this presentation, and will be responsible for rating others' presentations as well.

Make-up exams and classwork: In order to qualify for a make-up for exams **OR** for make-up classwork, you must notify me ***in advance*** by email ***and*** provide documentation (i.e., a doctor's note, police report, etc.). If you don't meet all of these criteria, you will not be permitted to take a make-up.

Academic Integrity: Collusion (getting any form of assistance from other students or outside sources) on exams is prohibited. Students suspected of doing so will be brought up on charges before university's Office of Student Conduct, and penalties, up to and including explusion, will be imposed for those found guilty. (See http://policies.rutgers.edu/PDF/Section10/10.2.13-current.pdf for specifics)

Attendance: Class attendance is not mandatory; however, since the in-class assignments constitute a substantial portion of your grade, and you cannot make them up if you miss them without documentation, you need to attend consistently. In addition, you should not skip class because missing lecture will put your conceptual understanding and procedural knowledge in jeopardy.

Grading: Final grades will be assigned according to the following scale:

A: 90.0 -100.0%
B+: 85.0-89.99%
B: 80.0-84.99%
C+: 75-79.99%
C: 70-74.99%
D: 60.0 - 69.99%
F: 0.0 - 59.99%

THIS GRADING RUBRIC APPLIES TO ALL STUDENTS IN THIS CLASS – NO EXCEPTIONS FOR ANY REASON.

General Principle. Please ask questions! It's the only reliable way we have of knowing whether you've understood the course content. Even if you can't articulate what it is you don't understand, just say "I have no idea what you're talking about," or, "I'm lost," or "Help!" Chances are that if you don't get it, there are a number of your classmates who are also struggling. Help everyone out by asking, please!

Materials. You will need to bring a calculator to each class session. Graphing calculators and other calculators that store equations are not permitted. **Bring your book and calculator to EVERY CLASS, as I will often be referring to specific tables or examples in the text.**

CLASS CALENDAR*
QUANTITATIVE METHODS 830:200:B2   SUMMER 2019

*SUBJECT TO CHANGE IF NECESSARY

DATE	TEXT READINGS*	TOPICS & EVENTS
Tues 5/28	Chapter 1 Ch 9 (pp. 198-208) Chapter 2 (pp. 32-46)	Orientation and review of syllabus and resources available Types of measurement – nominal, ordinal, interval, ratio. Independent vs. dependent variables. Issues in scientific measurement: Reliability and validity Measures of central tendency – mean, median, mode. Graphing frequency distributions
Wed 5/29	Chapter 2 (p. 47) Chapter 3 (pp. 54-59; 61-66) *NOTE: DO NOT USE "computational method" for standard deviation described on page 60 (table 3.2).	Measure of variability – range, variance, and standard deviation. Kurtosis and skew.
Thurs 5/30	Chapter 4	Characteristics of the normal distribution, Z-scores and their use.
Mon 6/3	Chapter 7 (pp. 144-151; 156-167)	Null hypothesis testing and the z-test
Tues 6/4		EXAM 1 REVIEW Homework 1 due
Wed 6/5		EXAM 1
Thurs 6/6	Chapter 8 (pp. 170-173; (ignore p. 174); 175-193)	The t-test – Testing for mean differences. Single-sample t-test. Inferences about populations from samples. Confidence intervals with *t*-values.
Mon 6/10	Chapter 10 (ignore p. 253)	The Sampling Distribution of the Difference and the independent samples t-test. Confidence intervals for mean differences
Tues 6/11	Chapter 11 (pp. 287-296; 300-308; 310-311	The Correlation Coefficient: Pearson's r

		Fisher's Z test for difference between Pearson's r values
Wed 6/12	Chapter 15 (pp.447-453)	Repeated-measures (within-subjects) t-tests. Presentation 1
Thurs 6/13		Presentations 2 and 3, Exam 2 review Homework 2 due
Mon 6/17		**EXAM 2**
Tues 6/18	Chapter 12 (pp. 330-350) (ignore Steps 1-4 on p. 342 for calculation of 1-Way F	The 1-way Analysis of Variance – Testing for mean differences among more than 2 groups. Post-hoc testing (Tukey test).
Wed 6/19	Chapter 12 pp. 350-360 (ignore steps 1-7 on pp. 353-354); 363-365	Factorial ANOVA – Testing for the effects of more than 1 independent variable on a dependent variable. Main effects and interactions.
Thurs 6/20		Factorial ANOVA (cont.)
Mon 6/24	Ch 14 pp.404-417	Linear Regression Analysis: Predicting values on a criterion using a predictor and the regression equation. Presentations 4 and 5
Tues 6/25		Exam 3 review Homework 3 due
Wed 6/26		Exam 3
Thurs 6/27	Chapter 13 (pp. 374-385, 395)	Nominal data and the chi-square test Presentation 6
Mon 7/1	**Review for final exam**	All topics Presentations 7 and 8
Tues 7/2	**Review for final exam**	All topics
Wed 7/3	**FINAL EXAM**	Covers all topics that have been covered throughout the course