

Spring 2016
 Quantitative Research Methods in Education: ANOVA
 16:300:515:01
 3 Credits
 Th 4:50-7:30, GSE 208

Instructor: Greg Camilli	Email address: greg.camilli@gse.rutgers.edu
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Office Hours: By appointment	Prerequisites or other limitations: 16:300:511, 15:291:531/532, or equivalent
Mode of Instruction: <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input checked="" type="checkbox"/> Hybrid <input type="checkbox"/> Online <input type="checkbox"/> Other	Permission required: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Directions about where to get permission numbers: Contact the instructor.

Program goals

The master's of education degree in Educational Statistics, Measurement and Evaluation aims to provide students training in basic and intermediate statistical, measurement, and evaluation methods. It serves as a preparation for students interested in working in research institutions, and pursuing Ph.D. studies in educational statistics and measurement or a related field. The Ph.D.in Statistics and Measurement within the Learning, Cognition, Instruction, and Development concentration prepares students to become statisticians and psychometricians with broad expertise in applied statistics, measurement theory, educational assessment and statistical analysis. An important feature of the program is early exposure to research and active learning through a variety of course offerings.

Prerequisites

The following skills are required for taking this class: Statistical methods courses through one-way ANOVA; facility with basic algebra is also required through linear equations. Familiarity with Excel--I will use this spreadsheet tool, but will not provide instruction. I strongly encourage you to acquire Excel skills. This is a fast-paced class. I will offer assistance through online and face-2-face meetings. However, there will be very little time to review perquisite material.

Learning goals

Upon successful completion of this course, you will be able to:

1. Use and interpret graphical representations.
2. Compute effect sizes.
3. Have an intermediate understanding of dummy variables and linear regression.
4. Understand and conduct hypothesis tests.
5. Conduct tests planned and unplanned comparisons.
6. Understand the concepts of internal and external validity.

7. Understand one- and two-way designs, mixed models, and propensity-score matching.
8. Carry out statistical analyses using computer software (SPSS & Excel).

Course catalog description

This course is the first part of a one-year sequence in statistical methods designed to introduce students to the most commonly used methods in educational and social science research. No prior knowledge of statistics is required, but essentials of arithmetic and basic algebra will be used throughout the semester. Topics covered in this course include graphical representations, descriptive statistics, correlation, regression, experimental designs, basic probability, sampling distributions, confidence intervals, and hypothesis testing.

Class materials/ Textbooks

Required text:

Experimental Design and Analysis (EDA) Howard J. Seltman (free, online)

Required chapters (on Sakai) from
What is a p-value anyway? (PVL) Andrew Vickers

Software:

SPSS for Windows (version 20 or newer). New York: Prentice-Hall.

Assignments and Requirements

1. **Email & Sakai Access:** Efficient communication is a key to the success of instruction. In this course, **email**, **Sakai**, and face-to-face meetings are the main communication tools. For optimal teaching and learning, please check your email account frequently and make sure you are able to receive information, download files, drop messages, do homework, take exams and access your grades online from our course web. All information and activities are time sensitive. Late responses and requests will not be honored. For example, you will have one week to finish each homework assignment, but you will not be able to access the homework questions after the due date.
2. **Exams:** The two online exams, midterm and final are each worth 30% of the final grade. No opportunities for extra credit are available.
3. **Homework assignments:** About 8 homework assignments, worth 40% of the final course grade, will be given online throughout the semester. Homework assignments will be assigned on Monday and will be due on the following Monday giving you a whole week to work on each assignment. No late homework assignment is accepted. I will allow you to drop one assignment - and grade on the basis of nine assignments. Homework assignment must be carried out independently. You cannot ask or offer help with homework unless the assignment is explicitly designated as a group activity.
4. **Participation:** Participation is encouraged throughout the semester. Examples are: asking questions in class, emailing me with questions and comments, or helping your classmates with regarding to instructional activities (in or out of classes).
5. **Software & Calculator:** SPSS for Windows will be used extensively to conduct statistical analyses for homework assignments and class exercises. However, for the

exams, a calculator that performs basic operations will suffice.

Discussion List

In addition class, an alternative to find the answer to your question is to simply post your questions online. A **Folder** labeled **Question Box** will be created every week on Sakai for you to drop content-related questions. Your questions will be replied on a daily basis (weekdays). Please make sure you are familiar with the Sakai function.

Final Grade

Final letter grade will be assigned as follows:

<u>Final Score</u>	<u>Letter Grade</u>
90% and Above	A
80%-89%	B+
75%-79%	B
65%-74%	C+
60%-64%	C
Below 60%	F

Academic Integrity Policy

The Office of Student Conduct supervises issues related to violations of academic integrity. Please familiarize yourself with the university policy on academic integrity at <http://academicintegrity.rutgers.edu/academic-integrity-policy>.

Office of Disability Services

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Class Schedule

The following class schedule is subject to change. It is likely that at least one class will be canceled due to travel. In that case, I will make arrangements for self and group study. Reading assignments should be completed prior to each lecture.

Class	Date	Assignments & Readings	Readings	Homework
	Jan			
1	21	Getting Started and EDA	5.1-5.8	
2	28	Hypothesis Testing	6.1-6.4	
	Feb			
3	4	One-Way ANOVA	7.1-7.6	#1
4	11	Threats to Validity;	8.1-8.8	
5	18	Simple Linear Regression	9.1-9.10	#2
6	25	Analysis of Covariance	10.1-10.5	
	March			
no class	3	Two-Way ANOVA		#3
8	10	MIDTERM EXAM (Classes 1-6)		
no class	17	Statistical Power	12.1-12.8	#4
9*	24	Contrasts & Custom Hypotheses	13.1-13.4	
10	31	Within-Subjects Designs	14.1-14.6	#5
	April			
11	7	Mixed Models	15.1-15.8	
12	14	Categorical Outcomes	16.1-16.2	#6
13	21	Logistic Regression/Propensity Scores	16.3	
14	28	Propensity Score Design	TBA	#7
	May			
15	5	FINAL EXAM (Classes 7, 9-14)		

* Homework on statistical power due by class time