

**Fall 2016**  
**Quantitative Research Methods in Education I: Introduction**  
**16:300:511:01**  
**3 Credits**

Wednesday 4:30 PM - 7:30 PM in Murray 113

Instructor: Youngsuk Suh	Email: <a href="mailto:youngsuk.suh@gse.rutgers.edu">youngsuk.suh@gse.rutgers.edu</a>
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Office Hours: By Appointment	Prerequisites or other limitations: Non
Mode of Instruction: <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Hybrid <input type="checkbox"/> Online <input type="checkbox"/> Other	Permission required: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes Directions about where to get permission numbers:

**Learning Goals**

**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.

**Course Goals:**

After successfully completing this class students should achieve the following goals.

1. Understand the probability theory, the foundation of statistical methods.
2. Understand the distributions of random variables as well as their properties.
3. Have a basic understanding of correlation and linear regression.
4. Carry out the statistical analysis using computer software (SPSS).
5. Test research hypotheses by applying probability theory.
6. Explain the differences among various statistical techniques and identify an appropriate technique for a given set of variables and research questions.
7. Make a decision based on the statistical results and interpret the results.

## **Course catalogue description**

Introduction to quantitative research techniques, examining their potential and limitations for investigating educational questions and issues. Topics include one- and two-sample tests of hypotheses, analysis of variance, multiple comparison procedures, regression, and effect size.

## **Class materials/ Textbooks:**

Text: Moore, D. S., McCabe, G. P., Craig, B. A. (2014). *Introduction to the practice of statistics* (8th ed). New York: W. H. Freeman.

Software: Software: SPSS\* for Windows (Version 19 or newer). New York: Prentice-Hall.

\*SPSS available through the Rutgers Scarlet aps system

## **Course Requirements:**

1. Exams: The two exams, midterm and final, presumably in-class, are worth 30% and 30% of the final grade, respectively. The exams may consist of multiple choice items, true/false items, computations, and short answer questions. Exams are held during class time and can only be re-scheduled for individual students under exceptional circumstances. The student is responsible for notifying the instructor by the day of the exam that they cannot attend the exam. The format of make-up test is at the discretion of the instructor.
2. Homework assignments: Approximately 10 homework assignments, worth 40% of the final grade, will be given throughout the semester. Some problems require SPSS analyses. Homework assignments are due at the beginning of the class the week after they are assigned. So basically you have almost a whole week to work on each homework assignment. No late homework assignment is accepted.
3. 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.
4. Participation: Your participation is expected throughout the semester. Please bring any necessary planned absences to my attention ahead of time. Also, questions during the office hours are strongly encouraged.
5. Reading assignments must be completed each week.
6. Cell phones and similar devices must be turned off and must stay stowed at all times during class.

## **Grading System**

Final letter grade will be assigned as follows:

<b><i>Final Score</i></b>	<b><i>Letter Grade</i></b>
90% and Above	A
80%-89.99%	B+
75%-79.99%	B
65%-74.99%	C+
60%-64.99%	C
55%-59.99%	D
Below 55%	F

## **Course Web Site**

Class handouts used by the instructor will be available on Sakai web site at <http://sakai.rutgers.edu> under *16:300:511 F16 Quant I*. They will be made available by 8AM each class day. It is your responsibility to print them out if you want to have hard copies in class. The handouts provide a skeleton of what is being covered each day and will thus be an incomplete version of the material actually covered.

## **Academic Integrity Policy:**

The Office of Student Conduct supervises issues related to violations of academic integrity (see <http://academicintegrity.rutgers.edu>). 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>.

## Course Schedule:

The following class schedule is subject to change if necessary.

Week	Topic	Reading
1 (9/7)	Introduction; Displaying and Describing Distributions	1.1-1.3
	Normal Distributions	1.4
2 (9/14)	Scatter Plots and Correlation	2.1-2.3
	Regression Analysis	2.4
	Cautions about Correlation and Regression	2.5
3 (9/21)	Design of Experiments and Statistical Inference	3.2, 3.4
	Randomness and Probability Models	4.1, 4.2
	Random Variables	4.3
4 (9/28)	Means and Variables of Random Variables	4.4
	Sampling Distributions	5.1, 5.2
5 (10/5)	Tests of Significance	6.2
	Confidence Intervals	6.1
	Use and Abuse of Tests; Effect Size	6.3
6 (10/12)	Power and Inference as a decision	6.4
	Inference for the Mean of One Population	7.1
7 (10/19)	Review	
<b>8 (10/26)</b>	<b>Midterm (covers Sections 1.1-7.1)</b>	
9 (11/2)	Comparing Two Means--Two-Samples T-Test	7.2
	Tests for Variances	7.3
10 (11/9)	Inference for Proportions	8.1, 8.2
	Analysis of Two-Way Tables	9.1, 9.2
11 (11/16)	Inference for Regression	10.1, 10.2
	Multiple Regression	11.1
12 (11/23)	<i>Thanksgiving week -- No class</i>	
13 (11/30)	One-Way ANOVA	12.1, 12.2
14 (12/7)	Two-Way ANOVA	13.1, 13.2
15 (12/14)	Review	
<b>16 (12/21)</b>	<b>Final Exam (covers Sections 7.2-13.2)</b>	

\*\* SPSS analysis will be discussed almost after each topic is covered.

\*\* **Religious holy days** sometimes conflict with class and examination schedules. You must notify your instructor of the issues prior to the classes scheduled on dates you will be absent to observe a religious holy day.