

Statistical Methods in Education I

15:291:531:90

Fall 2015

3 Credits

Fall 2015

Instructor Name: Youngsuk Suh	Email: youngsuk.suh@gse.rutgers.edu
Phone Number: 848-932-0829	10 Seminar Pl Rm 323
Lecture: Mondays	Online Session: Thursdays Discussion: Every Weekday
Office Hours: Wednesday 1:30 - 2:30 PM or by appointment	Prerequisites or other limitations: None
Mode of Instruction: <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Hybrid <input checked="" 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: Contact the instructor.

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:

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. Topics covered in this course include graphical representations, descriptive statistics, correlation, regression, experimental designs, basic probability, sampling distributions, confidence intervals, and hypothesis testing.

Upon successful completion of this course, you will be able to complete the following tasks:

1. Be able to use and interpret graphical representations.
2. Understand the basic probability theory and the foundation of statistical methods.
3. Understand the normal distributions of random variables as well as their properties.

4. Have a basic understanding of estimating correlation and linear regression.
5. Carry out the basic statistical analysis using calculator and/or computer software (SPSS).
6. Conduct research hypothesis tests and construct confidence intervals.
7. Make a decision based on the statistical test results and interpret the results.

Course Catalog Description

Descriptive statistics, SPSS statistical package, graphing, normal distribution theory, simple regression, correlation analysis, elementary probability theory, sampling, confidence intervals, and introduction to hypothesis testing.

Class Materials/ Textbooks

Required texts:

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

Software:

SPSS for Windows (version 19 or newer). New York: Prentice-Hall.

Other Description of Course Methods

No prior knowledge of statistics is required, but essentials of arithmetic and basic algebra will be used throughout the semester.

Software & Calculator: SPSS will be used to run some statistical analyses for homework assignments and class exercises. However, for the exams, a calculator that performs basic operations will suffice.

Grading Policy

Final letter grade will be assigned as follows:

Final Score	Letter Grade
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

Assignments and Requirements

1. **Email & eCollege Access:** Efficient communication is the key to evaluate how successful an online course is and in this course, **emailing** and **eCollege** are the two communication tools that we heavily rely on. To maximize teaching and learning effects, you have to check your email account frequently and make sure you are able to read information, download files, drop messages, do homework, and access your grades from our webpage. All information and activities are time sensitive. Late responses and requests will not be handled. For example, you will have a run of time to finish each homework assignment. However, you will not be able to access the homework questions after the designated time.
2. **Exams:** The two exams, midterm and final, are worth 30% and 30% of the final grade, respectively. The exams will be created to measure the course goals listed above.
3. **Homework assignments:** Approximately 10 homework assignments, worth 40% of the final grade, will be given online throughout the semester. Homework assignments will be created to assess the course goals. Homework assignments will be assigned on **Thursday** and will be due on the following Wednesday. So basically you have a whole week to work on a homework assignment. No late homework assignments will be accepted.
4. **Participation:** Your participation is expected during the semester.

Online Sessions

Online sessions in this course are analogous to office hours in a regular course. Online sessions are not held for getting through the entire notes, but for explaining important concepts in the notes and demonstrating how to solve challenging problems in the notes or extra problems. Voice-recorded sessions will be uploaded on every Thursday.

Discussion Sessions

In addition to the online sessions, an alternative to find the solution of your question is to simply post your questions online. A Basket labeled Question Box will be created every week for you to drop content-related questions. Your questions will be answered on a daily basis (weekdays during the daytime). Some of your questions can also be handled in online sessions. Therefore, please make sure you are familiar with the function, Dropbox.

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. Reading assignments must be completed prior to each lecture.

Date	Topic	Assigned Readings
Week1: 09/01-09/06	Getting Started; Data and Displaying Distributions	1.1, 1.2
Week2: 09/07-09/13	Displaying and Describing Distributions	1.3
Week3: 09/14-09/20	Normal Distribution Theory	1.4
Week4: 09/21-09/27	Scatter Plots and Correlation	2.1 - 2.3
Week5: 09/28-10/04	Regression Analysis	2.4
Week6: 10/05-10/11	Cautions About Correlation and Regression	2.5
Week7: 10/12-10/18	Designs of Experiments and Statistical Inference	3.2, 3.4
Week8: 10/19-10/25	MIDTERM EXAM (Sections 1.1 – 3.4)	
Week9: 10/26-11/01	Randomness and Probability Models	4.1, 4.2
Week10: 11/02-11/08	Random Variables and Means and Variances of Random Variables	4.3, 4.4
Week11: 11/09-11/15	Sampling Distributions	5.1, 5.2
Week12: 11/16-11/22	Hypothesis Testing	6.2
Week13: 11/23-11/29	Thanksgiving Holiday	
Week14: 11/30-12/06	Confidence Intervals	6.1
Week15: 12/07-12/13	Use and Abuse of Tests; Effect Size	6.3
Week16: 12/14-12/19	FINAL EXAM (Section 4.1 – Section 6.3)	