

Statistical Methods in Education I

Course Delivery Online through Rutgers Learning Studio (provided by Pearson eCollege)

Course Website [Access here.](#)

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Office Hours 'Virtual Office Hours' by means of Piazza discussion board.

Prerequisites None

Permission required No

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 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.

Learning 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.

Class Materials

The required text book for this course is: Moore, D. S., McCabe, G. P., & Craig, B. (2014). *Introduction to the practice of statistics*. (8th ed). New York: W. H. Freeman.

The following is a non-exhaustive list of recommended readings/video resources for your learning in this course. All of the recommended readings are available freely online via Rutgers Libraries.

- Cleophas, T. J. M., & Zwinderman, A. H. (2010). *SPSS for starters*. New York: Springer. [Access here.](#)
- Ellison, S. L. R., Barwick, V., & Farrant, T. J. (2009). *Practical statistics for the analytical scientist: A bench guide*. Cambridge: Royal Society of Chemistry. [Access here.](#)
- Lynch, S. M. 1. (2013). *Using statistics in social research: A concise approach*. New York: Springer. [Access here.](#)
- Morgan, G. A. 1. (2011). *IBM SPSS for introductory statistics: Use and interpretation*, (4th ed.). New York: Routledge. [Access here.](#)
- Organisation for Economic Co-operation and Development., & Ward, D. (2007). *Data and metadata reporting and presentation handbook*. Paris: Organisation for Economic Co-operation and Development. [Access here.](#)
- Pallant, J. (2010). *SPSS survival manual: A step by step guide to data analysis using SPSS* (4th ed.). Maidenhead: Open University Press/McGraw-Hill. [Access here.](#)
- Programme for International Student Assessment., & Organisation for Economic Co-operation and Development. (2009). *PISA data analysis manual: SPSS* (2nd ed.). Paris: OECD. [Access here.](#)

Software Requirement

In this course, SPSS is supported as a software tool for statistical analysis. Use of other statistical software is permitted but not supported by instruction.

Students are required to gain access to SPSS prior to the second week of the course. Off campus, SPSS is available through the Rutgers Remote Apps Server. Watch and learn how to use it here (a Youtube video) and access the apps here. On campus, SPSS Version 21 is available for students at all the university computing labs and at the GSE computer lab. For locations, phone numbers, and hours of operation, please check out [here](#) and [here](#). For buying and renting options, please check out [here](#) and [here](#).

Internet and Technology Requirement

You need very reliable access to the internet to successfully complete this course. Please make sure to have a reliable back-up plan in place (local library, friend's house, coffee shop) in case your primary access is not available when you plan to work on the class. Rutgers has a plethora of options for access on terminals (libraries, computing centers) and most buildings have wireless access for a laptop.

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.

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.

Weekly Schedule

The lectures will be posted on Mondays by noon. Online sessions are held on Thursdays at noon. Discussion happens every weekday. Homework assignments will be assigned on Thursday and will be due on the following Wednesday by noon.

1. 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.

2. Discussion Sessions

In addition to the online sessions, an alternative to find the solution of your question is to simply post your questions online. Use Piazza board for posting your 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.

Grading Rules

The final letter grade will be assigned as follows: 90% and above - A, 80-89% - B+, 75-79% - B, 65-74% - C+, 60-64% - C, 55-59% - D, Below 55% - F.

1. Exams (60%)

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.

2. Homework assignments (40%)

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 at noon and will be due on the following Wednesday by noon. You have a whole week to work on a homework assignment. No late homework assignments will be accepted.

3. Participation

Your participation is expected during the semester.

Policy on Assignment Submission

Efficient communication is the key to evaluate how successful an online course is and in this course, Piazza and eCollege are the two communication tools that we heavily rely on. To maximize teaching and learning effects, you have to check your Piazza board and eCollege frequently and make sure you are able to read information, download files, drop messages, do homework, and access your grade.

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. No late participation, homework, and/or project will be accepted. Should you submit an assignment after the due date, your grade will drop by 25% for each day late. Prior approval for a late assignment to receive full credit needs an acceptable reason: illness (with note from physician), family emergency, or religious holiday. In these cases, arrangements should be made with me as soon as possible for an alternative due date.

All homework assignments should be submitted ONLY using the eCollege dropbox (located on the top navigation bar), if not noted otherwise by the instructor. Other means of submission will not be guaranteed full credits, due to complications in feedback and grading.

Please follow all directions for both completing and submitting assignments. Send only required information.

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](#). As a student of Rutgers University you are responsible for adhering to the policies of this course and of Rutgers University, which includes the [Code of Student Conduct](#). By your continued enrollment in this class, it is understood that you are agreeing to all of the policies and procedures set forth in this syllabus. Failure to obtain or read this syllabus does not exempt the student from its policies and procedures. If you cannot abide by these policies and procedures, you are expected to drop the class. Failure to comply with the policies of this course and of the university can result in disciplinary action.

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 [here](#). 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 [here](#).

Tentative Course Schedule

The following class schedule is subject to change if necessary. Check the course website for the most updated schedule. Reading assignments must be completed prior to each lecture.

Date	Topic	Assigned Readings
Week1 9/12-9/16	Getting Started; Data and Displaying Distributions	1.1, 1.2
Week2 9/19-9/23	Displaying and Describing Distributions	1.3
Week3 9/26-9/30	Normal Distribution Theory	1.4
Week4 10/3-10/7	Scatter Plots and Correlation	2.1 - 2.3
Week5 10/10-10/14	Regression Analysis	2.4
Week6 10/17-10/21	Cautions About Correlation and Regression	2.5
Week7 10/24-10/28	Designs of Experiments and Statistical Inference	3.2, 3.4
Week8 10/31-11/4	MIDTERM EXAM (Sections 1.1 – 3.4)	
Week9 11/7-11/11	Randomness and Probability Models	4.1, 4.2
Week10 11/14-11/18	Random Variables and Means and Variances of Random Variables	4.3, 4.4
Week11 11/21-11/25	Sampling Distributions	5.1, 5.2
Week12 11/28-12/2	Hypothesis Testing	6.2
Week13 12/5-12/9	Confidence Intervals	6.1
Week14 12/12-12/16	Use and Abuse of Tests; Effect Size	6.3
Week15 12/19-12/23	FINAL EXAM (Section 4.1 – Section 6.3)	