

Course Syllabus
15:291:532
Statistical Methods II
Fall 2011

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Office hours: Wed, 7:30-8:30 in Scott 201 or by appointment

Time: Wednesday, 4:50–7:30 PM

Place: Scott Hall, Room 201

Text: Moore, D. S., McCabe, G. P., & Craig, B. A. (2009). *Introduction to the practice of statistics* (6th ed). New York: W. H. Freeman.

Software: *PASW Statistics (formerly SPSS)* 17.0. Chicago: SPSS Inc.

Course Description

This course is the second part of a two-semester sequence in statistical methods designed to introduce students to the most commonly used methods in educational and social science research. This course focuses on the concept of statistical inference and assumes that students have taken the first part of the sequence or have equivalent knowledge of exploratory data analysis, study design, probability, and sampling distributions.

Topics covered in this course include one- and two-sample t-test, chi-square test, regression analysis, and one- and two-way analysis of variance (ANOVA).

The best way to become proficient at the use of these analysis methods is to combine study of the statistics concepts with the design, creation, and interpretation of actual statistical analyses. Students will regularly analyze and interpret datasets provided for that purpose, as well as design and carry-out a study to address a research question of their choosing.

Learning Goals

During the course, students are encouraged to:

- Think statistically.
- Using statistical tools, accurately apply the statistical methods to realistic data samples.
- Effectively interpret the results of analyses.

- Communicate accurately and comprehensively about data results, conclusions and interpretations.
- Use a critical framework to evaluate study designs and results.

Course Requirements

Class participation

Class participation is crucial to your understanding and application of course content. You are expected to come to class prepared to discuss assigned readings and to participate in class activities.

Homework

All homework assignments are listed on the Sakai course website, under "Resources", on the "Homework Assignments" webpage.

Reading/study: Students are *expected* to read the assigned pages in *Introduction to the Practice of Statistics* (IPS6e) prior to attending class. Students are *encouraged* to further study the topic with the optional "further study" materials listed on the homework page.

Check assessments: These assessments, available on Sakai, are designed to help a student assess how well he/she understands the statistical concepts presented in the reading and should be completed as part of the student's pre-class study. These are formative assessments, for which the feedback option is available during the "test". Be sure to use it, click on the button in the top left, to help you better understand the concepts. If you have trouble with a question, be sure to ask during class for a review.

Data analysis and interpretation: These exercises follow the discussion of a topic in class, encouraging students to practice the implementation and interpretation of the newly learned statistical analysis method. Most exercises will require the use of SPSS. (Students interested to investigate other software tools--Excel, Calc, R, Minitab, SAS, PPSP--are encouraged to do so and to share their experience with the class.) Students should bring their work on these exercises to the next class session.

Chapter quizzes

Students will take chapter quizzes in class following discussion and practice of the methods presented in the chapter.

Research project

Students will design and implement a study to investigate a research question of their choosing. About halfway through the course, students will create a study proposal including discussion of the research question and specification of the study design, the sampling plan, data collection, and the data analysis (both exploratory analyses and statistical tests). Using the proposal, students will implement the study plan (collect the data and create the specified analyses) and write a report to describe the study, report results and present conclusions. Students will present their research study during one of the final class sessions.

Final grade self-assessment

At the end of the course, each student will submit a self-assessment, including a suggested final grade along with evidence to support that decision. Evidence should include specific examples and data (e.g., summary stats, counts, graphs) to support the student's claims.

Evidence of learning

- participated in class, in particular homework discussions.
- read about/studied new statistics concepts in preparation for discussion in class.
- used online check assessments to evaluate learning.
- created appropriate data analyses and thoughtfully interpreted results; if inadequate at first, persisted until successful.
- answered most of the quiz questions correctly; for instances when learning is not demonstrated on quiz--after further study of concepts missed on a quiz, demonstrated improved understanding.
- designed and implemented a research study, created a research report, and prepared a short presentation of study (including reflections on research process).
- demonstrated improved understanding of fundamental concepts in inferential statistics.

This list is not exhaustive of possible evidence. Students may include other relevant evidence of learning, as desired.

Rutgers Academic Integrity Policy

From 1/25/2010 draft policy, academicintegrity.rutgers.edu

The principles of academic integrity require that:

- All work submitted in a course must be a student's own and must have been produced without the aid of unsanctioned materials or collaboration.
- All use of the ideas, results, or words of others must be properly acknowledged and cited.
- All contributors to a given piece of work must be acknowledged properly.
- All data or results must be obtained by ethical means and reported accurately without suppressing any results inconsistent with the author's interpretation or conclusions.

Class Schedule

The following class schedule is *subject to change*. Reading assignments must be completed prior to each lecture. Additional study materials for each topic are specified on Sakai on the "Homework Assignments" page.

		chapt.sec	Pages
Sep 7	Intro; Review of Statistical Inference	6.1-6.4	353-410
Sep 14	Inference for the Mean of a Population	7.1	417-428; 432-433
Sep 21	Comparing Two Means (independent samples)	7.2; 7.3	447-461; 476-479
Sep 28	Matched Pairs (dependent samples)	7.1	428-431

Oct 5	Chapt 7 quiz; Inference for Proportions	8.1, 8.2	487-5156
Oct 12	Chapt 8 quiz; Analysis of Two-Way Tables	9.1, 9.2	525-545
Oct 19	Chapt 9 quiz; Simple Linear Regression I	10.1	559-579
Oct 26	Simple Linear Regression II	10.2	579-594
Nov 2	Chapt 10 quiz; Research study proposal presentations		
Nov 9	Multiple Regression	11.1, 11.2	607-625
Nov 16	Chapt 11 quiz; One-Way ANOVA	12.1	637-655
Nov 21 (Mon)	Contrasts and Multiple Comparisons	12.2	655-666
Nov 30	Chapt 12 quiz; Two-Way ANOVA <ul style="list-style-type: none">• Submit research report	13.1, 13.2	683-699
Dec 7	Chapt 13 quiz; Research study presentations		
Dec 14	Research study presentations <ul style="list-style-type: none">• Submit self-assessment		