

SOC 570A: SOCIAL STATISTICS I

Fall 2014

Lecture: Tues/Thurs 9:30-10:45, Social Sciences 415
Lab: Wednesdays 11-11:50, Social Sciences 415

Instructor contact and office hours:

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Course Description

This is a graduate-level, introductory course in statistics, with a focus on sociological applications. The course will begin with a review of basic probability theory and introduction to statistical inference. Next we will cover the fundamentals of regression analysis, including dummy variables and interactions; nonlinear relationships; indirect effects; diagnostics and remedies for outliers, heteroskedasticity, and multicollinearity.

Lectures will focus on statistical theory and substantive interpretation of applied quantitative sociological research. A weekly lab run by the graduate assistant will demonstrate statistical software and applications relevant to the lecture content.

Non-Sociology Graduate Students: This is a required course for sociology graduate students. If you are in another department, you may take this course with permission from the instructor.

Course Objectives and Expected Learning Outcomes

The purpose of the course is to familiarize the students with elementary statistical operations so that they can read, understand and evaluate research that uses these methods, and use these methods in their own research. The course also provides the foundation for more advanced techniques to be taught in 570B, the companion to this course. Students should have mastered GRE-level math prior to enrollment in the course, including basic probability theory and descriptive statistics (e.g. measures of central tendency and dispersion such as mean and variance).

An understanding of statistical inference is fundamental to most statistical techniques employed by sociologists. Thus we will begin with a review of basic probability theory, the normal distribution, and sampling distributions. Statistical hypothesis testing and confidence intervals will also be introduced, with reference to the simple case of estimating a mean.

The rest of the course focuses on applications of the linear model, which is the driving logic of much of empirical social science. Students will learn about the assumptions of linear regression models, use of categorical independent variables and interactions, and non-linear transformations.

Since social scientific data rarely conform to the assumptions of statistical methods, we will discuss violations of assumptions including heteroskedasticity, specification error, and correlated error terms.

Because social statistics are a tool that sociologists use to analyze data, this course requires students to engage in hands-on data analysis. Learning how to analyze data and interpret statistical results is the key to understanding the underlying concepts of social statistics. You will complete computer exercises using Stata statistical software. The weekly lab will demonstrate applications of a given week's subject matter using Stata.

Class attendance is very important. Please be prepared and come to class on time. Complete all readings before the class for which they are assigned.

Course Materials

Required Text. Rachel A. Gordon, *Regression Analysis for the Social Sciences*. New York: Routledge, 2010.

I will post additional class materials, including handouts, reading assignments, homework assignments, and datasets on the course d2l site (<http://d2l.arizona.edu>).

Software. Although Stata is available in the DASL lab, I encourage you to purchase a personal license, as you will need it for both this course and 570B. You can purchase a license from Stata's GradPlan program: <http://www.stata.com/order/new/edu/granplans/>. You will need version IC or SE.

The lab will consist mainly of demonstrations and will be conducted in a regular classroom (without student computers). You are welcome to bring a laptop with Stata installed if you wish to follow along, but this is not required.

Grades

Grade Distribution for this Course:

90-100% (900-1000 points)	A:	Excellent
80-89.9% (800-899 points)	B:	Good
70-79.9% (700-799 points)	C:	Satisfactory
60-69.9% (600-699 points)	D:	Poor
<60% (0-599 points)	E:	Failure

The course grade is based on 10 homework assignments (5% each), a take-home midterm (20%), and a take-home final exam (30%).

50%	500 points	10 homework assignments
20%	200 points	Take-home midterm exam (due Thurs. Oct. 9 at 9:25am)
30%	300 points	Take-home final exam (due Tues. Dec. 16 at 5pm)

Requests for incompletes (I) and withdrawal (W) must be made in accordance with university policies which are available at <http://catalog.arizona.edu/2013-14/policies/grade.htm#I> and <http://catalog.arizona.edu/2013-14/policies/grade.htm#W> respectively.

Late Work Policy

As a rule, I will not accept late work except in case of documented emergency or illness. You may petition the professor in writing for an exception if you feel you have a compelling reason for turning work in late.

You will submit your homework assignments through d2l dropbox by 9:25am on the day that they are due. The dropbox will close at 9:25am to ensure that students can upload their assignments and get to class on time. Do not come to class late or skip class in order to finish the homework. I will not accept late homework.

Attendance Policy

The UA's policy concerning Class Attendance and Administrative Drops is available at: <http://catalog.arizona.edu/2013-14/policies/classatten.htm>

The UA policy regarding absences on and accommodation of religious holidays is available at <http://deanofstudents.arizona.edu/religiousobservanceandpractice>.

Absences pre-approved by the UA Dean of Students (or Dean designee) will be honored. See: http://uhap.web.arizona.edu/chapter_7#7.04.02

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and lab session meetings.

Classroom Behavior

To foster a positive learning environment, students may not text, chat, make phone calls, play games, read the newspaper or surf the web during lecture and discussion. Please refrain from disruptive conversations with people sitting around them during lecture. I will ask students engaging in disruptive activity to cease this behavior. If students continue to disrupt the class, I will ask them to leave lecture or discussion and may report them to the Dean of Students.

The Arizona Board of Regents' Student Code of Conduct, ABOR Policy 5-308, prohibits threats of physical harm to any member of the University community, including to one's self. See: <http://policy.arizona.edu/threatening-behavior-students>.

Accessibility and Accommodations

It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations. For additional information on Disability Resources and reasonable accommodations, please visit <http://drc.arizona.edu/>.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Student Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:

<http://deanofstudents.arizona.edu/codeofacademicintegrity>.

The University Libraries have some excellent tips for avoiding plagiarism available at:

<http://www.library.arizona.edu/help/tutorials/plagiarism/index.html>.

According to Section D (6) (a) of the University's Intellectual Property Policy (which is available at http://www.ott.arizona.edu/uploads/ip_policy.pdf), faculty own the intellectual property for their course notes and course materials. The instructor holds the copyright to his/her lectures and course materials, including student notes or summaries that substantially reflect them. Student notes and course recordings are for individual use or for shared use on an individual basis. *Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent.* Violations to the instructor's copyright are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA email to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student email addresses.

Additional Resources for Students

- 1) UA Non-discrimination and Anti-harassment policy:
<http://policy.arizona.edu/sites/default/files/Nondiscrimination.pdf>
- 2) UA Academic policies and procedures are available at:
<http://catalog.arizona.edu/2013-14/policies/aaindex.html>
- 3) Student Assistance and Advocacy information is available at:
<http://deanofstudents.arizona.edu/studentassistanceandadvocacy>

Confidentiality of Student Records

<http://www.registrar.arizona.edu/ferpa/default.htm>

Subject to Change Statement

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.

COURSE SCHEDULE

Week 1

(August 25, 27)

Lecture: Introduction to social statistics

Lab: Introduction to Stata software: finding, retrieving, and entering data

Reading: Gordon, ch. 2 and 3

Week 2

(September 2, 4)

Lecture: Measures of Central Tendency and Dispersion: describing a single variable and descriptive correlation

Lab: Descriptive statistics, data organization

Reading: Gordon, ch. 4

D2L: “Measures of Central Tendency and Dispersion”

Homework #1 due by 9:25am on Thurs. Sept. 4

Week 3

(September 9, 11)

Lecture: Probability, the normal distribution, and sampling distributions

Lab: Simulating and graphing sampling distributions in Stata

Reading: D2L: Knoke, Bohrnstedt, and Mee, Chapter 3, “Making Statistical Inferences,” pp. 69-81.

Homework #2 due by 9:25am on Thurs. Sept. 11

Week 4

(September 16, 18)

Lecture: Chi-square test of independence and difference in means t-test

Lab topic: Running t-tests; transforming variables in Stata

Readings: D2L: Linneman, Chapter 4, “Using Sample Crosstabs to Talk about Populations: The Chi-Square Test.”

D2L: Aron, Aron, and Coups, Chapter 9, “The t Test for Independent Means”

Homework #3 due by 9:25am on Thurs. Sept. 18

Week 5:

(September 23, 25)

Lecture: Confidence intervals and hypothesis tests

Lab: Stata techniques for hypothesis testing; adjusting for complex sample design

Readings: D2L: Knoke, Bohrnstedt, and Mee, Chapter 3, “Making Statistical Inferences,” pp. 81-100

D2L: Gravetter and Wallnau, chapter 8, “Introduction to Hypothesis Testing”

Homework #4 due by 9:25am on Thurs. Sept. 25

Week 6

(September 30, October 2)

Lecture: Basic concepts of bivariate regression
Lab: Running bivariate models; graphing bivariate data
Reading: Gordon, Ch. 5

Week 7

(October 7, 9)

Midterm review and exam: Midterm due by noon on Thurs. Oct. 9

Week 8

(October 14, 16)

Lecture: Basic concepts of multiple regression: OLS estimation
Lab: Running multivariate models, interpreting output, saving estimates
Reading: Gordon, Ch. 6, pp. 153-182

Homework #5 due by 9:25am on Thurs. Oct. 16

Week 9

(October 21, 23)

Lecture: Basic concepts of multiple regression: goodness of fit and assumptions
Lab: Stata techniques for comparing models and assessing goodness of fit
Reading: Gordon, Ch. 6, pp. 182-198

Homework #6 due by 9:25am on Thurs. Oct. 23

Week 10

(October 28, 30)

Lecture: Categorical independent variables (dummy variables)
Lab: Stata techniques for categorical variable contrasts; graphing results
Reading: Gordon, Ch. 7

Homework #7 due by 9:25am on Thurs. Oct. 30

Week 11

(November 4, 6)

Lecture: Regression diagnostics: outliers, heteroskedasticity and multicollinearity
Lab: Diagnostics in Stata
Reading: Gordon, Ch. 11

Homework #8 due by 9:25am on Thurs. Nov. 6

Tuesday, November 11 VETERANS DAY – NO CLASS

Week 12

(November 13, 18)

Lecture: Interactions among independent variables
Lab: Automating generation of interaction terms; interpreting output
Reading: Gordon, Ch. 8

Homework #9 due by 9:25am on Tues. Nov. 18

Week 13

(November 20, 25)

Lecture: Non-linear relationships

Lab: Stata techniques for transforming non-linear variables and comparing different types of transformations

Reading: Gordon, Ch. 9

Homework #10 due by 9:25am on Tues. December 2

November 27-30 THANKSGIVING RECESS

Week 14

(December 2, 4)

Lecture: Review of linear regression and applications

Lab: Review of Stata techniques needed to complete final exam

December 16: **Take-home final exam due by 5:00pm via d2l dropbox**