Sociology 13200: Social Science Inquiry II
(Winter 2017)

Meeting Time: Tuesday/Thursday 10:30 – 11:50 pm.
Location: Cobb 106

Professor: Xi Song
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Office Hours: Tuesday/Thursday 1:30-2:30 pm or by appointment

Teaching Interns:
Jenn M. Jackson (JennJackson@uchicago.edu); Tuesday 1:00-2:00 pm (Pick Hall third floor lounge).
Joshua G. Mausolf (jmausolf@uchicago.edu); Thursday 3:00-4:00 pm (Harris School Cafe).
Note that office hours will be held only on weeks without lab sessions.

Lab Sessions:
Walker 303 computer lab

Course Objectives:

This course is an introduction to data description and analysis. The philosophy behind this course is that there are some lawful, reasonably stable relationships among social phenomena and causes are identifiable in a probabilistic sense. You will learn a coherent scientific language for systematically describing data and drawing logical conclusions. You will also learn how to produce statistical information needed to answer sociological questions. The goal of this course is to develop your ability to increase your level of understanding of the most common statistical concepts and analytical tools and to help you to develop your own research paper.

This syllabus is subject to changes after faculty Core meetings.

Contacts:

You can reach me via email; however, I do not respond to email between 9 pm and 9 am (and neither do the teaching interns). If I don't respond within 24 hours, please feel free to send me a polite reminder. I don't intend to be unavailable, but sometimes I get quite a lot of email and/or I simply get swamped. Reminders do not offend me.

I will respond to most of the emails regarding the course, and this is the best way to work through simple questions. Please check your email and blackboard several times a week. Email is one of the best ways to keep in touch with our class when we are not in class. More complex questions would likely require more time, and for these, I recommend my office hours.

Course Requirements:

Required Reading:

Frankfort-Nachmias, Chava and Leon-Guerrero, Anna (2014). *Social Statistics for a Diverse Society (7th edition)*. Pine Forge Press.

Optional Reading:

Agresti, Alan and Finlay, Barbara. 2009. *Statistical Methods for the Social Sciences (4th edition).*
(This is a classic textbook on social statistics but has not been updated for years.)

Wilcox, Rand R. (2016). *Understanding and Applying Basic Statistical Methods Using R*. Wiley Publication.
(This book includes R examples. It is available on Amazon.com.)

Attendance and Class Preparation:

Students are expected to come to class and to participate in class activities. Many topics that are possibly not covered in the reading will be dealt with in class discussions and activities. You should read the assigned reading(s) for a particular class day prior to coming to class. *If you attend class and do your work responsibly, then you will do well in this class.*

Software, Computer Use, and Data Sets:

The textbook uses SPSS to illustrate examples of data analysis. The SPSS program is available in most computer labs on campus. SPSS student version 11.0 is packaged with the textbook. See the course web page for lab locations and schedules (under External Links). SPSS is very easy to use because it relies on a "point and click" interface that allows you to use pull-down menus to select commands that you wish to perform.

However, for this class we will be using STATA, a statistical software that is more powerful than SPSS in complex statistical analyses. It was first developed by an economist, so has been very popular in social sciences. The software is available on many public computers in the UChicago network. For those who wish to purchase it, student version of Stata/IC are available at a discount price from https://answers.uchicago.edu/page.php?id=20254#stata. Unlike SPSS, STATA requires you to enter commands, which means that you will have to memorize some commonly used commands. I will use this program to illustrate examples in class.

Access to Stata will be through the UChicago VLab or any on campus labs:
http://academictech.uchicago.edu/vlab

a. Access online student software lab, Guide:
   https://answers.uchicago.edu/page.php?id=33269
b. Remote Desktop Access – How to Connect:
   https://answers.uchicago.edu/page.php?id=16726

Another statistical program that I recommend is called R, which is a free software for statistical computing (https://www.r-project.org/). It is more flexible and powerful than SPSS and STATA. It

is the most widely used statistical software among statisticians, and has become very popular among social scientists in recent years.

You are welcome to use whatever statistical analysis software they like.

You can find helpful resources that help you learn these statistical softwares from the following links:

STATA:

UCLA ATS Statistical Computing: http://www.ats.ucla.edu/stat/stata
UW Social Science Computing Cooperative: http://www.ssc.wisc.edu/sscc/pubs/stat.htm

We will use the data sets that I have uploaded to the course's Chalk site. Most of the datasets are extracted from the General Social Survey (GSS). The National Opinion Research Center (NORC) website provides the compete GSS data and codebook. You can download them from http://www.norc.org/Research/Projects/Pages/generalsocial-survey.aspx.

Assignments and Quizzes

Homework:

There are homework assignments due approximately every 1 ½ to 2 weeks. Most of these assignments involve computing statistics and interpreting those statistics. The assignments also involve some hand calculation.

In-Class assignments:

There are many class sessions in which students are expected to complete an in-class activity. Often these activities are completed in a group, but each student is responsible for completing his/her activity and turning it in.

Pop Quizzes:

I will administer pop quizzes randomly throughout the course. The quizzes will cover information from the readings, material presented in class, and information arising from class discussions and activities.

The quizzes are administered at the beginning of the class period and take approximately five to ten minutes. If you come to class late after a quiz has been administered you are not allowed to take that quiz.

Research Paper:

You will develop a research paper during the quarter. Instead of just memorizing methodological concepts and techniques, you should be able to apply them to an actual research project. The paper should include the objective of the research, a short literature review and one or two hypotheses,

variables for study, and measurement. During the latter part of the quarter, you will have to conduct data analyses to test your hypothesis or support your argument. I highly encourage you to utilize one module of General Social Surveys (GSS) rather than collecting your own data for this research paper (as you may not have enough time to collect new data). If you decide to use data other than GSS, you need to first speak with me and discuss your research question.

You are expected to deliver a short 5 min presentation during the last class. With your presentation, you will receive several comments for your projects. We (instructor and TAs) will let you know which comments you should seriously consider. You will also have to respond to our comments in your final revision. The final version of the paper will be graded based on how seriously and persuasively you respond to these comments. You should submit the final version of your paper no later than **5 pm**, **March 16**.

Grading

Grading will not be on a curve. You can access your personal grades on the course web page as we move along in the course (under Tools in Blackboard). Your final course grade will be figured according to the following cutoffs:

Class Participation: 10%
Please come to class prepared to participate particularly during class discussions and group work. You are expected to have finished the reading prior to the class meeting.
Pop-up Quizzes and Discussion Assignment: 15%
Homework Assignments: 60%
Research Paper: 15%

A = 94 – 100	C = 73 – 76
A- = 90 – 93	C- = 70 – 72
B+ = 87 – 89	D+ = 67 – 69
B = 83 – 86	D = 63 – 66
B- = 80 – 82	D- = 60 – 62
C+ = 77 – 79	F = 59 and Below

Tentative Course Outline

Week 1

Tuesday – January 3th- Welcome & Introduction

Learning Objectives:

1. Overview of the course
2. Why statistics is amazing/fun/a useful tool
3. An introduction to the research process and quantitative data
4. What empirical research is
5. To identify "variables" including independent and dependent variables
6. To identify the *level of measurement* of variables
7. How to "operationalize" concepts using variables
8. About the visual presentation of data in graphs and figures, including appropriate use and interpretation of pie charts, histograms, and bar charts
9. The importance of validity and reliability when using variables to measure concepts

Suggested Reading: Chapter 1

Thursday – January 5th- Organization of Information

Learning Objectives:

1. How to organize data so that we can summarize results and identify trends
2. What frequency tables are and how to understand them
3. What proportions, percentages and ratios are and how to calculate them
4. Further information regarding charts

Readings: Chapters 2 & 3

Thursday – January 5th Introduction to Statistical Softwares 1 (Mausolf)

Lab session: Introduction to STATA and R
Venue: TBA

Week 2

Tuesday – January 10th – Measures of Central Tendency

Learning Objectives:

1. What is a measure of central tendency and what do they tell us about data
2. How to compute mean, median and mode
3. The appropriate measure of central tendency for variables with different levels of measurement
4. The difference between raw data and grouped data

Assignments Due: Math Review Assignment

Readings: Chapter 4

Tuesday – January 10th Introduction to Statistical Softwares 1 (Jackson)

Lab session: Introduction to STATA and R
Venue: TBA

Thursday – January 12th- Measures of Central Tendency continued

Learning Objectives:
1. Introduce Stata, a powerful tool for analyzing data
2. Learn to open data and calculate measures of central tendency using Stata

Readings: None (continue with Chapter 4)

Thursday – January 12th- Introduction to Statistical Softwares 2 (Mausolf)

Lab session: STATA and R Basics
Time & Venue: TBA

Week 3

Tuesday – January 17th - Measures of Variability

Learning Objectives:
1. To understand and calculate the range, interquartile range, standard deviation and variance
2. To gain more familiarity with histograms (they are very important!)
3. To understand box plots

Readings: Chapter 5

Tuesday – January 17th- Introduction to Statistical Softwares 2 (Jackson)

Lab session: STATA and R Basics
Time & Venue: TBA

Thursday – January 19th- Measures of Variability continued

Learning Objectives:
1. Learn to calculate measures of variability in Stata

Readings: None (continue with Chapter 5)

Week 4

Tuesday – January 24th – The Normal Distribution

Learning Objectives:

1. Learn about the Normal Distribution
2. Introduce standard (z) scores, the Standard Normal Distribution and the Standard normal Table
3. Learn to use z-scores to calculate the probability of events

Assignment Due: HW Assignment 1 due Before Class

Readings: Chapter 6

Thursday – January 26th – Sampling and Sampling Distributions

Learning Objectives:

1. What is a random sample? Is it "better" than a nonrandom sample?
2. Discuss the relations between samples and populations
3. Introduce the all-important Sampling Distribution of the Mean and the Central Limit Theorem
4. Learn to calculate and use the standard error of the mean

Readings: Chapter 7

Week 5

Tuesday – January 31 – Estimation

Learning Objectives:

1. Statistics gets powerful: Learn to use sample statistics to estimate population parameters
2. Learn to calculate confidence intervals for means and proportions

Readings: Chapter 8

Thursday – February 2 – Estimation continued

Learning Objectives:

1. Continue working with data in Stata

Readings: None (continue with Chapter 8)

Week 6

Tuesday – February 7th – Testing Hypotheses

Learning Objectives:

1. Learn the assumptions and procedures of statistical hypothesis testing
2. Learn to state the Research (H1) and Null Hypothesis (H0)
3. Discuss the potential errors in hypothesis testing

Reading: Chapter 9

Thursday – February 9th – Testing Hypotheses continued

Learning Objectives:

1. Learn to test hypotheses with data in Stata

Readings: None (continue with Chapter 9)

Week 7

Tuesday – February 14th - Bivariate Tables (Crosstabs!)

Learning Objectives:

1. How to determine the relationship between two categorical variables
2. How to interpret crosstabulation tables (known as "crosstabs")
3. How to calculate and use row percents and column percents
4. How to calculate a chi-square test statistic

Reading: Chapter 10

Assignment Due: HW Assignment 2 due Before Class

Thursday – February 16th- The Elaboration Model

Learning Objectives:

1. Introduction to multivariate data analysis
2. How to introduce a third variable into crosstabulations
3. How to use Chi-Square tests with three variable crosstabs
4. Use Stata to create three variable crosstabs

Week 8

Tuesday – February 21th- Simple Linear Regression

Learning Objectives:

1. Learn to interpret and calculate Pearson's r (Correlations)
2. Learn to interpret scatterplots
3. Learn to interpret regression models

Readings: Chapter 13 (may include other materials as well).

Tuesday – February 21th- Regression Lab 1 (Jackson)

Lab session: Building Regression Models using STATA and R
Time & Venue: TBA

Thursday – February 23th- Simple Linear Regression

Learning Objectives:

1. Analysis of Variance
2. Ordinary Least Square
3. Gauss-Markov Assumptions

Thursday – February 23th- Regression Lab 1 (Mausolf)

Lab session: Building Regression Models using STATA and R
Time & Venue: TBA

Week 9

Tuesday – February 28th- Multiple Linear Regression

Learning Objectives:

1. Model fit
2. Graphical representation of results
3. Interaction

Due: HW Assignment 3 due

Readings: Electronic chapter

Tuesday – February 28th- Regression Lab 2 (Jackson)

Lab session: Regression Diagnostics using STATA and R
Time & Venue: TBA

Thursday – March 2nd – Multiple Linear Regression (cont'd)

Learning Objectives:

1. Regression diagnostics

Readings: None.

Thursday – March 2nd- Regression Lab 2 (Mausolf)

Lab session: Regression Diagnostics using STATA and R
Time & Venue: TBA

Week 10

Tuesday – March 7 – (Last Class!)

1. Lightening Presentations

   Lightening talks are designed to be short presentations capped at five minutes. The goal is to present a topic in a quick, concise, and efficient manner. Students need to prepare several slides and convey key information in their research paper including at least research question, data and variables, hypothesis, and results.

Due: HW Assignment 4 due

Thursday – March 9 – (No class; reading period)

Exam Week

Thursday – March 16

Due: Research paper