SOCY 580: Introduction to Methods in Quantitative Sociology, Fall 2019

Instructor: Emma Zang (emma.zang@yale.edu)
Day/Time: Tuesday 1:30-3:20 pm
Location: Watson Center A38
Lab Session Day/Time: Tuesday 3:30-4:20 pm
Lab Session Location: Watson Center A38
Office Hours: Monday 3-5pm or by appointment.
Teaching Assistant: Esther Chan (esther.chan@yale.edu)

Overview:
This course is designed for first-year graduate students in sociology. After taking this course, students will be familiar with basic mathematical and statistical concepts and be able to conduct elementary data analyses using linear regressions. In addition to teaching students to understand statistics and deal with data appropriately, this course also prepares students to explain and present their analyses and results to the general public. There is no pre-requisite for this course, but all students are encouraged to take the Math Workshop for Incoming Sociology Graduate Students offered in the summer.

Objectives:
- Understand probability.
- Explain statistical concepts: population, sample, sampling distribution, random variable, the Central Limit Theorem, correlation, and causation.
- Effectively display descriptive statistics and provide appropriate interpretation of the results.
- Conduct hypothesis testing (z tests, t tests, chi-square tests) and provide appropriate interpretation of the results.
- Apply linear regression analysis to solve real life problems.
- Grasp sufficient knowledge of using the statistical software Stata.

Graduate Course Requirement:
This course is the first of a year-long series that first year doctoral students must complete in sociology. Intermediate Methods in Quantitative Sociology is offered in the spring and fulfills the second half the quantitative methods requirement.

Undergraduate Enrollment:
Advanced undergraduate and masters students are welcome to take this course under the instructor's permission.

Required Materials:
Diez, D. M., Barr, C. D., & Cetinkaya-Rundel, M. (2012). *OpenIntro statistics*.

Minneapolis: Open Textbook Library. (Free download link: https://drive.google.com/file/d/0B-DHaDEbiOGkc1RycUtIcUtIelE/view).

Wooldridge, J. M. (2012). *Introductory Econometrics: A Modern Approach (5th Edition)*. Ontario: Nelson Education.

Other readings (such as research papers) will be uploaded to the course website when needed.

Recommended Readings:
Agresti, A., & Finlay, B. (2018). *Statistical Methods for the Social Sciences (5th Edition)*. London: Pearson.

Angrist, Joshua D. and Jörn-Steffen Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist's Companion.* Princeton: Princeton University Press.

Kieran Healy. 2019. *Data Visualization*. Princeton University Press.

Required Statistical Software:
Stata version 15/16 (earlier versions are fine). Stata is a statistical data analysis program. You have several options for acquiring it. You can purchase a student version at a discounted price for your own computer (https://www.stata.com/order/new/edu/gradplans/). I would recommend either Stata/SE or Stata/IC, but do not recommend Small Stata because it cannot sufficiently handle most of the datasets we will use because of stringent size restrictions. Alternatively, you can access the program for free at the Social Science Statistical Laboratory (StatLab), which is located on Science Hill. For more information about the Stat Lab, see: http://statlab.stat.yale.edu/.

Course Requirements:
- **In-class quizzes.** There is an in-class quiz at the beginning of every class. There are 10 points total for each quiz. The purpose of the quiz is to assess whether students have read the assigned background materials. As long as students submit the in-class quiz, they will obtain at least 5 points.
- **Problem sets.** There are three problem sets. Students are encouraged to work in groups but each student must submit their problem set answers independently.
- **Take-home exams.** Each student is required to finish a take-home exam independently within a given exam period. Communications with other students on exam questions are NOT allowed.
- **Replication project.** In this project, each student will find a published article of their interest, preferably but not necessarily related to one of the topics covered during the semester. The task is to replicate that article. Replication means obtaining the original data the author(s) used, reconstructing the sample(s) the

author(s) used for statistical/regression analysis, repeating the main results the author(s) obtained, performing some robustness/sensitivity tests the author(s) conducted (for example, those tests only mentioned in the article text but not shown in the tables—typically for space concerns), and (encouraged but not required) even doing some updating or extension work if the article has limitations or room for improvement. Students are NOT allowed to use the data extract and codes accompanying the article that can be downloaded from some journals' websites. Each student is required to discuss the replication paper with the instructor in advance and submit a final replication report.

- **No late submission is accepted.**

Course Assessment:
See the table below for grade allocation and cut-points:

Grade Allocation		Cut-points for Final Grades	
Item	% of Final Grade	Final grade	% Point Range
In-class quizzes	10%	A+	95-100
Problem sets	30%	A	90-94
Take-home exams	30%	A-	85-89
Replication project	30%	B+	80-84
		B	75-79
		B-	70-74
		C+	65-69
		C	60-64
		F	0-59

Class Participation:
I expect you to participate actively in this course. As you likely already know, the best way to learn is to be directly involved in making meaning out of the knowledge with which we're wrestling. Not only do I welcome your comments, thoughts, questions, and challenges – I expect them. From my perspective, active participation means that you come prepared to be intellectually curious, emotionally and cognitively present, and ready to engage in our class and its community.

Academic Integrity:
Plagiarism and other forms of academic dishonesty are unacceptable and be handled according to university guidelines. The instructor will strictly adhere to university regulations concerning academic integrity, and shall report all suspected violations of the policy (including suspicion of plagiarism and/or cheating). Familiarize yourself with the university's policy on academic integrity which can be found at: http://yalecollege.yale.edu/content/cheating-plagiarismand-documentation.

Disability Statement:

Students with disabilities that may affect their ability to participate fully in the class or to complete all course requirements are encouraged to bring this to the instructor's attention promptly so that appropriate accommodations can be made. Please also see the website of Yale Resource Office on Disabilities for more information (https://rod.yale.edu/student-information).

Preferred Contact:
Please do not hesitate to contact the instructor via email with any questions or comments. Expect a response within two business days of email delivery.

Course Schedule:

Date	Topics	Readings	Lab Topics	Assignments
Sep 3	Overview of the course & The research process & Types of data & Data collection	OIS Chapter 1.2-1.5 (p.7 - p. 26); Wooldridge Chapter 1 (p.1 – p.17)	Handout 1	Beginning of semester survey; Problem set 1 open
Sep 10	Summarizing data	OIS Chapter 1.6-1.7 (p.26 - p. 50)	Handout 1	
Sep 17	Probability I	OIS Chapter 2.1 - 2.3 (p.76 - p. 103)	Handout 2	
Sep 24	Probability II	OIS Chapter 2.4 - 2.5 (p.104 - p. 115)	Handout 2	
Oct 1	Distributions of random variables	OIS Chapter 3.1 - 3.5 (p.127 - p. 152)	Handout 3	Problem set 1 due
Oct 8	Introduction to inference I	OIS Chapter 4.1 - 4.3 (p.169 - p. 194)	Handout 3	Midterm survey; Problem Set 2 open
Oct 15	Introduction to inference II	OIS Chapter 4.4 - 4.5 (p.194 - p. 202)	Handout 3	Discuss replication project with the instructor
Oct 22	Hypothesis testing I	OIS Chapter 5.1 - 5.5 (p.219 - p. 256)	Handout 4	
Oct 29	Hypothesis testing II	OIS Chapter 6.1-6.4 (p.274 - p. 302)	Handout 4	
Nov 5	Linear regression I	OIS Chapter 7.1-7.4 (p.331 - p. 355); Wooldridge Chapter 2 (p. 20- p. 57)	Handout 5	Problem Set 2 due; Problem set 3 open
Nov 12	Linear regression II	OIS Chapter 8.1-8.3 (p.372 - p. 385); Wooldridge Chapter 3 (p. 65- p. 101)	Handout 6	
Nov 19	Linear regression III	Wooldridge Chapter 4-6 (p. 110- p. 209)	Handout 7	
Nov 26	No Class			Problem set 3 due; Take-home exam open

Dec 3	Presentation			
Dec 10	No Class			Take-home exam due
Dec 17	End of semester			Replication project report due