SOCY 581: Intermediate Methods in Quantitative Sociology, Spring 2020

Instructor: Emma Zang (emma.zang@yale.edu)
Day/Time: Tuesday 1:30-3:20 pm
Location: Watson Center, Room B35
Lab Session Day/Time: Tuesday 3:30-4:20 pm
Lab Session Location: TBD
Office Hours: Monday 3-5pm or by appointment.
Teaching Assistant: Thomas Lyttelton (thomas.lyttelton@yale.edu)
TA Office Hours: TBD

Overview:
This course is designed for first-year graduate students in sociology. After taking this course, students will be familiar with statistical techniques in handling continuous, categorical, count dependent variables as well as data with cross-sectional and panel structure. In addition to teaching students to deal with data appropriately, this course also prepares students to explain and present their analyses and results to the general public. Students are required to take SOCY 580 or equivalent before enrolling in this course.

Objectives:
- Develop a good taste in research
- Learn how to design and conduct an advanced statistical analysis that should be used when the identification assumptions of the OLS method are violated.
- Gain hands-on experience of writing a research paper that aims to be publishable in an academic journal.
- Use Stata effectively for analyzing socioeconomic data and presenting outcomes in a reader friendly way.

Graduate Course Requirement:
This course is the second of a year-long series that first year doctoral students must complete in sociology. Introduction to Methods in Quantitative Sociology is offered in the fall and fulfills the first 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:
Wooldridge, J. M. (2012). *Introductory Econometrics: A Modern Approach (5ᵗʰ Edition)*. Ontario: Nelson Education.

Angrist, Joshua D. and Jörn-Steffen Pischke. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion.* Princeton: Princeton University Press.

Powers, D., & Xie, Y. (1999). *Statistical Methods for Categorical Data Analysis*. Emerald Group Publishing.

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.

Eliason, S. R. (1993). *Maximum Likelihood Estimation: Logic and Practice* (No. 96). Sage.

Scott J. Long 1997. Regression Models for Categorical and Limited Dependent Variables Sage Publication

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 data sets 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:
- **Problem sets.** There are three problem sets. Students are encouraged to work in groups but each student must submit their problem set answers independently.
- **Writing assignments.** Each week, the instructor will post a required reading, typically an ASR/AJS article. Each student is required to submit a short discussion note for this article. In this note, students should 1) provide a brief summary (at most 5 sentences per paper), 2) discuss why the paper is considered a contribution, 3) identify at least one limitation the paper (e.g. mismatch between theory and empirical test, poor measure of key variable, problematic interpretation of a key empirical result), 4) suggest at least one avenue for future research (e.g. alternative theoretical explanation for the main empirical result, alternative way to empirically test the theory). The discussion note should be approximately a half page of writing per paper. The discussion note is graded using a 0 (note absent) - 4 (excellent) scale.

- **Referee report.** Each student is required to write a referee report on an assigned academic article. The referee report should briefly summarize the paper (less than half a page), evaluate the paper's contribution (or lack thereof), and evaluate the methods used to answer the paper's main research questions. This evaluation may discuss any theoretical model or conceptual framework, data, empirical methods, or interpretation of results.
- **Final project.** Each student is required to pursue a semester-long project. For the project, students are required to choose a topic of their own interest, find appropriate data to address their questions, conduct data analyses that are covered by this course, write a final report of their analyses and findings, and present their work at the end of the semester. The final report is expected to be no more than 60 pages (including figures, tables and references). The final presentation is expected to be 20 minutes per individual.
- **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 (undergraduate)	Final grade (graduate)	% Point Range
Problem sets	30%	A+	Honors	95-100
Writing assignments	15%	A	Honors	90-94
Referee report	15%	A-	High Pass	85-89
Final project	40%	B+	High Pass	80-84
		B	Pass	75-79
		B-	Pass	70-74
		C+	Fail	65-69
		C	Fail	60-64
		F	Fail	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	Assignments
Jan 14	Overview of the course & Review of linear regression	Wooldridge Chapter 19 (p.650 – p. 668) Wooldridge Chapter Appendix A	Writing assignment 1 due
Jan 21	Maximum likelihood estimation	Myung, I. J. (2003). Tutorial on Maximum Likelihood Estimation. Journal of Mathematical Psychology, 47(1), 90-100.	Problem set 1 open; Writing assignment 2 due
Jan 28	Inference for proportions & Logistic regression	Powers Chapter 3 (p.41 - p.85)	Writing assignment 3 due; Referee paper assigned; Finalize the topic and data for final project
Feb 4	Probit regression & Interpreting non-linear interactions	Mize, T. D. (2019). Best practices for estimating, interpreting, and presenting nonlinear interaction effects. Sociological Science, 6, 81-117. Mustillo, S. A., Lizardo, O. A., & McVeigh, R. M. (2018). Editors' comment: A few guidelines for quantitative submissions.	Writing assignment 4 due
Feb 11	Event history analysis & Models for rates	Powers Chapter 5.1-5.4 (p.147 - p.174) Allison, P. D. (1982). Discrete-time methods for the analysis of event histories. Sociological Methodology, 13, 61-98.	Writing assignment 5 due

Feb 18	Ordinal logistic regression & Multinomial logistic regression	Powers Chapter 6-7 (p. 201 – p. 252)	Problem set 1 due; Problem set 2 open; Writing assignment 6 due
Feb 25	Introduction to causal inference	Sobel, M. E. (1996). An Introduction to Causal Inference. Sociological Methods & Research, 24(3), 353-379. Gangl, M. (2010). Causal Inference in Sociological research. Annual Review of Sociology, 36. Hedström, P., & Ylikoski, P. (2010). Causal Mechanisms in the Social Sciences. Annual Review of Sociology, 36, 49-67.	Writing assignment 7 due; Finish data cleaning for the final project; Midterm-survey due
Mar 3	Randomized experiment	Angrist Chapter 1-3 (p.1 – p. 110) Quadlin, N. (2018). The Mark of a Woman's Record: Gender and Academic Performance in Hiring. American Sociological Review, 83(2), 331-360. Pager, D., Bonikowski, B., & Western, B. (2009). Discrimination in a Low-Wage Labor Market: A Field Experiment. American Sociological Review, 74(5), 777-799.	Writing assignment 8 due

		Pager, D. (2003). The Mark of a Criminal Record. American Journal of Sociology, 108(5), 937-975.	
Mar 10	No class (Spring break)		
Mar 17	No class (Spring break)		Problem set 2 due; Problem set 3 open; Submit final project extended abstract
Mar 24	First differences model & Fixed effects model	Wooldridge Chapter 13.3-14.1 (p.443 – p.473); Angrist Chapter 5.1, 5.3 (p.221 – p. 226; p.243-p.245); Powers Chapter 5.5.1 (p.177 - p.182)	Referee report due; Writing assignment 9 due
Mar 31	Difference in Differences	Angrist Chapter 5.2 (p.227 – p. 242); Angrist Chapter 8 (p.293 – p. 323)	Writing assignment 10 due
Apr 7	Random effects model & Random coefficient model	Wooldridge Chapter 14.2-14.3 (p.474 – p.481) Powers Chapter 5.5.2 (p.183 - p.187) Halaby, C. N. (2004). Panel Models in Sociological Research: Theory into Practice. Annual Review of Sociology., 30, 507-544.	Writing assignment 11 due
Apr 14	Quantile regression	Angrist Chapter 7 (p.269 – p. 283)	Writing assignment 12 due

Apr 21	Final project presentation		Problem set 3 due
Apr 28	No class		
May 5			Final project paper due