

SOC 402: Intermediate Sociological Statistics

Syllabus, Spring 2023

Meetings 9:00 – 11:45 on Wednesdays
4133 Behavioral Sciences Building

Instructor **Mahesh Somashekhar**
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Office: 4170 Behavioral Sciences Building
Office Hours: 12:00 – 1:15 on Mondays (In-Person & Virtual)

Teaching Assistant **Mariya Khan**
Sections: AB1
OH: 10:00 – 11:00am & 1:00 – 2:00pm on Fridays (and by appt), 4111 BSB
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Course Webpage Available on Blackboard

Contact For simple questions, email is the best way to reach me or your TA. We will respond to your messages within 72 hours. For more involved questions or discussions, please use our office hours.

Course Description:

SOC 402 is the second course in the graduate statistics sequence in sociology. The course picks up where SOC 401 leaves off, reinforcing basic concepts of ordinary least squares (OLS) regression and expanding these concepts with the generalized linear model and maximum likelihood estimation to accommodate dichotomous, ordinal, nominal, and count outcomes. Additional topics will be discussed, such as strategies for analyzing longitudinal data, quasi-experimental data, and hierarchical data.

The statistical content covered across the two-course sequence is meant to provide graduate students with the grounding they need to read and produce research that uses statistical methods. Throughout the course, the emphasis is on the concepts, calculations, and interpretations most often seen and used in the scholarly literature, with attention to using the techniques wisely and avoiding common pitfalls. The course also emphasizes the importance of transparency and reproducibility, helping students write clean code and convey results succinctly but accurately.

Successful completion of this course will allow you to:

1. Define real world questions and problems in statistical terms.
2. Analyze data and solve statistical problems, both by hand and using STATA.
3. Read and write statistical analyses as presented in sociological journals.
4. Present statistical analyses as done at sociology conferences.

Course Requirements:

There are two requirements to take this course. First, one must have graduate standing. Second, one must have received a B or higher in SOC 401.

Required Equipment:

Text: There is one required textbook for the course:

Gordon, Rachel. 2022. *Applied Statistics for the Social and Health Sciences*. New York: Routledge. 2nd Ed. Note that *THIS BOOK HAS NOT YET BEEN RELEASED. WE WILL PROVIDE A COPY TO YOU BECAUSE YOU CANNOT BUY ONE.*

Throughout the semester, I will supplement this textbook with other readings that will be available on the course website.

Calculator: You will need a calculator that can add, subtract, multiply, divide, and take square roots. It is wise to bring this device to class every day because we will do many in-class activities that require them.

Assignments and Grading:

Your course grade will be based on the following:

- **Homework (49%)**

There will be 7 homework assignments throughout the semester, each worth 7 points. These homeworks will require statistical calculations, but more importantly, they will help me assess your sociological interpretation of statistical data. Each homework will be posted on the course website. All assignments are due at 11:59pm on the due date and must be turned in on the course website. Late homework assignments will be accepted up to 2 days after the due date, and 20% will be deducted from your assignment grade for each day it is late. Homework that is more than 2 days late will not be accepted. For the final grade, your lowest homework score will be dropped, and your highest score will be doubled.

- **Midterm Exam (11%)**

There will be one take-home midterm exam administered over the course of the semester. The midterm will help me gauge if students are understanding the theory and practice of generalized linear models. The exam may include a variety of question types such as multiple-choice, fill-in, and problems requiring calculation and interpretation. Questions may cover concepts, by-hand calculations, or interpreting STATA output. No late exams will be accepted, and no make-up exams will be administered except under extreme circumstances and with approval *prior to* the scheduled examination time.

- **Final Paper (30%)**

By the end of the semester, you will have the skills to conduct a wide variety of statistical analyses and interpret statistical results. You should also be able to write up your interpretation of results and convincingly connect your findings to a sociological research question. Your final paper will be a 12-page, double-spaced piece written in the style of an academic journal article that uses generalized linear models. You will use standard margins, and the 12 pages must include at least two

tables and/or figures that help establish your point. No late final papers will be accepted. You are allowed to use any cross-sectional data set from either the GSS, IPUMS, or Social Explorer, but you must use at least one generalized linear model. To help you prepare for the final paper, you will have to turn in a final paper proposal, introduction, and outline throughout the semester, on which you will receive feedback.

- **Final Presentation (10%)**

Prior to turning in your final paper, you will give a 5-minute talk about your paper to the class in the style of a conference presentation. You can incorporate the feedback you receive to help you write the final paper. You will be graded on the rigor of your sociological argument and your ability to discuss statistical analyses. Makeup presentations will only be allowed for extreme circumstances.

Academic Accommodations:

The University of Illinois at Chicago is committed to maintaining a barrier-free environment so that students with disabilities can fully access campus programs, courses, services, and activities. Students with disabilities must inform the instructor of the need for accommodations. Those who require accommodations for access and participation in this course must be registered with the Disability Resource Center. Please contact the DRC at <http://drc.uic.edu>.

Grievance Procedures:

UIC is committed to the most fundamental principles of academic freedom, equality of opportunity, and human dignity involving students and employees. Freedom from discrimination is a foundation for all decision making at UIC. Students are encouraged to study the University's "Nondiscrimination Statement". Students are also urged to read the document "Public Formal Grievance Procedures". Information on these policies and procedures is available on the University web pages of the Office of Access and Equity: <https://oae.uic.edu/>

Things You Should Do to Succeed in This Class:

This course tries to engage you in active rather than passive learning. That means it is not a standard lecture course. You will be expected to participate in activities and discussion in class. The following things will help you to succeed in this kind of course:

1. Read and study the assigned texts *before* class. This is where you will learn the content of the course.
2. Attend and participate in class and laboratory section. This is where you will learn how to use the content in the textbook as well as the skills needed to do your final paper.
3. Do homework assignments soon after class. Doing assignments soon after you have read the texts and participated in class activities will help solidify your learning and ensure better retention.
4. Most importantly, ASK QUESTIONS. If you are confused, others likely are too. You will be doing your classmates a favor, and make it easier to keep up, by asking the question early.

COVID-19 Policy:

This class is taught in-person. There is no virtual attendance option. All lectures will be recorded and posted on Blackboard immediately after being given. Attendance will not be monitored, but since you

are graduate students, it should be obvious to you that regular attendance will help you succeed in your graduate careers. Students MUST follow the rules below, or they will be asked to leave the classroom immediately:

- wear a facemask while in the classroom
- social distance whenever possible
- stay home if they have a temperature or show other symptoms of COVID-19

Class Rules:

1. Maintain a good learning environment by:
 - entering quietly and politely if you happen to arrive late
 - turning off the ringers on your cell phones and any other devices
 - avoid loud eating or talking
2. Respect your class partners by:
 - pulling your weight during in-class group assignments
 - listening carefully to other students, the TA, and the instructor.

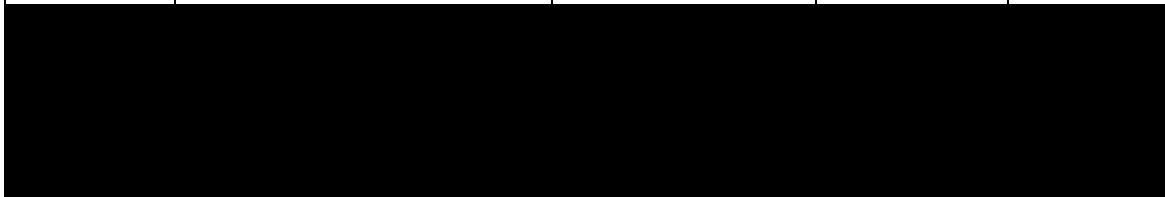
Academic Honesty:

All students are expected to do their own work on all assignments and exams. Students representing the work of others as their own or cheating in any other way will receive a zero for the assignment in question and may fail the course or be referred to the college for disciplinary action.

Schedule of Topics and Required Readings:

******Dates listed below are subject to change. Changes will be announced in class and/or the class website. All readings that do not come from the textbooks will be provided on the class website.******

Dates	Topics	Required Reading	STATA Lab	Notes
1/11 (Week 1)	COURSE INTRODUCTION REVIEW OF OLS REGRESSION	Gordon, Chs. 6 – 10	OLS Regression & Regression Diagnostics	HW1 due on 1/16
1/18 (Week 2)	THE LINEAR PROBABILITY MODEL MAXIMUM LIKELIHOOD ESTIMATION & GLMS	Gordon, Ch. 11	Linear Probability Models & OLS Using MLE	HW2 due on 1/23



1/25 (Week 3)	BINARY OUTCOMES: IDENTIFICATION AND BASIC INTERPRETATION	Gordon, Ch. 12 (part one) Auyero & Moran (2007) Von Hippel (2015)	Logistic Regression I	<i>Final Paper Proposal Due 1/30</i>
2/1 (Week 4)	BINARY OUTCOMES: INTERPRETATION USING PREDICTED PROBABILITIES AND MARGINAL EFFECTS	Gordon, Ch. 12 (part two) Armstrong et al. (2012)	Logistic Regression II	HW3 due on 2/6
2/8 (Week 5)	BINARY OUTCOMES: TESTING, FIT, AND DIAGNOSTICS	Gordon, Ch. 12 (part three) Johnson & Jacobson (2005)	Logistic Regression III	
2/15 (Week 6)	ORDINAL OUTCOMES I	Gordon, Ch. 13	Ordinal Logistic Regression I	HW4 due on 2/20
2/22 (Week 7)	ORDINAL OUTCOMES II	Chamberlain et al. (2008)	Ordinal Logistic Regression II	<i>Final Paper Introduction Due 2/27</i>
3/1 (Week 8)	NOMINAL OUTCOMES I	Gordon, Ch. 14	Multinomial Logistic Regression I	
3/8 (Week 9)	NOMINAL OUTCOMES II	Leppel (2016)	Multinomial Logistic Regression II	HW5 due on 3/13
3/15 (Week 10)	COUNT OUTCOMES I REVIEW FOR MIDTERM EXAM	Long (1997:Ch. 8)	Poisson Regression & More Midterm Review	
3/22	NO CLASS THIS WEEK		<i>No Lab This Week</i>	<i>Midterm Due 3/27</i>
3/29 (Week 11)	COUNT OUTCOMES II	Garcia et al. (2016)	Negative Binomial Regression (Virtual Lab)	HW6 due on 4/3

4/5 (Week 12)	NO CLASS THIS WEEK		<i>No Lab This Week</i>	<i>Final Paper Outline Due 4/10</i>
4/12 (Week 13)	INTRODUCTION TO ADVANCED TOPICS IN REGRESSION, AND BRINGING IT ALL TOGETHER	Blumenstock (n.d.) Sen and Wasow (2016)	Final Presentation Exercises	HW7 due on 4/17
4/19 (Week 14)	FINAL PRESENTATIONS	<i>No Reading</i>	Final Paper Exercises	
4/26	NO CLASS THIS WEEK		<i>No Lab This Week</i>	
5/1	FINAL PAPER DUE ON BLACKBOARD AT 11:59pm			