

## **SOC 503: Intermediate Sociological Statistics**

Syllabus, Spring 2024

<b>Meetings</b>	1:00 – 3:45 on Thursdays 4113 Behavioral Sciences Building
<b>Instructor</b>	<b>Mahesh Somashekhar</b> Email: msoma@uic.edu Phone: 312-996-5373 Office: 4170 Behavioral Sciences Building Office Hours (in-person and virtual): 11:45 – 1:00 on Mondays, and by appointment
<b>Teaching Assistant</b>	<b>Jessie Miller</b> Sections: AB OH (in-person and virtual): 2:00 – 4:00pm on Fridays, 4111 BSB, and by appointment Email: jmill66@uic.edu
<b>Course Webpage</b>	Available on Blackboard
<b>Contact</b>	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 503 is the second course in the graduate statistics sequence in sociology. The course picks up where SOC 502 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 sociological 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 R.
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 502.

### **Required Equipment:**

---

**Text:** Rather than use a textbook, this course relies on a combination of online resources, empirical readings, and sections from textbooks. All readings will be provided to students through the course website. Reading assignments are noted in the course schedule at the end of this syllabus.

**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 (7%)**

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 and causal inference. 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 R 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 either generalized linear models or causal inference techniques. 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 data set from either the GSS, IPUMS, or Social Explorer, and you must use either one generalized linear model or one formal causal inference

technique. 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.

- **Reading Quizzes (4%)**

On weeks when we discuss empirical readings, you will receive a short quiz in which you have to provide a one- or two-sentence answer to a question about the readings for that week. On 5 randomly selected weeks, these quizzes will be collected and graded for credit. To account for circumstances, you can miss one week when these quizzes are collected. The point of these quizzes is to ensure that you do the readings. Responses will be graded on a 1/0 scale. A "0" will be given if no quiz was submitted or the student gave a nonsensical answer. A "1" will be given if the student's response makes clear they did the readings.

#### **Academic Accommodations:**

---

UIC is committed to full inclusion and participation of people with disabilities in all aspects of university life. If you face or anticipate disability-related barriers while at UIC, please connect with the Disability Resource Center (DRC) at [drc.uic.edu](http://drc.uic.edu), via email at [drc@uic.edu](mailto:drc@uic.edu), or call (312) 413-2183 to create a plan for reasonable accommodations. To receive accommodations, you will need to disclose the disability to the DRC, complete an interactive registration process with the DRC, and provide me with a Letter of Accommodation (LOA). Upon receipt of an LOA, I will gladly work with you and the DRC to implement approved accommodations.

#### **Religious Accommodations:**

---

Following campus policy, if you wish to observe religious holidays, you must notify me by the tenth day of the semester. If the religious holiday is observed on or before the tenth day of the semester, you must notify me at least five days before you will be absent. Please submit this form by email with the subject heading: "YOUR NAME: Requesting Religious Accommodation."

#### **Pregnancy Accommodations:**

---

Following campus policy, pregnant students have rights under Title IX. To request pregnancy-related accommodations, contact the Title IX Coordinator at [titleix@uic.edu](mailto:titleix@uic.edu) or 312-996-8670.

#### **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/>

### **Name and Pronoun Use:**

---

If your name does not match the name on my class roster, please let me know as soon as possible. My pronouns are he/him. I welcome your pronouns if you would like to share them with me. For more information about pronouns, see this page: <https://www.mypronouns.org/what-and-why>.

### **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. If you have a temperature or show other symptoms of COVID-19, please stay home. Students who provide proof of a positive COVID-19 test will be given the opportunity to make up any work they missed, including flexible deadlines.

### **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 who cheat and/or represent the work of others or a large language model (such as ChatGPT) as their own 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 <b>(Week 1)</b>	COURSE INTRODUCTION  REVIEW OF OLS REGRESSION	Field, Chs. 6 & 7	OLS Review & Practice Downloading Final Paper Data	HW1 due on 1/16
1/18 <b>(Week 2)</b>	THE LINEAR PROBABILITY MODEL  MAXIMUM LIKELIHOOD ESTIMATION & GLMS	Gordon, Ch. 15  Werth, Ch. 3	Linear Probability Models & MLE Exercises	HW2 due on 1/23
1/25 <b>(Week 3)</b>	BINARY OUTCOMES: IDENTIFICATION AND BASIC INTERPRETATION	Auyero & Moran (2007)  Long, Ch. 3  Von Hippel (2015)  Werth, Ch. 5	Logistic Regression I	<i>Final Paper Proposal Due 1/30</i>
2/1 <b>(Week 4)</b>	BINARY OUTCOMES: INTERPRETATION USING PREDICTED PROBABILITIES AND MARGINAL EFFECTS	Armstrong et al. (2012)  Mood (2010)  Werth, Ch. 7	Logistic Regression II	HW3 due on 2/6
2/8 <b>(Week 5)</b>	BINARY OUTCOMES: TESTING, FIT, AND DIAGNOSTICS	Johnson & Jacobson (2005)  Long, Ch. 4  Werth, Ch. 9	Logistic Regression III	
2/15 <b>(Week 6)</b>	ORDINAL OUTCOMES I	Long, Ch. 5  Werth, Ch. 17	Ordinal Logistic Regression I	HW4 due on 2/20
2/22 <b>(Week 7)</b>	ORDINAL OUTCOMES II	Chamberlain et al. (2008)	Ordinal Logistic Regression II	<i>Final Paper Introduction Due 2/27</i>

2/29 <b>(Week 8)</b>	NOMINAL OUTCOMES	Long, Ch. 6 Leppel (2016) Werth, Ch. 15	Multinomial Logistic Regression	HW5 due on 3/5
3/7 <b>(Week 9)</b>	COUNT OUTCOMES	Garcia et al. (2016) Long, Ch. 8 Werth, Ch. 19	Poisson & Negative Binomial Regression	HW6 due on 3/12
3/14 <b>(Week 10)</b>	REVIEW FOR MIDTERM EXAM	<i>No Reading</i>	More Midterm Review	
3/21	<b>NO CLASS OR LAB THIS WEEK</b>			<i>Midterm Due 4/2</i>
3/28	<b>NO CLASS OR LAB THIS WEEK</b>			
4/4 <b>(Week 11)</b>	FIXED EFFECTS AND PANEL REGRESSION	Blumenstock (n.d.) Somashekhhar (2018)	Panel Data Exercises	<i>Final Paper Outline Due 4/9</i>
4/11 <b>(Week 13)</b>	DIFFERENCE-IN-DIFFERENCES	Flores (2017)	Diff-in-Diff Exercises	HW7 due on 4/16
4/18	<b>NO CLASS OR LAB THIS WEEK</b>			
4/25 <b>(Week 14)</b>	FINAL PRESENTATIONS	<i>No Reading</i>	Final Paper Check-Ins	
5/2	<b>FINAL PAPER DUE ON BLACKBOARD AT 11:59pm</b>			