

Political Science 270: Understanding Political Numbers

Instructor: Marcy Shieh

University of Wisconsin-Madison, Fall 2021

E-mail: mshieh2@wisc.edu

Office Hours: TR 10:30-11:30 a.m. (or by appointment)

Office: College Library (Open Book Cafe Area)

Web: canvas.wisc.edu

Class Hours: TR 08:50-09:40 a.m.

Classroom: B302 Birge Hall

TA Name: Priyadarshi Amar

TA E-mail: pamar@wisc.edu

TA Office: [Sign Up](#)

TA Office Hours: M 9:30-11:30 a.m. (or by appointment)

Course Description

Are women voters more likely to vote for women candidates? Are judges really impartial? Does the availability of public services alleviate intergroup conflict? Political scientists often ask these questions, and this course will walk students through how to address these and other social science questions by using quantitative data. In this course, you will learn some foundational skills on how to make statistical inferences and analyze data using statistical programming. The goal of this course is to ensure that you not only become proficient in understanding political data, but that you too be able to generate data-driven knowledge using the skills obtained in this course.

Learning Outcomes

By the end of this course, you will be able to conduct data analysis and interpret statistical results ranging from news polls to academic research articles. In addition, you will learn about different methods of data analysis and the pros and cons of each method. More specifically, you will be able to:

- Critically interpret quantitative research in the social sciences
- Write clean and replicable R code

These outcomes are more detailed versions of the general QR-B requirements.

Course Credit Information

Official course description: How numbers and statistics are used in electoral strategies, political debates and legal proceedings. Presents basic tools of analysis and how to use them.

This course fulfills both the political science major research methods requirement and the general education Quantitative Reasoning B requirement. Prerequisite: Quantitative Reasoning A satisfied.

This is a 3-credit course. The credit standard for this course is met by an expectation of a total of 135 hours of student engagement with the course learning activities (at least 45 hours per credit), which include regularly scheduled lectures and labs/sections, reading, writing, problem sets, and other student work as described in the syllabus. Other course designations: Breadth- Social Science, Level- Elementary, L&S Credit- Counts as Liberal Arts and Science credit in L&S.

Technology

You will need a computer for this course. If you do not have a computer, please contact me as soon as you can so we can figure out options for loaning or accessing a laptop.

Since much of this course requires the use of a laptop, laptops are allowed in lectures and section. Cell phones can be used for multi-factor authentication and other classroom activities. That said, please refrain from using social media, texting, emailing, shopping, and other activities unrelated to class.

Required Software

You will need to download the following software tools on to your computer. Fortunately, they are all free.

- **R**, a free software environment to conduct statistical analyses and create data visualizations. For those uninitiated to the world of statistical programming but has worked in an office before, R is basically a super powerful version of Microsoft Excel, but way more efficient. Download R at <https://www.r-project.org/>.
- **R Studio**, a user-friendly environment for programming in R. One way to think about this is that R is the engine, and R Studio is the car. You can use the engine without the car, but you cannot drive the car without the engine. Download RStudio Desktop (the free open source version) at <https://rstudio.com/products/rstudio/download/>.
- **LaTeX**, a software system for preparing documents. I don't envision us using LaTeX in its purest form too often, but you will need to download the software in order to compile R Markdown documents. Download LaTeX at <https://www.latex-project.org/get/>.

Required Textbook

Imai, Kosuke. *Quantitative Social Science: An Introduction*. Princeton University Press, 2018. ISBN: 9780691175461

Assignments

The capstone project for this course will be a quantitative research paper. The paper will consist of 3 components. The first component will be a one-page, single-spaced research proposal that

contains a) your research question, b) discussion as to *why* you are interested in studying this question, c) your hypotheses, d) the data set you plan to use and why you think this data set will be best for answering your question, and e) the method you plan to use and why you think that this method would be the most effective for testing your hypotheses. You will receive feedback from me, your TA, and your classmates in section. The second component will be obtaining a data set. The data set can be from an existing data repository, or you can collect an original data set that you believe will be able to best answer your question. The final paper will be a 20-paged (maximum, including tables and graphics), double-spaced write-up of your results.

You will also have 5 problem sets throughout the semester. These problem sets will require you to apply the concepts you learn in class to real questions and data sets. It is imperative that you attend sections as that is where you can ask questions on the problem sets and work on questions that are similar to the ones in the problem set. When you are doing the problem sets, please take note of the methods you can use to answer your own research question.

Section is worth 10% of your final grade. This is to encourage you to attend section so you have a space to discuss the readings and ask clarifying questions and not fall behind. Your section TA will provide a syllabus for section, but expect a large percentage of it to go towards participation. In section, your TA will respond to questions about the concepts discussed in class and in the readings and go over questions similar to the problem sets. You will also be able to form study groups and give and receive feedback on your research projects throughout the semester in section.

You must submit all assignments on Canvas. If you encounter any issues, please email me or your TA as soon as possible!

Grading

- Final research project: 50%, composed of:
 - Research proposal: 10%
 - Data set: 5%
 - Paper: 35%
- Problem sets (5): 40%
- Section: 10%

This class uses the standard UW-Madison grading scale:

A: 93-100

AB: 88-92.5

B: 83-87.5

BC: 78-82.5

C: 70-77.5

D: 60-69.5

F: 0-59.5 (please avoid this)

Mask Policy

From <https://covidresponse.wisc.edu/>: *All students, employees and visitors to campus will be required to wear masks when inside campus buildings except when actively eating or drinking. Exceptions to this order will be determined on an individualized basis, considering reasonable accommodations due to*

a documented medical condition. The UW-Madison Police Department is authorized to enforce this order. Violations are subject to citation and fine under UWS Chapter 18.11(7)(e).

Academic Integrity

Academic integrity is important to the University of Wisconsin–Madison. As such, please do not plagiarize, use unauthorized materials or fabricated data, tamper with another student’s work, or assist any students in these acts. If you collaborated with your colleagues (i.e., worked on the assignment together), do not copy and paste their code and pass them as your own. To keep yourself honest, you may also link to the website(s) or forum post(s) that helped you to the answer. Type out the code and credit them for their help. Explain the code in ways that you understand and can reference in the future. If you fail to follow best practices, you can face disciplinary action, which includes failing the assignment, failing the course, or facing other disciplinary action by the department or the university. I will report substantial or repeated cases of misconduct to the Office of Student Conduct & Community Standards for further review. Refer to <https://conduct.students.wisc.edu/misconduct/academic-integrity/> for more information.

Diversity & Inclusion

From diversity.wisc.edu: *Diversity is a source of strength, creativity, and innovation for UW–Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin–Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background — people who as students, faculty, and staff serve Wisconsin and the world.*

Accommodations

From <https://mcburney.wisc.edu/instructor/>: *The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. I will work either directly with the student you or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student’s educational record, is confidential and protected under FERPA.*

If you observe any religious holidays, please let me know as soon as possible and we can discuss accommodations.

Sudden life circumstances can certainly impact class performance. There are various resources on campus to help you navigate difficult times, such as the [Dean of Students Office](#) and the [Division of Student Life](#).

Please let me know as soon as possible if you require any accommodations, including anything that I did not mention.

Resources

At some point, you might get stuck, as we all do. But have no fear! Not only will this class allow you to make mistakes, you will have me, your TA, and your fellow colleagues as resources. And, since computing tools are so ubiquitous in academic and professional circles, it is very likely that someone asked your exact question on an Internet forum. With any luck, someone may have even answered the question!

1. **Class Attendance** Attendance to lectures is not required but strongly recommended. If you cannot attend a lecture, please ask a fellow classmate for notes. I will upload the relevant materials on to the course website. You are, however, expected to attend discussion sections, but I will leave it to the TA to determine how attendance and participation will influence your overall section grade. In general, both your TA and I encourage you to **stay at home if you are feeling sick**.
2. **Class Materials** I strongly recommend that you reference the class materials first. Rarely would I include a question in an assignment that you will be unable to solve by applying concepts that we went over in lecture. The answer keys will reference the section where the concept is discussed in case you want to go back to the exact section and review the concept. All readings will be posted on Canvas. If I link to a news article, I will make sure there is a copy on Canvas in case of the paywall.
3. **Collaboration** I highly encourage that students collaborate with each other on weekly assignments. You can either collaborate in study groups or on the Canvas discussion board. For effective collaboration, I recommend doing the exercises on your own, identifying the questions you need help on, then showing up to a collaborative space with what you know and what you don't know. Collaboration *does* mean seeking help from each other, but it *does not* mean copying and pasting text and code written by someone else and passing it off as your own. If you do use your colleague's code, as one often does when they learn coding, type out the code yourself, change the variable names to a word that means something to you, and make sure to *credit* your colleague for their work. If you have some experience with coding or feel comfortable with the material, please consider assisting your colleagues. Sharing knowledge is as rewarding as gaining knowledge, but hoarding knowledge is not rewarding at all.
4. **Email** If your question is of a personal nature and is specific to you and only you, please email me. Expect me to respond within 24 hours and if I do not, please feel free to email me again. You will *not* be annoying me.
5. **Google (or your preferred search engine)** There are *tons* of online resources about R. You will start to notice that your search results will often yield either posts from Stack Overflow and Stack Exchange. Use them. Much of Googling in R to achieve required results is learning how to refer to certain commands. You learn as you go. Sometimes the Stack Overflow and Stack Exchange communities can get a bit abrasive (in my experience). I recommend the [R Studio Community](#) if you do actually want to ask a question because you can't find an answer to it anywhere. I love Googling and I have spent many hours going down on various R-related Googling rabbit holes late into the night. I don't recommend this. While it has helped me learn *how* to Google, there comes a point (it's the 5-hour mark for me, but it might be the 2-hour mark for you) where you should ask for help.
6. **Office Hours** Please do not hesitate to attend office hours if you want to discuss anything

about the class at all. If my office hours conflict with your schedule, I am happy to meet by appointment in-person or on Zoom.

Class Schedule

Some dates are subject to change, but the final paper date will not change. Please check Canvas and your email inbox regularly for updates.

WEEK 1: INTRODUCTION

September 9

- Install R, R Studio, and LaTeX
 - Sign up for an RStudio Cloud account
1. Textbook: Chapter 1 (Introduction)
 2. [“For Today’s Graduate, Just One Word: Statistics” \(New York Times\)](#)
 3. Brainstorm research questions related to the social sciences that you would like to explore this semester.

WEEK 2: CAUSALITY

September 14

1. Textbook: Chapter 2.1 (Racial Discrimination in the Labor Market), Chapter 2.2 (Subsetting the Data in R), Chapter 2.6 (Descriptive Statistics)

September 16

1. Textbook: Chapter 2.3 (Causal Effects and the Counterfactuals)
2. [What Coronavirus Researchers Can Learn From Economists \(New York Times\)](#)

WEEK 3: CAUSALITY (continued)

September 21

1. Textbook: Chapter 2.4 (Randomized Controlled Trials)

September 23

1. Textbook: Chapter 2.4 (Randomized Controlled Trials)

WEEK 4: CAUSALITY (continued)

September 28

1. Textbook: Chapter 2.5 (Observational Studies)
2. [American National Elections Survey Guide \(ANES\)](#)

September 30

1. Textbook: Chapter 2.5 (Observational Studies)

Problem Set 1 (Chapter 2.8.2 Changing Minds on Gay Marriage) due Monday, October 4 at 11:59 PM

WEEK 5: MEASUREMENT

October 5

1. Textbook: Chapters 3.1 (Measuring Civilian Victimization during Wartime), 3.2 (Handling Missing Data in R)

October 7

1. Textbook: Chapter 3.4 (Survey Sampling), Chapter 3.5 (Measuring Political Polarization)

WEEK 6: MEASUREMENT (continued)

October 12

1. Textbook: Chapter 3.7 (Clustering)

October 14

1. Textbook: Chapter 3.3 (Visualizing the Univariate Distribution), Chapter 3.6 (Summarizing Bivariate Relationships)
2. Kastle, Jonathan P., and Eduardo L. Leoni. "Using graphs instead of tables in political science." *Perspectives on Politics* 5, no. 4 (2007): 755-771.
3. King, Gary, Michael Tomz, and Jason Wittenberg. "Making the most of statistical analyses: Improving interpretation and presentation." *American Journal of Political Science* (2000): 347-361.

Problem Set 2 (Chapter 3.9.1 Changing Minds on Gay Marriage: Revisited) due Monday, October 18 at 11:59 PM

WEEK 7: PREDICTION

October 19

1. Textbook: Chapter 4.1 (Predicting Election Outcomes)
2. LaCour, Michael J., and Donald P. Green. "When contact changes minds: An experiment on transmission of support for gay equality." *Science* 346, no. 6215 (2014): 1366-1369.

October 21: Prediction (continued)

1. Chapter 4.2 (Linear Regression)
2. "How a Gay-Marriage Study Went Wrong" (*The New Yorker*)
3. "How Two Grad Students Uncovered An Apparent Fraud – And A Way to Change Opinions on Transgender Rights" (*Five Thirty Eight*)

Research proposal due on Monday, October 25 at 11:59 PM

WEEK 8: PREDICTION (continued)

October 26

1. Chapter 4.3 (Regression and Causation)

October 28

1. Chapter 4.3 (Regression and Causation)

Problem Set 3 (Chapter 4.5.2 Election and Conditional Cash Transfer Program in Mexico) due Monday, November 1 at 11:59 PM

WEEK 9: PROBABILITY

November 2

1. Textbook: Chapter 6.1 (Probability), Chapter 6.2 (Conditional Probability)
2. [Watch scene from Moneyball](#)

November 4

1. Textbook: Chapter 6.3 (Random Variables and Probability Distributions), Chapter 6.4 (Large Sample Theorems)

Problem Set 4 (Chapter 6.6.3 Election Fraud in Russia) due Monday, November 8 at 11:59 PM

WEEK 10: UNCERTAINTY

November 9

1. Textbook: Chapter 7.1 (Estimation)

November 11

1. Textbook: Chapter 7.1 (Estimation)
2. [Watch Law of Large Numbers - Explained and Visualized](#)

Data set (or plan for data collection) due on Friday, November 12 at 11:59 PM

WEEK 11: UNCERTAINTY (continued)

November 16

1. Textbook: Chapter 7.2 (Hypothesis Testing)

November 18

1. Textbook: Chapter 7.2 (Hypothesis Testing)

WEEK 12: UNCERTAINTY (continued)

November 23

1. Textbook: Chapter 7.3 (Linear Regression Model with Uncertainty)

Problem Set 5 (Chapter 7.5.3 The 1932 German Election in the Weimar Republic) due Wednesday, November 24 at 11:59 PM

November 25

Thanksgiving - No class

November 30: Tidyverse

December 2: Tidyverse (continued)

Tidyverse resources

- R for Data Science (<https://r4ds.had.co.nz/>)
- RStudio Primers (<https://rstudio.cloud/learn/primers>)

WEEK 13: DISCOVERY

December 7: Text as Data

1. Textbook: Chapter 5.1 (Textual Data)
2. Wilkerson, John, and Andreu Casas. "Large-scale computerized text analysis in political science: Opportunities and challenges." *Annual Review of Political Science* 20 (2017): 529-544.

December 9: Network Analysis

1. Textbook: 5.2 (Network Data)
2. Ward, Michael D., Katherine Stovel, and Audrey Sacks. "Network analysis and political science." *Annual Review of Political Science* 14 (2011): 245-264.
3. Box-Steffensmeier, Janet M., Dino P. Christenson, and Matthew P. Hitt. "Quality over quantity: Amici influence and judicial decision making." *American Political Science Review* 107, no. 3 (2013): 446-460.

WEEK 14: WRAP-UP

December 14: Replication

1. Harvard Dataverse: <https://dataverse.harvard.edu/>

Research paper due on Wednesday, December 22 at 11:59 PM