POLS 2000 Methods in Political Science

Tue/Thu: 11:00 AM–12:15 PM, Room: MCG118L
Thu: 4:15–7:00 PM, Room: MCG118L
Department of Political Science
Saint Louis University

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Instructor

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Course Description

This is an introductory course on political science research design. Students will assess how research questions are posed, learn how to apply the scientific method to the study of politics, explore issues of measurement, and investigate the virtues of quantitative and qualitative methods. Theoretical and ethical concerns will guide our inquiries into empirical methods. Students will learn to use statistical software and analyze data as they hone their skills regarding research design.

Course Objectives

By the end of this course, you will:

- Apply the scientific method to questions about politics
- Identify the limitations of statistics presented in the media and communicate those limitations effectively to a non-specialist audience
- Evaluate the claims, strengths, and weaknesses of evidence in contemporary social science research
- Interpret and evaluate evidence presented in political science research

The lab portion of the class has additional objectives:

- Apply appropriate methodological tools to describe empirical evidence
- Use statistical methods appropriately to draw inferences about politics

Statistical Tool

This course adopts `R` as the statistical tool for this class. `R` is an open-source statistical software developed by statisticians. It is one of the most popular statistical tools in both academia and the business world. There are platforms that make `R` easier to use. These platforms are called Integrated Developing Environment (IDE). IDEs have a battery of features important to developers, including coding style, package management, debugging, etc. This course adopts RStudio, which is probably the most popular IDE for `R`. Not long ago, the RStudio company changed its name to *Posit*. Despite the name change, we will still refer to it as RStudio for simplicity.

Whereas a desktop version of RStudio is available for different operating systems, we will be using RStudio Cloud, or *Posit Cloud*, which allows all of us to use RStudio online for free. There are three advantages of utilizing RStudio Cloud relative to downloading a desktop version for local usage.

- No need to install R and RStudio. All we need is an RStudio Cloud account that enables us to log in to use the R language.
- When we utilize RStudio Cloud, everyone is on the same page regardless of the differences in their computer operating systems (Windows vs. Mac OS). Additionally, everyone will have the same version of R and RStudio. This will make it much easier for you to follow my instructions.
- RStudio Cloud not only serves as an online statistical software but also enables us to store files on the cloud. That means you can always work on your projects remotely. Just grab a digital device such as a laptop, tablet or even cell phone; log into your RStudio Cloud account; start working on your projects.

The only downside to RStudio Cloud is that you must have an Internet connection, as it essentially entails cloud services. However, this is not a big problem given that we will always meet in person in the computer lab. In the first lab session scheduled on August 24, I will help everyone set up their RStudio Cloud.

If we compare RStudio to a smartphone, there are numerous packages—equivalent to smartphone apps—that make RStudio even more powerful and useful. One of those packages is called `RMarkdown`. `RMarkdown` can incorporate `R` code, outputs, and texts in a single file, thus avoiding repeatedly copying and pasting of code and outputs from R to other editors such as Microsoft Word. It can also be a good tool for formatting your document. We will be using `RMarkdown` to cover labs. Additionally, you will find `RMarkdown` to be a fascinating tool for homework. I will devote the second lab to teaching the basics of `RMarkdown` on August 31.

The lab session will be based on a lab handout, which is a `zip` file containing a dataset to be used for the lab, a Word file that includes `R` code, outputs, and notes. Besides, it also contains an `.rmd` file, which is the source file used to compile the Word document. Students will be able to run `R` code within the `.rmd` file and edit the `.rmd` file to generate their own Word documents. During the lab session, I will walk students through the lab handout (.rmd file) and make sure they understand the `R` code.

Course Materials

This course adopts the textbook entitled *Even You Can Learn Statistics and Analytics: An Easy to Understand Guide to Statistics and Analytics* by David M. Levine and David F. Stephan. As suggested by the title, this book is intended to help students conquer fear about statistics and discover the fun in dealing with data. We will primarily focus on one chapter each week. In addition to this text, we will use some book chapters and journal articles from other sources. Those materials will be shared with the class on Canvas ahead of each lecture.

After learning statistical theories from lectures, we will apply those theories and techniques through lab sessions, which are of particular importance for students to understand how statistics could facilitate the study of politics or other social phenomena. Students need not buy additional books to study `R` because major `R` skills will be covered and explained in the lab session. If students are interested in learning more `R` skills, they may consider the textbooks listed below as "recommended."

- (Required) Levine, David M., & David F. Stephan. (2022). *Even You Can Learn Statistics and Analytics: An Easy to Understand Guide to Statistics and Analytics*. Fourth Edition. Addison-Wesley.
- (Recommended) Imai, Kosuke., & Nora Webb Williams. (2022). *Quantitative Social Science: An Introduction in Tidyverse*. Princeton University Press.
- (Recommended) Monogan, J. E. (2015). *Political Analysis Using R*. Springer.
- (Recommended) Field, A., Miles, J., & Field, Z. (2012). *Discovering Statistics Using R*. Sage Publications.

Grading Policy

- Attendance and participation: 10%
- Three problem sets: 45%
- Midterm exam: 25%

- Research project: 20%

- Final grade percentages ending in a decimal of .5 or greater will be rounded up to the next whole number. The grading scale is as follows.

A	$\in$	$[93, 100]$
A-	$\in$	$[90, 92]$
B+	$\in$	$[87, 89]$
B	$\in$	$[83, 86]$
B-	$\in$	$[80, 82]$
C+	$\in$	$[77, 79]$
C	$\in$	$[73, 76]$
C-	$\in$	$[70, 72]$
D	$\in$	$[60, 69]$
F	$\in$	$[0, 59]$

All students are expected to attend the class. Absence without a University-accepted excuse will be penalized. Participation takes the form of not only attendance but also active engagement in the course. Students might be randomly called on to answer some questions. They will be evaluated based on whether they are present in class and if they are called, how well they are able to answer the question.

There are three take-home problem sets, with each accounting for 15% of the final grade. Students will be given one week to accomplish each problem set on their own. No one is allowed to plagiarize other people's work. If caught, he or she will receive a zero on that assignment. Moreover, students should turn in their homework via Canvas in a timely manner. Late submissions of problem sets will lead to the following grade penalty depending on how late it is:

- Lateness within 24 hours of the deadline will result in a 5-point penalty.
- Lateness within 48 hours of the deadline will result in a 10-point penalty.
- Homework submitted over 48 hours later than the deadline will NOT be accepted.

Additionally, there is a midterm exam scheduled on October 19. It covers all content that students have learned in the first eight weeks. The midterm exam makes up 25% of the final grade. The exam is open-book and open-notes, and it will include both conceptual and coding questions. Prior to the exam, we will hold a review session on October 17. This is also a good opportunity for students to ask questions about the exam.

Finally, students must work in groups to complete a research project at the end of the semester. The groups will be composed of 4–5 persons randomly chosen by a statistical program. The group members will discuss to determine the research topic,

data and method. They will work together to write a short research paper and present it on December 7. I will provide comments on the presentations, and the finalized paper should be submitted by midnight of December 14.

To encourage students to set up RStudio Cloud in a timely manner, 2% bonus points will be offered if they successfully create an RStudio Cloud account and use it to solve a simple arithmetic problem by the end of the first week (by 23:59 PM on August 27). This is a small bonus, but it can have a large impact. The bonus will be based on the final grade. Students getting a final grade of 78 out of 100 will earn additional 1.56 points if they finish this easy task, which could change their letter grade from $C+$ to $B-$. Likewise, a student scoring 88 out of 100 can end up getting an $A-$ instead of $B+$ if they earn additional 1.76 points owing to this task. More details on this bonus point will be announced in the first class meeting on August 24.

Deadlines

All assignments will be distributed through Canvas at noon. I will set up a submission link for each assignment. Students are expected to submit an electronic version of their work to Canvas. Only word format is accepted. Hard copies will not be accepted. As noted earlier, everyone must meet the following deadlines to receive due credits:

- August 27^{th}: deadline for submitting evidence of account setup to earn 2% bonus points.
- September 11^{th}: posting the first problem set. Due by noon, September 18.
- October 2^{nd}: posting the second problem set. Due by noon, October 9.
- October 19^{th}: midterm exam scheduled between 4:30 PM–6:00 PM.
- November 6^{th}: posting the third problem set. Due by noon, November 13.
- December 7^{th}: group presentation of a research project.
- December 14^{th}: research paper is due at 23:59 PM.

Course Protocol

Technology

Put everything on mute. You do not need to use your laptop for this course. Please take notes the old-fashioned way. This will dissuade the trend of college students to browse the web, check email, and frequent social networking sites during lecture. I will upload to Canvas all lecture PowerPoints.

Communication

I will post grades, send class emails, etc. through the SLU Banner and Canvas systems. Be sure that you can access the email address listed. I will only send email out to your SLU e-mail accounts listed on the course roster in Banner. I will not keep track of any other email addresses you may use.

I am teaching multiple courses. When you email me, please make sure to indicate your name and class to ensure the timely handling of your case.

Academic Integrity

Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is "the pursuit of truth for the greater glory of God and for the service of humanity." Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care, and community service through which SLU fulfills its mission. The University strives to prepare students for lives of personal and professional integrity, and therefore regards all breaches of academic integrity as matters of serious concern. The full University-level Academic Integrity Policy can be found on the Provost's Office website at: https://www.slu.edu/provost/policies/academic-and-course/academic-integrity-policy.pdf.

Additionally, each SLU College, School, and Center has its own academic integrity policies, available on their respective websites.

Disability Accommodations

Students with a documented disability who wish to request academic accommodations must formally register their disability with the University. Once successfully registered, students also must notify their course instructor that they wish to use their approved accommodations in the course.

Please contact the Center for Accessibility and Disability Resources (CADR) to schedule an appointment to discuss accommodation requests and eligibility requirements. Most students on the St. Louis campus will contact CADR, located in the Student Success Center and available by email at accessibility_disability@slu.edu or by phone at 314.977.3484. Once approved, information about a student's eligibility for academic accommodations will be shared with course instructors by email from CADR and within the instructor's official course roster. Students who do not have a documented disability but who think they may have one also are encouraged to contact to

CADR. Confidentiality will be observed in all inquiries.

Title IX

Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of sexual harassment, including sexual assault, stalking, domestic or dating violence, we encourage you to report this to the University. If you speak with a faculty member about an incident that involves a Title IX matter, that faculty member must notify SLU's Title IX Coordinator that you shared an experience relating to Title IX. This is true even if you ask the faculty member not to disclose the incident. The Title IX Coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

Anna Kratky is the Title IX Coordinator at Saint Louis University (DuBourg Hall, room 36; anna.kratky@slu.edu; 314-977-3886). If you wish to speak with a confidential source, you may contact the counselors at the University Counseling Center at 314-977-TALK or make an anonymous report through SLU's Integrity Hotline by calling 1-877-525-5669 or online at http://www.lighthouse-services.com/slu. To view SLU's policies, and for resources, please visit the following web address: https://www.slu.edu/about/safety/sexual-assault-resources/index.php.

Student Support Resources

University Counseling Center

The University Counseling Center (UCC) offers free, short-term, solution-focused counseling to Saint Louis University undergraduate and graduate students. UCC counselors are highly trained clinicians who can assist with a variety of issues, such as adjustment to college life, troubling changes in mood, and chronic psychological conditions. To make an appointment, call 314-977-8255 (TALK), or visit the clinic on the second floor of Wuller Hall. For after hours needs, please press #9 after dialing the clinic number.

Wellness

All students experience stressors and challenges at some point, and seeking support is beneficial. Such challenges may be the result of academic concerns (such as those related to particular assignments or content in a course), or they may be more personal in nature (such as concerns related to relationships, mental health, loss, identities, alcohol

or drugs, housing or food security, or finances, among other things). If you experience these or other difficulties, please consider seeking support from the resources available to you.

- For concerns related to this course, please contact me. I am invested in your success and will support your success in the ways I can.
- Additionally, you have access to the many resources SLU provides in support of your personal wellness. You will find a list of available resources on the Well-being page of the SLU website.

If you or someone you know is experiencing a crisis: please consult the Crisis Support and Warning Signs on the University Counseling Center website.

In the spirit of cura personalis, the University sees your academic success as connected to your well-being and provides resources to support your holistic wellness.

Basic Needs Security

Students experiencing food insecurity, housing insecurity, and any other challenges that are impacting their personal and/or academic wellbeing are encouraged to contact the Dean of Students Office for support. Students can submit an intake form, email deanofstudents@slu.edu, or call 314-977-9378 to connect with their office. Students may also communicate directly with their instructors about any challenges they are experiencing to receive support and resource referrals.

Course Schedule

Week 1: Course Overview

1. August 24 (Thursday): Course Overview
2. August 24 (Thursday): Lab
    - Lab 1: Getting Started with R

Week 2: Studying Politics with Data

1. August 29 (Tuesday): The Scientific Study of Politics
    - Kellstedt and Whitten (2018), Chapters 1&2
2. August 31 (Thursday): Making Sense of Data
    - Levin and Stephan (2022), Chapter 1

- Gunitsky, Seva. 2015. How do you measure democracy? *The Washington Post*.

3. August 31 (Thursday): Lab
    - Lab 2: RMarkdown Basics

Week 3: Describing and Visualizing Data

1. September 5 (Tuesday): Descriptive Statistics
    - Levin and Stephan (2022), Chapter 3
2. September 7 (Thursday): Data Visualization
    - Levin and Stephan (2022), Chapter 2
3. September 7 (Thursday): Lab
    - Lab 3: Describing and Visualizing Data

Week 4: Probability and Statistical Distributions

1. September 12 (Tuesday): Probability Theory
    - Levin and Stephan (2022), Chapter 4
2. September 14 (Thursday): Statistical Distributions
    - Levin and Stephan (2022), Chapter 5
3. September 14 (Thursday): Lab
    - Lab 4: Understanding Discrete Probability

Week 5: Sampling Distributions and Confidence intervals

1. September 19 (Tuesday): Sampling Distributions
    - Levin and Stephan (2022), Chapter 6.1 & 6.2
2. September 21 (Thursday): Confidence Intervals
    - Levin and Stephan (2022), Chapter 6.3, 6.4 & 6.5
3. September 21 (Thursday): Lab
    - Lab 5: Understanding Continuous Probability

Week 6: Fundamentals of Hypothesis Testing

1. September 26 (Tuesday): The Test Statistics Approach
    - Levin and Stephan (2022), Chapter 7.1 & 7.2
2. September 28 (Thursday): The P Value Approach
    - Levin and Stephan (2022), Chapter 7.3 & 7.4
    - Greenland, S., Senn, S. J., Rothman, K. J., Carlin, J. B., Poole, C., Goodman, S. N., & Altman, D. G. 2016. "Statistical Tests, P Values, Confidence Intervals, and Power: A Guide to Misinterpretations." *European Journal of Epidemiology* 31:337–350.
3. September 28 (Thursday): Lab
    - Lab 6: Critical Values, P Values and Confidence Intervals

Week 7: Hypothesis Testing with Numerical Data

1. October 3 (Tuesday): two-sample t test
    - Levin and Stephan (2022), Chapter 8.2 & 8.3
2. October 5 (Thursday): ANOVA
    - Levin and Stephan (2022), Chapter 9.2
3. October 5 (Thursday): Lab
    - Lab 7: Conducting t Tests and ANOVA

Week 8: Hypothesis Testing with Categorical Data

1. October 10 (Tuesday): Equal Proportion Test
    - Levin and Stephan (2022), Chapter 8.1
2. October 12 (Thursday): Chi2 Test of Independence
    - Levin and Stephan (2022), Chapter 9.1
3. October 12 (Thursday): Lab
    - Lab 8: Equal Proportion Test and Chi Square Test of Independence

Week 9: Midterm Exam

1. October 17 (Tuesday): Exam Review
2. October 19 (Thursday): Exam Day

- Time: 4:30 PM–6:00 PM
- Classroom: MCG 118L

Week 10: Correlation

1. October 24 (Tuesday): Pearson's Correlation Coefficient and Rank Coefficients
   - Field et al. (2012), Chapter 6.1–6.5
2. October 26 (Thursday): Fall Break, No Class

Week 11: Simple Linear Regression

1. October 31 (Tuesday): Inference-based Models
   - Levin and Stephan (2022), Chapter 10
2. November 2 (Thursday): Prediction-based Models
   - James et al. (2023), Chapter 2
3. November 2 (Thursday): Lab
   - Lab 10: Simple Linear Models: Estimation, Interpretation and Prediction

Week 12: Multiple Regression

1. November 7 (Tuesday): Why Multiple Regression?
   - Levin and Stephan (2022), Chapter 11
2. November 9 (Thursday): Interactive Effects
   - Brambor, T., Clark, W. R., & Golder, M. 2006. "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14(1):63–82.
3. November 9 (Thursday): Lab
   - Lab 11: Estimating and Interpreting Multiple Regressions

Week 13: Regression Diagnostics

1. November 14 (Tuesday): Multicollinearity and Influential Points
   - Fox (1991), Chapters 3–4
   - Monogan (2015), Chapter 6.2.4–6.2.5
2. November 16 (Thursday): Non-normality and Nonconstant Error Variance
   - Fox (1991), Chapters 5–6

- Monogan (2015), Chapter 6.2.2–6.2.3

3. November 16 (Thursday): Lab
    - Lab 12: Performing Sound Regression Analysis

Week 14: Experimental Designs

1. November 21 (Tuesday): Lecture
    - Bhattacherjee (2012), Chapter 10
    - Salsburg (2001), Chapter 1
2. November 23 (Thursday): Thanksgiving Holiday, No Class

Week 15: Causal Inference

1. November 28 (Tuesday): Challenges of Causality in Social Science
    - Kellstedt and Whitten (2018), Chapter 3
2. November 30 (Thursday): Addressing Causality
    - Imai and Williams (2022), Chapter 2.1, 2.3, 2.4 & 2.5
3. November 30 (Thursday): Lab
    - Lab 13: Making Causal Claims in Quantitive Analysis

Week 16: Wrap Up

1. December 5 (Tuesday): Q&A
2. December 7 (Thursday): Group Presentations

Week 17: Finals

1. December 12 (Tuesday): Final Exam Week, No Class
2. December 14 (Thursday): Final Exam Week, No Class
    - The research paper is due at 23:59 PM, December 14.