

# **POLS 2000 Methods in Political Science**

Tue/Thu: 9:30 AM–10:45 AM, Room: MCG 118L

Thu: 4:15–7:00 PM, Room: MCG 118L

Department of Political Science

Saint Louis University

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## **Instructor**

Dr. Hui Zhou

Department of Political Science

Email: hui.zhou@slu.edu

Office: McGannon Hall (MCG) 124

Office hours: Friday 10:00 AM–11:00 AM or by appointment

## **Course Description**

This is an introductory course on political science research design. Students will assess how research questions are posed, learn about how to apply scientific methods 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, students 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 use [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 for January 18<sup>th</sup>, 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 use 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 [January 25<sup>th</sup>](#).

The lab session will be based on a lab handout, which is typically a zip file containing a dataset to be used for the lab, an .rmd source file, and a Word file compiled based on the source file. An .rmd source file is composed of source codes and texts. Students will be able to run R code within the source file and edit the file to compile their own Word documents. During the lab session, I will walk students through source files and make sure they understand each line of the R code as well as the results generated by the 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 the 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. These 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 helping students 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*. 4<sup>th</sup> Edition. Addison-Wesley Professional.
- (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 to the next whole number. The grading scale is as follows.

A	∈ [93, 100]	A-	∈ [90, 92]		
B+	∈ [87, 89]	B	∈ [83, 86]	B-	∈ [80, 82]
C+	∈ [77, 79]	C	∈ [73, 76]	C-	∈ [70, 72]
D	∈ [60, 69]				
F	∈ [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, including AI-generated content. If caught, the student 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, a midterm exam is scheduled for **March 7<sup>th</sup>**. It covers all content that students have learned in the first seven weeks. The midterm exam makes up 25% of the final grade. The exam is open-book and open-notes, and it includes both conceptual and coding questions. Prior to the exam, we will hold a review session on Tuesday immediately before the exam. I will curve the midterm exam by returning to everyone the same number of points defined as 30% of the gap between the class average and 100. With that being said, everyone can get 9 points back if the class average is 70/100 because  $(100 - 70) \times 0.3 = 9$ .

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 the research topic, theory, data and methods. They will work together to write a short research paper and present it on **May 9<sup>th</sup>**. I will provide written comments on the presentations, and the finalized paper should be submitted by midnight, **May 16<sup>th</sup>**. Guidelines on the group project will be offered throughout the semester.

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 several simple arithmetic problem by the end of the first week (i.e., midnight on **January 20<sup>th</sup>**). 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 a *B+* if he or she earns additional 1.76 points owing to this task. More details on this bonus opportunity will be announced during the first class meeting on January 16<sup>th</sup>.

## Deadlines

All assignments will be posted on Canvas at noon on Monday. I will set up a submission link for each assignment. Students are expected to submit an electronic version of their work to Canvas. Only the word format is accepted. As noted earlier, only problem sets can be submitted within two days after the deadlines at the expense of a penalty. Other assignments must be submitted on time to receive due credits.

- **January 20<sup>th</sup>**: deadline for completing the account setup to earn 2% bonus points.
- **February 5<sup>th</sup>**: posting the first problem set. Due by midnight, February 12<sup>th</sup>.
- **February 26<sup>th</sup>**: posting the second problem set. Due by midnight, March 4<sup>th</sup>.
- **March 7<sup>th</sup>**: midterm exam scheduled between 4:30 PM–6:30 PM in MCG 118L.
- **April 8<sup>th</sup>**: posting the third problem set. Due by midnight, April 15.
- **May 9<sup>th</sup>**: group presentation of a research project.
- **May 16<sup>th</sup>**: research paper is due by midnight.

## Course Protocol

### Technology

Put everything on mute. You do not need to use your laptop for this course. Please take notes in the old-fashioned way. This will dissuade the trend of college students from browsing the web, checking email and social networking sites during lectures. I will upload to Canvas all lecture slides so that you don't need to be worried about missing important information on the slides.

## **Time Zone**

All the dates and times mentioned in this syllabus are based on CST or CDT (whatever applies at the time). If you are traveling, be wary of the deadlines. Failure to notice the time zone change is not an acceptable reason for requesting a deadline extension.

## **Communication**

I will post assignments and manage grades on Canvas. After grading, assignments/exams will be returned to each student's SLU email account. Be sure that you can access the SLU email address listed in the Banner system. I will only send email to your SLU email accounts listed on the course roster in Banner. I will not keep track of any other email addresses you may use, and you will be responsible for missing messages sent to your SLU email account.

For issues concerning everyone in the class, I will send group emails via the course listserv [POL200002\\_420@list.slu.edu](mailto:POL200002_420@list.slu.edu). You may make use of it too if your email is of interest to everyone in this class.

I am teaching multiple courses. **When you email me, please make sure to indicate your name and class to expedite the 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>.

## **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](mailto: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 SLUs 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](mailto: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 SLUs Integrity Hotline by calling 1-877-525-5669 or online at <http://www.lighthouse-services.com/slu>. To view SLUs policies, and for resources, please visit the following web addresses: <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.

### **Student Success Center**

The Student Success Center (SSC) supports students in reaching their goals in and out of the classroom. Providing a variety of resources, the Student Success Center houses both the Center for Accessibility and Disability Resources (CADR) and Academic Support, which includes Tutoring, Supplemental Instruction, University Writing Services, and Student Success Coaching. The Student Success Center is located in the Busch Student Center, Suite 331, and students can make an appointment with any SSC resource via EAB Navigate. To learn more about the Student Success Center and its resources, please visit: <https://www.slu.edu/life-at-slu/student-success-center/index.php>.

### **University Writing Services**

University Writing Services offers one-on-one consultations with trained writing consultants who help with everything from brainstorming, outlining, and proposing research questions to documenting sources, revising, and implementing feedback. These consultations can take place in-person, asynchronously, or via Zoom and can be scheduled through EAB Navigate–Student. Getting feedback benefits writers at all skill levels on different writing projects (including but not limited to class assignments, conference papers, cover letters, dissertations, group projects, multimedia assignments, personal statements, senior capstone projects, short answer questions on applications, speeches, and theses). For additional information, visit <https://www.slu.edu/life-at-slu/student-success-center/academic-support/university-writing-services/index.php> or send an email to [writing@slu.edu](mailto:writing@slu.edu).

### **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.

### **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 Introduction**

1. **Jan 16 (Tue) Course Overview**
  - Course syllabus (please make sure to peruse it)
2. **Jan 18 (Thu) The Scientific Study of Politics**
  - Kellstedt and Whitten (2018), Chapter 1
3. **Jan 18 (Thu) Lab in the Afternoon**
  - Lab 1 Getting Started with R

### **Week 2 Theory and Measurement**

1. **Jan 23 (Tue) Theory Building**
  - Kellstedt and Whitten (2018), Chapter 2
2. **Jan 25 (Thu) Data and Measurement**
  - Levin and Stephan (2022), Chapter 1
  - Gunitsky, Seva. 2015. [“How Do You Measure Democracy?”](#) *The Washington Post*.
3. **Jan 25 (Thu) Lab in the Afternoon**
  - Lab 2 RMarkdown Basics

### **Week 3 Describing and Visualizing Data**

#### **1. Jan 30 (Tue) Descriptive Statistics**

- Levin and Stephan (2022), Chapter 3

#### **2. Feb 1 (Thu) Data Visualization**

- Levin and Stephan (2022), Chapter 2
- Center for American Political Studies at Harvard University. [“The Harris Poll.”](#) Field dates, September 13–14, 2023.

#### **3. Feb 1 (Thu) Lab in the Afternoon**

- Lab 3 Describing and Visualizing Data

### **Week 4 Probability and Statistical Distributions**

#### **1. Feb 6 (Tue) Probability Theory**

- Levin and Stephan (2022), Chapter 4

#### **2. Feb 8 (Thu) Statistical Distributions**

- Levin and Stephan (2022), Chapter 5

#### **3. Feb 8 (Thu) Lab in the Afternoon**

- Lab 4 Discrete Probability Distributions

### **Week 5 Sampling Distributions and Confidence Intervals**

#### **1. Feb 13 (Tue) Sampling Distributions**

- Levin and Stephan (2022), Chapter 6.1 & 6.2

#### **2. Feb 15 (Thu) Confidence Intervals**

- Levin and Stephan (2022), Chapter 6.3, 6.4 & 6.5

#### **3. Feb 15 (Thu) Lab in the Afternoon**

- Lab 5 Continuous Probability Distributions

### **Week 6 Fundamentals of Hypothesis Testing**

#### **1. Feb 20 (Tue) The Test-Statistic Approach**

- Levin and Stephan (2022), Chapter 7.1 & 7.2

#### **2. Feb 22 (Thu) 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. Feb 22 (Thu) Lab in the Afternoon

- Lab 6 Critical Values, P Values and Hypothesis Testing

## Week 7 Hypothesis Testing with Numerical Data

### 1. Feb 27 (Tue) Two-Sample t Test

- Levin and Stephan (2022), Chapter 8.2 & 8.3

### 2. Feb 29 (Thu) Analysis of Variance (ANOVA)

- Levin and Stephan (2022), Chapter 9.2

### 3. Feb 29 (Thu) Lab in the Afternoon

- Lab 7 Conducting t Tests and ANOVA

## Week 8 Midterm Exam

### 1. Mar 5 (Tue) Exam Review

### 2. Mar 7 (Thu) Midterm Exam

## Week 9 Spring Break (No Class)

## Week 10 Hypothesis Testing with Categorical Data

### 1. Mar 19 (Tue) Equal Proportion Test

- Levin and Stephan (2022), Chapter 8.1

### 2. Mar 21 (Thu) $\chi^2$ Test of Independence

- Levin and Stephan (2022), Chapter 9.1
- Pearce, Susanna and Trinity College. 2014. "Religious Rage: A Quantitative Analysis of the Intensity of Religious Conflicts." In Jonathan Fox and Shmeul Sandler (Eds). *Religion in World Conflict*. 1<sup>st</sup> Edition. Chapter 10, pp. 39–58.

### 3. Mar 21 (Thu) Lab in the Afternoon

- Lab 10 Equal Proportion Test and Chi Square Test of Independence

## **Week 11 Correlation**

1. **Mar 26 (Tue) Pearson's Correlation Coefficient and Rank Coefficients**
  - Field et al. (2012), Chapter 6.1–6.5
2. **Mar 28 (Thu) Easter Break (No Class)**

## **Week 12 Simple Linear Regression**

1. **Apr 2 (Tue) Inference-Based Models**
  - Levin and Stephan (2022), Chapter 10
2. **Apr 4 (Thu) Prediction-Based Models**
  - James et al. (2023), Chapter 2
3. **Apr 4 (Thu) Lab in the Afternoon**
  - Lab 12 Simple Linear Models: Estimation, Interpretation and Prediction

## **Week 13 Multiple Regression**

1. **Apr 9 (Tue) Why Multiple Regression?**
  - Levin and Stephan (2022), Chapter 11
2. **Apr 11 (Thu) Interactive Effects**
  - Brambor, T., Clark, W. R., & Golder, M. 2006. "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14(1):63–82.
3. **Apr 11 (Thu) Lab in the Afternoon**
  - Lab 13 Estimating and Interpreting Multiple Regressions

## **Week 14 Regression Diagnostics**

1. **Apr 16 (Tue) Multicollinearity and Influential Points**
  - Fox (1991), Chapters 3–4
  - Monogan (2015), Chapter 6.2.4–6.2.5
2. **Apr 18 (Thu) Heteroscedasticity, Autocorrelation and Nonnormality**
  - Fox (1991), Chapters 5–6
  - Monogan (2015), Chapter 6.2.2–6.2.3
3. **Apr 18 (Thu) Lab in the Afternoon**

- Lab 14 Performing Sound Regression Analysis

### **Week 15 Experimental Designs**

#### **1. Apr 23 (Tue) What Are Experimental Designs?**

- Bhattacharjee (2012), Chapter 10
- Salsburg (2001), Chapter 1

#### **2. Apr 25 (Thu) Examining Politics with Experiments**

- Kim, Eunji. 2023. "Entertaining Beliefs in Economic Mobility." *American Journal of Political Science* 67(1):39–54.
- Brader, T., Valentino, N. A., & Suhay, E. 2008. "What Triggers Public Opposition to Immigration? Anxiety, Group Cues, and Immigration Threat." *American Journal of Political Science* 52(4):959–978.

#### **3. Apr 25 (Thu) Lab in the Afternoon**

- Lab 15 Analyzing Experimental Data

### **Week 16 Causal Inference**

#### **1. Apr 30 (Tue) Challenges of Causality in Social Science**

- Kellstedt and Whitten (2018), Chapter 3

#### **2. May 2 (Thu) Addressing Causality**

- Imai and Williams (2022), Chapter 2.1, 2.3, 2.4 & 2.5

#### **3. May 2 (Thu) Lab in the Afternoon**

- Lab 16 Making Causal Claims in Quantitative Analysis

### **Week 17 Wrap Up**

#### **1. May 7 (Tue) Study Day (No Class)**

#### **2. May 9 (Thu) Group Presentations (No Lab in the Afternoon)**

Caveat: This syllabus might be subject to change in the future. If a change is made, I will notify the class by email.