POLS 2000 Methods in Political Science

Tue/Thu: 9:30 AM–10:45 PM, Room: MCG 118L
Thu: 4:15–7:00 PM, Room: MCG 118L
Department of Political Science
Saint Louis University
Spring 2024

Instructor

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O ce: McGannon Hall (MCG) 124
O ce 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 e ectively 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:

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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 18th, 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 `RMarkd`. `RMarkd` 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 `RMarkd` to cover labs. Additionally, you will find `RMarkd` to be a fascinating tool for homework. I will devote the second lab to teaching the basics of `RMarkd` on January 25th.

The lab session will be based on a lab handout, which is typically a   file containing a dataset to be used for the lab, an `.    d` source file, and a Word file compiled based on the source file. An `.    d` 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.* 4th 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%

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- 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

To encourage students to set up RStudio Cloud in a timely manner, 2% bonus points will be o ered 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 20th). 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 16th.

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 20th: deadline for completing the account setup to earn 2% bonus points.
- February 5th: posting the first problem set. Due by midnight, February 12th.
- February 26th: posting the second problem set. Due by midnight, March 4th.
- March 7th: midterm exam scheduled between 4:30 PM–6:30 PM in MCG 118L.
- April 8th: posting the third problem set. Due by midnight, April 15.
- May 9th: group presentation of a research project.
- May 16th: 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 **POLS200002_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 com-

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 o cial 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

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

- 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.

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 Understanding Discrete Probability

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 Understanding Continuous Probability

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 Confidence Intervals

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) χ^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*. 1st 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**