

POLS 309: Polimetrics

FALL 2024

Credit Hours	3	
Meeting Times and Locations	Lecture: Blocker 102, WF 1:50-2:40 PM Section 501: Allen 2003, M 12:05-12:55 PM Section 503: Allen 2002, M 12:05-12:55 PM Section 504: Allen 2002, M 1:15-2:05 PM Section 505: Allen 2003, M 2:25-3:15 PM	
Professor	Isaac Mehlhaff Office: Allen 3075 Office hours: Th 12-3 PM (calendly.com/imehlhaff/office) Email: imehlhaff@tamu.edu	
Teaching Assistants	Sunhee Kim (501, 504) Office: Allen 3049 Office hours: M 2:30-4:30 PM Email: sunheekim@tamu.edu	Chamseul Yu (503, 505) Office: Allen 3049 Office hours: M 1-2 PM, F 3-4 PM Email: cham3.yu@tamu.edu

Course Description and Objectives

This course is designed to equip you with the statistical and programming skills necessary to analyze complex data and use it to answer important questions in political science. We will explore how to use data to understand and interpret a wide range of political phenomena, such as the impact of economic conditions on voting behavior, the relationship between democracy and economic growth, and the factors that influence the duration of civil conflicts.

You will develop a foundation in regression analysis, hypothesis testing, and data visualization, with a strong emphasis on using the R computer programming language for practical application. We will also focus on the essential skill of effectively communicating technical findings and translating complex statistical results into clear, actionable insights.

By the end of the course, you will be able to:

- Articulate key statistical concepts and understand their limitations in social scientific applications.
- Apply regression analysis and other statistical techniques to investigate correlational and causal relationships in political data.
- Characterize the degree of uncertainty in substantive inferences.
- Write R code to manipulate, visualize, and analyze data.
- Communicate findings in a clear and compelling manner.

This course is designed to not only enhance your marketable skills but also to deepen your understanding of the world through data analysis. This means it can be quite rewarding, but it is also challenging. Doing well in this course requires regular practice and study outside of class. It is easy to fall behind and difficult to catch up. Perhaps more than in any other political science course, you must take responsibility for your education and communicate with the instructional team if you are struggling.

Prerequisites

POLS 209 and nine additional hours of political science coursework, or consent of instructor.

Textbooks

There are three required textbooks for this course. The first must be purchased or rented, either in print or ebook format:

- Elena Llaudet and Kosuke Imai. *Data Analysis for Social Science: A Friendly and Practical Introduction*. Princeton, NJ: Princeton University Press (2023).

The other two textbooks are freely available online:

- David Diez, Mine Cetinkaya-Rundel, Christopher Barr, and OpenIntro. *OpenIntro Statistics*, edition 4. <https://leanpub.com/os>.
- Andrew Gelman, Jennifer Hill, and Aki Vehtari. *Regression and Other Stories*. New York: Cambridge University Press (2020). <https://users.aalto.fi/~ave/ROS.pdf>.

Note that when downloading the OpenIntro book, the website will allow you to determine the price. You can drag the slider all the way down to zero if you wish to get it for free. If you prefer, the Gelman et al. book can also be purchased or rented in print format.

Software

We will use the R computer programming language extensively this semester. R has many benefits over other statistical software packages:

- It is the primary tool for statistical computing in private-sector, government, and academic settings.
- It is open-source, which means it is free for anyone to use and contribute to, and users can always see how each function works.
- It is cross-platform, meaning you can run it on almost any operating system.
- It is more powerful and versatile than other software packages.

We will write and edit our R code using a user interface called RStudio. While R code can be written in any plain text editor, RStudio provides a number of useful features in a user-friendly environment.

You must have both R and RStudio installed on your computer when you show up for your first lab meeting. Follow the two-step process on this website to download R and RStudio: <https://posit.co/download/rstudio-desktop/>, or follow the guidance in Llaudet and Imai, section 1.5.

Grading and Logistics

Grade Components

- **Lecture exercises (10%):** At some point during most—though not all—lectures, we will pause for a short exercise related to that week’s reading or lecture material. These exercises are graded on completion and are intended to give the instructional team a sense of the class’s progress. The exercise will be submitted on Canvas but will only be displayed on the lecture slides, meaning you must attend lecture to complete them. No late work will be accepted. If you have an excused absence from a lecture in which we completed an exercise, you will simply receive credit for that exercise.
- **Lab assignments (20%):** Most lab meetings will consist of you working in small groups to complete an R script applying concepts from lecture and readings. Even though you will work in groups, you must submit your own assignment. Lab meetings are always on Monday and the assignment will be due by the start of Wednesday lecture that same week. Assignments will be graded on completion, with one point awarded for partial completion and two points for full completion. I will drop your lab assignment with the lowest grade, so no late assignments will be accepted.
- **Problem sets (30%):** There will be four problem sets throughout the semester, always due by the start of Friday lecture. You may collaborate with other students if you wish, but you must submit your own assignment documenting the students with whom you collaborated, if any. Assignments will be graded on the degree to which your written responses and code are accurate and thorough. I will drop your problem set with the lowest grade, so no late assignments will be accepted.
- **Capstone project (40%):** Over the course of the semester, you will work on a data analysis project to answer a substantive question in political science, selected from a list provided by the instructional team. This project will be broken down into five components, always due by the start of Friday lecture. The final report is due at the end of our final exam period. The components will contribute to your capstone project grade as follows:
 1. Topic selection and theory (10 points)
 2. Data description (10 points)
 3. Bivariate analysis (10 points)
 4. Multivariate analysis (10 points)

5. Model diagnostics and robustness checks (10 points)
6. Final report (50 points)

Grading standards will be described when each component is assigned. Late work on assignments related to the capstone project will be accepted, but will be penalized 10% for each day it is late.

Extra Credit

The following are the only opportunities for extra credit in this course:

- **Problem sets:** Problem sets may contain one or more extra credit questions that are not required. They will be clearly marked as such and will be worth a varying number of points, which will be added to that problem set's grade.
- **Proofreading:** If you catch a mistake in lecture slides or assignments, you are the first to bring it to my attention, and I judge the mistake would have substantively affected students' understanding of course material, I will award one percentage point of extra credit on your final grade.
- **Syllabus annotation:** At the end of the semester, I want to get your feedback on what went well and what I could improve for next time. This could include comments on readings, topics, recommended changes, or advice for future students. If you submit a PDF of the syllabus with these comments embedded, I will award one percentage point of extra credit on your final grade.

Grading Policies

The teaching assistants (TAs) will grade all assignments. If there is an arithmetic error in your grade, please alert your TA. If you wish to dispute an assignment grade on substantive grounds, you must email me a written justification no less than 24 hours and no more than 72 hours after the assignment grade is returned. For each disputed element, your written justification must include complete, detailed explanations of why you believe your grade should be adjusted. If I determine that the challenge has merit, I will re-grade the entire assignment. This process may result in your grade increasing, decreasing, or remaining unchanged. This new grade will be final.

A final percentage grade x will translate into letter grades as follows:

- $90 \leq x \rightarrow A$
- $80 \leq x < 90 \rightarrow B$
- $70 \leq x < 80 \rightarrow C$
- $60 \leq x < 70 \rightarrow D$
- $x < 60 \rightarrow F$

Course Schedule

The schedule below is subject to change depending on the speed at which we progress through the material. Abbreviations: Llaudet and Imai (LI), Diez et al. (OIS), Gelman et al. (ROS), problem set (PS), capstone project component (CP), Wednesday (W), Friday (F).

Week	Dates	Topics	Reading	Due Dates
1	8/19 - 8/23	<ul style="list-style-type: none"> • NO LAB • Introduction • Generative AI 	<ul style="list-style-type: none"> • Pan and Schwartz (on Canvas) • Bialozor (online here) • LI 1.4 - 1.7, 2.5 (stop at pg. 43) 	
2	8/26 - 8/30	<ul style="list-style-type: none"> • Lab 1: R setup, working with data • Data description • Probability, random variables 	<ul style="list-style-type: none"> • LI 6.1 - 6.3, 3.1, 3.3, 3.4 (skip 3.4.1) • OIS 3.1.2 - 3.1.4, 3.1.7 	<ul style="list-style-type: none"> • Lab 1 (W)
3	9/2 - 9/6	<ul style="list-style-type: none"> • NO LAB • Probability distributions • NO F LECTURE 	<ul style="list-style-type: none"> • LI 6.4 • OIS 3.1.5, 3.4.1, 3.4.2, 3.5 	<ul style="list-style-type: none"> • CP 1 (F)
4	9/9 - 9/13	<ul style="list-style-type: none"> • Lab 2: data description • Point estimation • Uncertainty 	<ul style="list-style-type: none"> • LI 3.2, 6.5, 7.1, 7.2 (skip 7.2.3) 	<ul style="list-style-type: none"> • Lab 2 (W) • PS 1 (F)
5	9/16 - 9/20	<ul style="list-style-type: none"> • Lab 3: sampling distributions • Hypothesis testing • Correlation 	<ul style="list-style-type: none"> • LI 7.3 (skip 7.3.2), 7.4, 3.5 • OIS 1.2.3, 5.3.7 	<ul style="list-style-type: none"> • Lab 3 (W)
6	9/23 - 9/27	<ul style="list-style-type: none"> • Lab 4: hypothesis testing, confidence intervals • Bivariate regression 	<ul style="list-style-type: none"> • LI 4.1 - 4.3, 4.5, 7.2.3, 7.3.2 • OIS 1.2.4 	<ul style="list-style-type: none"> • Lab 4 (W) • CP 2 (F)
7	9/30 - 10/4	<ul style="list-style-type: none"> • Lab 5: bivariate regression • Catch-up, capstone project work 		<ul style="list-style-type: none"> • Lab 5 (W) • PS 2 (F)

Week	Dates	Topics	Reading	Due Dates
8	10/7 - 10/11	<ul style="list-style-type: none"> • NO LAB • Multiple regression 	<ul style="list-style-type: none"> • OIS 9.1.2 • ROS 10.1 	
9	10/14 - 10/18	<ul style="list-style-type: none"> • Lab 6: omitted variable bias • Model diagnostics • Discrete predictors 	<ul style="list-style-type: none"> • LI 4.6 • OIS 8.2.8, 9.1.1, 9.1.3, 9.2 (skip 9.2.3) • ROS 7.3 	<ul style="list-style-type: none"> • Lab 6 (W) • CP 3 (F)
10	10/21 - 10/25	<ul style="list-style-type: none"> • Lab 7: model diagnostics • Interactions and moderators • Covariate transformations 	<ul style="list-style-type: none"> • LI 4.4 • ROS 10.3, 12.1, 12.4 (stop at pg. 191), pg. 196-198 	<ul style="list-style-type: none"> • Lab 7 (W)
11	10/28 - 11/1	<ul style="list-style-type: none"> • Lab 8: interactions and transformations • Statistical power • Missing data 	<ul style="list-style-type: none"> • LI 3.4.1 • OIS 7.4 • ROS 16.1, 16.2 (stop at pg. 296), 17.3 - 17.4 	<ul style="list-style-type: none"> • Lab 8 (W) • PS 3 (F)
12	11/4 - 11/8	<ul style="list-style-type: none"> • Lab 9: statistical power • Logistic regression 	<ul style="list-style-type: none"> • OIS 4.3.1 • ROS 13.1 - 13.3 (stop at pg. 224), 15.5 	<ul style="list-style-type: none"> • Lab 9 (W) • CP 4 (F)
13	11/11 - 11/15	<ul style="list-style-type: none"> • Lab 10: missing data • Correlation vs. causation • Design-based causal inference 	<ul style="list-style-type: none"> • LI 2.1 - 2.4, 5.2, 5.5 (skip 5.5.3) 	<ul style="list-style-type: none"> • Lab 10 (W)
14	11/18 - 11/22	<ul style="list-style-type: none"> • Lab 11: limited dependent variables • Model-based causal inference • Catch-up 	<ul style="list-style-type: none"> • LI 5.3, 5.4, 5.5.3 • ROS 20.1 	<ul style="list-style-type: none"> • Lab 11 (W) • PS 4 (F)
15	11/25 - 11/29	<ul style="list-style-type: none"> • Lab 12: causal inference • NO LECTURE 		<ul style="list-style-type: none"> • Lab 12 (W) • CP 5 (F)

Week	Dates	Topics	Reading	Due Dates
16	12/2 - 12/6	<ul style="list-style-type: none"> • Lab: capstone project work • NO LECTURE 		
Final	12/9			<ul style="list-style-type: none"> • CP 6 (5:30 PM)

Communication

Piazza

We will use Piazza for asking and answering questions about course material or logistics. Piazza is an intuitive platform designed to get you help quickly and efficiently from classmates and the instructional team. Rather than emailing questions to the instructional team, please first check whether a similar question has already been answered on Piazza. If not, post your question on Piazza so other students can also benefit from the discussion. There is an option to post anonymously. You can join our course Piazza discussion board at: <https://piazza.com/tamu/fall2024/pols309>.

Communication with the Instructional Team

We are always happy to meet with you during our scheduled office hours or outside those hours if they do not work with your schedule. The TAs' office hours are generally first-come, first-served. I encourage you to sign up for a time slot during my office hours using the link at the top of this document. Advanced sign-up is not required, but students with appointments will be prioritized over walk-ins. We will tend to emails as quickly as possible, but please allow at least one business day for a response. We are here to facilitate your learning but, ultimately, you are the only one who can be responsible for your education. Be proactive and let us know how we can assist you.

Communication with Other Students

Learning is a collaborative endeavor, and we all bring unique backgrounds and experiences to the course material. Treat your classmates how you want to be treated. You will have the option to collaborate on labs and problem sets; use these opportunities to learn from each other. I encourage you to form study groups and discuss material amongst yourselves if you do not understand it.

Academic Integrity

“An Aggie does not lie, cheat or steal, or tolerate those who do.”

“Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the

work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" ([Section 20.1.2.3, Student Rule 20](#)). You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Generative Artificial Intelligence

Generative artificial intelligence (AI)—such as OpenAI's ChatGPT or Google's Gemini—is gradually reshaping human-computer interaction. These are valuable tools for understanding and conducting data analysis and for producing computer code. It is almost certain that your future careers will draw heavily on this technology. However, generative AI also presents thorny issues for education: it often generates incorrect content and makes it easy to breach academic integrity.

Use of generative AI in this course is permitted under the condition that you cite how and where you use it, and submit the full conversation transcript along with any assignment on which you use it. Further details will be given in class and in the "Use of Generative AI" document on Canvas. I reserve the right to revoke this privilege at any time if I suspect it is being abused.

Attendance and Late Work

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments. Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Because I will drop the lab and problem set with the lowest score, no late work will be accepted on those assignments. An assignment submitted after the deadline will receive a score of zero. Since lecture exercises are graded on completion and require lecture attendance, no late work will be accepted on these assignments either. If you have an excused absence from a lecture, I will simply award you the point for the lecture exercise you missed. Late work related to the capstone project will be accepted, but will be penalized ten percent for each day it is late. If you have an extended period of excused absence (as defined in [Student Rule 7](#)), exceptions to these policies may be made at my discretion.

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in [Student Rule 7](#), or other reason deemed appropriate by the instructor. Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

"Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" ([Student Rule 7, Section 7.4.1](#)). "The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" ([Student Rule 7, Section 7.4.2](#)). Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

University Policies

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact the Disability Resources office on your campus (resources listed below). Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention—including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services \(CAPS\)](#). Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's [Title IX](#) webpage.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus. Students who

need someone to talk to can contact Counseling and Psychological Services (CAPS) or call the TAMU Helpline (979-845-2700) from 4:00 PM to 8:00 AM weekdays and 24 hours on weekends. 24-hour emergency help is also available through the 988 Suicide and Crisis Lifeline (988) or at [988lifeline.org](https://www.988lifeline.org).