POLS 7012: Introduction to Political Methodology

Fall 2024

Professor:	Joe Ornstein	**Time:**	W 4:10 – 6:55pm
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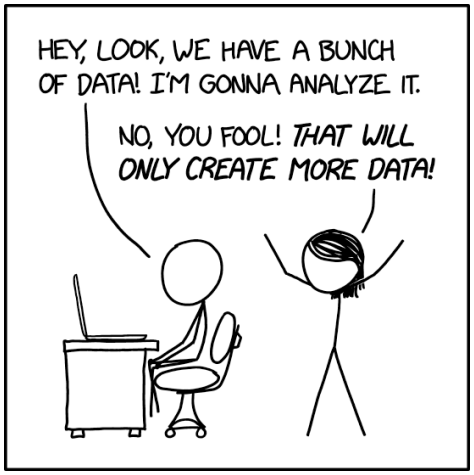
So you want to be a political scientist? Cool! It's a fun and fulfilling profession. But before you can eat your cake, you need to eat your vegetables. In this analogy, cake is political science, and vegetables is math. Because modern political science is heavily quantitative, and in order to fruitfully engage with the ongoing scientific conversation, you will need to understand the language.

I intend for this class to be a very practical introduction to the mathematical and computational skills you'll need to conduct political science research. Throughout the semester, we will focus on building up the techniques that social scientists use to address the three fundamental problems of our discipline: measurement, causal inference, and prediction. And when we're done, you'll have the foundational skills you need to tackle the more advanced material that makes up the rest of the graduate methods sequence.



Course Objectives

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

- Confidently work with data using the `R` programming language
- Create beautiful and informative data visualizations
- Organize your work so that it is transparent and reproducible
- Build basic statistical models and estimate their parameters from data
- Communicate the uncertainty around your estimates
- Describe research designs that can credibly identify causation (not just correlation)

Assignments & Grading

Each week I will assign a problem set, due at noon the day of class. Your responses will be graded pass-fail (a passing problem set demonstrates a solid grasp of the concepts from that week's reading, even if there are some mistakes in implementation). Feel free to work with your classmates, but please submit your answers individually. 70% of your grade will come from these problem sets, and 15% each from a midterm and final exam.

Office Hours and Email Policy

I will be available for students to drop in and chat every Monday, Wednesday, and Friday afternoon from 1:30-3pm. My office is Baldwin 304C. If you send me an email, please allow me 24 hours to respond. Like many professors, my inbox is pretty overloaded. Also, I have small children, so it's my policy to not check email after 5pm or on weekends. You should feel free to seek assistance from the senior graduate students staffing the SPIA Methods Helpdesk. You can email them questions at spia-methods-help@uga.edu.

Books

Our readings will come from the two books listed below. The first book (DAFSS) must be purchased, but the second (R4DS) is freely available online.

- **DAFSS:** Llaudet, Elena & Imai, Kosuke (2022). *Data Analysis for Social Science: A Friendly and Practical Introduction.* Princeton University Press.
- **R4DS:** Wickham, H., Cetinkaya-Rundel, M., & Grolemund, G., (2023). *R For Data Science: Import, Tidy, Transform, Visualize, and Model Data, 2nd Edition.* O'Reilly Media, Inc.

Course Outline

Week 1: Getting Started

Introduction, The Three Fundamental Problems of Scientific Inquiry, Setting Up R and RStudio
Reading Due: None

Week 2: Writing Code

Tidy Datasets, Variables, Basic Programming
Reading Due: DAFSS Chapter 1

Week 3: Experiments

Causal Inference, Potential Outcomes, Randomization, Estimation
Reading Due: DAFSS Chapter 2

Week 4: Samples

Descriptive Statistics, Representative Samples, Distributions, Basic Data Visualization
Reading Due: DAFSS Chapter 3

Week 5: The Linear Model

Regression, Logarithms, Prediction
Reading Due: DAFSS Chapter 4

Week 6: Causality

Confounders, Multiple Regression, Internal and External Validity
Reading Due: DAFSS Chapter 5

Week 7: Probability

Sampling, Expected Value, Variance, Normal Distributions, Bernoulli Distributions, Central Limit Theorem, the Law of Large Numbers
Reading Due: DAFSS Chapter 6

Week 8: Uncertainty

Sampling Distributions, Standard Errors, Hypothesis Testing, p-values, Confidence Intervals, Integrals, The Fundamental Theorem of Calculus
Reading Due: DAFSS Chapter 7

Week 9: Data Visualization

ggplot2, Exploration, Communication
Reading Due: R4DS Chapters 1-2

Week 10: Data Transformation

Data Wrangling, Filtering, Summarizing, Code Style
Reading Due: R4DS Chapter 3-4, 12

Week 11: Data Tidying

Pivoting, Scripts, and Projects
Reading Due: R4DS Chapter 5-6

Week 12: Data Import & Export

Pivoting, Scripts, and Projects
Reading Due: R4DS Chapter 7-8

Week 13: Merging Datasets

Keys, Joins, Fuzzy Record Linkage
Reading Due: R4DS Chapter 19

Weeks 14-15: Wrap Up

Review, Catchup, Bonus Topics, Final Exam

Academic Honesty

Remember that when you joined the University of Georgia community, you agreed to abide by a code of conduct outlined in the academic honesty policy called *A Culture of Honesty*. You may work on problem sets in groups, but I expect you to submit individual responses, and the midterm and final must be completed individually.

Mental Health and Wellness Resources

- If you or someone you know needs assistance, you are encouraged to contact Student Care and Outreach in the Division of Student Affairs at 706-542-7774 or visit https://sco.uga.edu. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.
- UGA has several resources for a student seeking mental health services or crisis support.
- If you need help managing stress anxiety, relationships, etc., please visit BeWellUGA for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center.
- Additional resources can be accessed through the UGA App.