

# POLS 7012: INTRODUCTION TO POLITICAL METHODOLOGY

Fall 2020

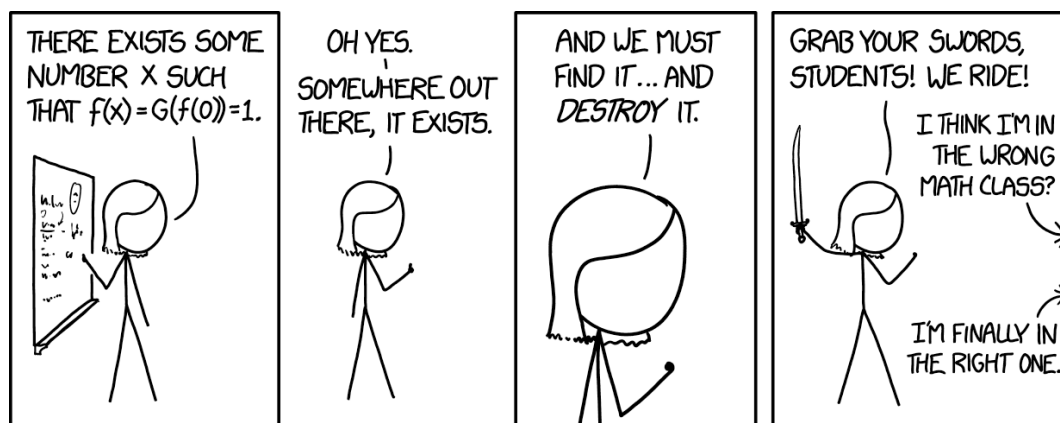
**Professor:** Joe Ornstein

**Email:** [jornstein@uga.edu](mailto:jornstein@uga.edu)

**Website:** <https://uga.view.usg.edu/d2l/home/2058721>

**Time:** W 6:30 – 9:15pm

**Place:** 102 Baldwin Hall



Math. Computation. ....In this class, we'll learn the math and computer skills we need to get started analyzing political data. Hit the ground running with real datasets.

## Course Objectives

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

- Manipulate, wrangle, and clean datasets using the R programming language
- Create beautiful data visualizations
- Organize your work so that it is transparent and reproducible
- Compute derivatives and solve systems of linear equations
- Explain the properties of probability distributions and expected values
- Perform hypothesis tests and fit models to data

## Assignments & Grading

Each week, I will assign a problem set. Midterm and a final, completed individually.

## Office Hours

Every Wednesday from noon to 1pm I will hold Virtual Office Hours over Zoom. I will put a sign up spreadsheet on the course website. I'm also available before and after class to chat.

## Textbook

There are no

- R4DS
- All of Statistics
- Simon & Blume
- Tufte
- Kieran Healy

## Tentative Course Outline

Von Moltke writes that no battle plan survives first contact with the enemy. The same is true for syllabi. The following schedule is a rough outline that I may need to adjust on the fly. For instance, can I teach you everything you need to know about calculus in one week? Maybe! But if not, I've built in some Bonus Weeks towards the end of the semester that we can use for catch up. If everything goes according to plan, then we can cover extra topics during those weeks by popular demand.

### Week 1: Getting Started

*Pre-Class Survey, Overcoming Fear, Notation, Setting up R and RStudio, Tidy Data, Basic Programming*

### Week 2: Visualizing Data

*ggplot2, Tufte's Principles, Distributions, Correlations, Faceting*

### Week 3: Tools for Reproducible Research

*Workflow, Documentation, File Structure, RMarkdown, L<sup>A</sup>T<sub>E</sub>X, Zotero/Mendeley, git and GitHub*

### Week 4: Tidying, Transforming, and Describing Data

*tidyverse, Merging, Filtering, Grouping*

### Week 5: Functions

*Summation, Products, Logarithms, Exponentials, Writing Better Code, Flow Control*

### Week 6: All The Calculus You Need

*Limits, Derivatives, Optimization, Integrals, Fundamental Theorem of Calculus*

### Week 7: Probability

*Combinatorics, Random Variables, Expectation, Variance, Covariance, Conditional Probability, Bayes Rule, Law of Large Numbers*

**Week 8: Inference**

*PDFs and CDFs, Central Limit Theorem, Hypothesis Testing*

**Week 9: Matrix Algebra and OLS**

*Regression, Systems of Linear Equations, Independence, Matrix Multiplication, Matrix Inversion*

**Week 10: Prediction**

*Fitting Models, Machine Learning, Overfitting, Cross-Validation, Regularization, Ensembles*

**Week 11: Review & Catchup**

*Midterm Exam*

**Week 12: Bonus Week 1**

Possible Topics: *Causal Inference, Text-As-Data, Big Data, Machine Learning, Networks, Spatial Data, blogdown, bookdown, Advanced Reproducible Research*

**Week 13: Bonus Week 2**

Possible Topics: *Causal Inference, Text-As-Data, Big Data, Machine Learning, Networks, Spatial Data, blogdown, bookdown, Advanced Reproducible Research*

**Week 14: Bonus Week 3**

Possible Topics: *Causal Inference, Text-As-Data, Big Data, Machine Learning, Networks, Spatial Data, blogdown, bookdown, Advanced Reproducible Research*

**Week 15: Review & Catchup**

*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\*](#). COVID-19 hasn't changed any of that. Problem sets can be completed in groups, but I expect your responses to be individual, and the midterm and final must be completed individually.