

POLI502: Methods of Political Analysis

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Course Objectives

POLI502 provides an introduction to the theory and practice of quantitative data analysis techniques targeted toward Political Science graduate students. The purpose of the course is to (1) build a foundational understanding of statistics and ordinary least-squares (OLS) models; (2) read, understand and evaluate quantitative research; and (3) design and conduct data analysis using the R programming language. This course is designed for students with no prior experience in the R programming language, so students will be given a comprehensive introduction to its use. By the end of the term, students will know how to summarize distributions of variables, estimate relationships between variables, and illustrate quantities of interest via statistical graphics.

Required Materials

- Paul M. Kellstedt and Guy D. Whitten. 2018. *The Fundamentals of Political Science Research*, 3rd ed. New York: Cambridge University Press (Hereafter *Kellstedt and Whitten*)
- Sean Gailmard. 2014. *Statistical Modeling and Inference for Social Science*. New York: Cambridge University Press (Hereafter *Gailmard*)
- Ismay, Chester and Albert Y. Kim. 2024. *Statistical Inference via Data Science: A ModernDive into R and the Tidyverse*, First Edition. Chapman and Hall. You can access it at <https://moderndive.com/> (Hereafter *Moderndive*).

Statistical Analysis Resources

Most the analysis examples and assignments in this course will employ R and RStudio, both of which can be freely downloaded and installed (R: <https://www.r-project.org/> RStudio: <https://posit.co/download/rstudio-desktop/>).

Here are some useful guides to using R that will come in handy throughout the semester:

- [R for Non-Programmers: A Guide for Social Scientists](#)
- [SimpleR - Using R for Introductory Statistics](#)

Course Requirements

Course Formats

1. *Problem sets* ($12 \times 2.5\%$ each = 30%, due by 11:59 PM on Friday of the assigned week)

After each class, students must complete the corresponding problem set and submit it through Blackboard. Submissions must include both (1) responses to the questions and/or interpretations of output and (2) the code necessary to complete each exercise in R.

2. *Midterm/Final Exams* ($2 \times 25\%$ each = 50%)

While using Google, YouTube, and Chat GPT is encouraged, you are required to write and hand in your own computer code and final write-up of the answers. DO NOT simply copy computer code or answers from your classmates.

3. *Quizzes* ($10 \times 2\%$ each = 20%)

After each class, students must complete the corresponding quizzes. will feature theory-based questions to check whether students have thoroughly read the reading materials.

Rubric

The following grading scale maps the final grade-points to letter grades. A: 90-100; B+: 87-89; B: 80-86; C+: 77-79; C: 70-76; D+: 67-69; D: 60-66; F: 0-59. Standard rounding rules apply. Late work will lose ten points for every six hours that it is turned in late. Further, tests may be curved, but this is at the discretion of the instructor.

Technology Requirements

You will access most of your course material and submit assignments through Blackboard. Please familiarize yourself with Blackboard during the first week of classes. You will need access to a working computer with internet access for the course. If your computer fails, please use one in the campus computer labs or borrow a laptop from the library.

Assignments must be submitted as described on the assignment and through Blackboard. Blackboard requires documents to be submitted in PDF format. Otherwise, I cannot read your submission.

Please be sure your browser is updated and compatible with Blackboard. Google Chrome is the recommended browser for Blackboard. The university provides students with Microsoft Office 365 free of charge. This allows you to install Word, Excel, PowerPoint, Outlook, OneNote, Publisher, and Access on up to 5 PCs or Macs and Office apps on other mobile devices including tablets. Office 365 also includes unlimited cloud storage on OneDrive. For more information about university software, please visit the Software section of my.sc.edu.

If you have problems or questions about computer technology or Blackboard, please contact the Division of Information Technology's (DoIT's) Service Desk at (803) 777-1800 or submit an online request through the Self-Service Portal or visit Carolina Tech Zone. The Service Desk is open Monday–Friday from 8:00 AM–6:00 PM (Eastern Daylight Time). If you contact DoIT with a technology problem, make sure you save your documents with the case number.

Accommodations

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Student Disability Resource Center. All disability accommodations must be approved through the Office of Student Disability Services. For more information, see [Student Disability Resource Center](#). Special accommodations are also available for veterans on duty and for parents.

Medical Matters

Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, contact the Office of Student Disability Services: 777-6142, TDD 777-6744, email sasds@mailbox.sc.edu, or stop by Close Hipp Room 112A.

Academic Dishonesty Policy

I will enforce rigorous standards of academic integrity in all aspects of this course. For the detailed policy of the University of South Carolina regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, see the University Honor Code: [Academic Responsibility - The Honor Code](#). Should you have any questions about possibly improper research citations or references, or any activity that may be interpreted as academic dishonesty, please see me before the assignment is due to discuss the matter.

Personal Integrity

I am committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. I will not tolerate discrimination and harassment on the basis of identity or status, including race, color, national origin, religion, sex, gender, age, disability, sexual orientation, genetics, or veteran status. For more information on the University Student Non-Discrimination and Non-Harassment Policy, see [Student Non-Discrimination and Non-Harassment Policy](#). If you want to speak to someone about an incident involving harassment, sexual assault, or interpersonal violence, you can call 803-777-8248 to talk to a trained interpersonal violence advocate.

Additional Information

Students are responsible for knowing both university and course schedules. The academic calendar is available at: [University Registrar](#).

Class Schedule

All course deadlines are listed in Eastern Time Zone. Blackboard will record all deadlines in this time zone. If you are in a different time zone, then plan accordingly. Each week will begin on a [insert day of week] and will end on [insert day of week].

Students must complete the required readings before class sessions and are encouraged to attend lectures and check Blackboard for updates. The course schedule is listed below:

📖: book, 📄: journal article or manuscript, 🔗: hyperlink, 📺: video, and 💡: weekly assignments.

Week 1: Scientific Study of Political Science and Theory Building

- 📖 Kellstedt and Whitten, Chapter 1, 2
- 🔗 *Moderndive*, Chapter 1 : <https://moderndive.com/1-getting-started.html>
- 📺 RStudio for the Total Beginner
- 📺 R tutorial - How to Create and Name Vectors in R
- 📺 R tutorial - Learn How to Create and Name Matrices in R
- 💡 Problem Set 1 (due by 11:59 PM on Friday)

Week 2: Causal Relationships and Research Design

- 📖 Kellstedt and Whitten, Chapter 3, 4
- 🔗 *Moderndive*, Chapter 1 : <https://moderndive.com/1-getting-started.html>
- 💡 Problem Set 2 (due by 11:59 PM on Friday)
- 💡 Quiz 1

Week 3: Data and Information I: Measuring Concepts of Interest

- 📖 Kellstedt and Whitten, Chapter 5
- 📖 Gailmard, pp.14-21
- 🔗 *Moderndive*, Chapter 3, 4 : <https://moderndive.com/3-wrangling.html> <https://moderndive.com/4-tidy.html>
- 💡 Problem Set 3 (due by 11:59 PM on Friday)
- 💡 Quiz 2

Week 4: Data and Information II: Univariate & Bivariate Distribution

- 📖 Gailmard, pp. 21-37
- 📖 Kellstedt and Whitten, Chapter 6
- 🔗 *Moderndive*, Chapter 2 : <https://moderndive.com/2-viz.html>
- 💡 Problem Set 4 (due by 11:59 PM on Friday)
- 💡 Quiz 3

Week 5: Probability and Statistical Inference I: Probability Theory

📖 Gailmard, pp.83-115

📺 [Basic probability: Joint, marginal and conditional probability | Independence](#)

💡 Problem Set 5 (due by 11:59 PM on Friday)

💡 Quiz 4

Week 6: Probability and Statistical Inference II: Populations and Samples

📖 Kellstedt and Whitten, pp.143-148

🔗 *Moderndive*, Chapter 7 : <https://moderndive.com/7-sampling.html>

📺 [Sampling Distributions](#)

💡 Problem Set 6 (due by 11:59 PM on Friday)

💡 Quiz 5

Week 7: Probability and Statistical Inference III: Normal Distribution and Confidence Intervals

📖 Kellstedt and Whitten, pp.148-160

📖 Gailmard, pp.160-168, 187-203

🔗 *Moderndive*, Chapter 8 : <https://moderndive.com/8-confidence-intervals.html>

💡 Problem Set 7 (due by 11:59 PM on Friday)

💡 **Midterm**

Week 8: Hypothesis Testing I

📖 Gailmard, pp.236-246

📖 Kellstedt and Whitten, pp.161-166

🔗 *Moderndive*, Chapter 9 : <https://moderndive.com/9-hypothesis-testing.html>

💡 Problem Set 8 (due by 11:59 PM on Friday)

💡 Quiz 6

Week 9: Hypothesis Testing II

📖 Kellstedt and Whitten, pp.166-188

💡 Problem Set 9 (due by 11:59 PM on Friday)

💡 Quiz 7

Week 10: Bivariable Linear Regression I

📖 Kellstedt and Whitten, pp.188-207

🔗 *Moderndive*, Chapter 5 : <https://moderndive.com/5-regression.html>

💡 Problem Set 10 (due by 11:59 PM on Friday)

💡 Quiz 8

Week11: Bivariable Linear Regression II

📖 Kellstedt and Whitten, pp.207-215

🔗 *Moderndive*, Chapter 10.2 : <https://moderndive.com/10-inference-for-regression.html#regression-interp>

💡 Problem Set 11 (due by 11:59 PM on Friday)

💡 Quiz 9

Week 12: Introduction to Multiple Regression I

📖 Kellstedt and Whitten, Chapter 10

🔗 *Moderndive*, Chapter 6: <https://moderndive.com/6-multiple-regression.html>

💡 Quiz 10

Week 13: Introduction to Multiple Regression II

📖 Kellstedt and Whitten, pp.246-258

🔗 *Moderndive*, Chapter 6: <https://moderndive.com/6-multiple-regression.html>

💡 Problem Set 12 (due by 11:59 PM on Friday)

Week 14: Thanksgiving

Week 15: Final Wrap-up

💡 Final Exam