Political Science 502 - Fall 2020

Methods of Political Analysis
Wednesday 5:50 PM-8:35 PM

Contact Information

Professor: Timothy M. Peterson
Email: timothy.peterson@sc.edu
Office hours: by appointment
TA: Rahul Hemrajani
TA email: rahulh@email.sc.edu
TA office hours: by appointment

About the Course

This course introduces students to the fundamentals of statistical inference and the analysis of data. Little to no mathematical background is necessary to take this course; and while we will be using some math, the primary aim of the course is to familiarize students with the conceptual knowledge necessary to carry out statistical analyses. We will also devote time to developing practical skills for data management and visualization, as well as broader workflow management to facilitate replication and transparency in quantitative research. This is an introductory course, and as such should be viewed as only the first step towards mastering quantitative research methods. Learning outcomes of the course include the following:

- Students will apply statistical methods for describing and assessing associations in data
- Students will create graphics to illustrate data
- Students will implement Data Access and Research Transparency guidelines
- Students will manage and analyze data using R
- Students will typeset scientific papers using LaTeX

Course Requirements

Attendance and Participation

Although this course will consist primarily of lecture, it nonetheless benefits from student participation and discussion. Students should attend synchronous class meetings prepared to take part in the discussion of the assigned readings each week, and ready to apply concepts learned to research questions in Political Science.

Given the unusual circumstances of our current pandemic, I ask that everyone be understanding if some students face occasional interruptions from, e.g., children or pets. Please let me know if you face any difficulties participating in web meetings.

Computers

Students will need access to a computer capable of joining synchronous class meetings and running necessary software, specifically R and R Studio.

Readings

Readings will complement and expand on the material discussed in class. Though the volume of reading in this course is less than in a typical seminar, the material can be dense, benefiting from careful attention and the

completion of example exercises. Particularly when reading about statistical software, you will likely find it useful to try out examples as you go.

All assigned readings are free/open-source and can be read with a pdf viewer (e.g., Preview or Acrobat) or in a web browser. Any changes to the schedule listed below will be discussed in class and posted on Blackboard at least one week in advance.

Required Texts

- Diez, David, Mine Çetinkaya-Rundel, and Christopher D. Barr. 2019. *OpenIntro Statistics*. Fourth Edition. **Electronic version available for free here** (suggested donation is $0 for classic pdf, $15 for tablet-friendly pdf). Hard copies available on Amazon.com.
- Wickham, Hadley, and Garrett Grolemund. 2017. *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data.* 1st Edition. **Web version available for free here.** Hard copies available on Amazon.com.

Supplemental Texts

- Gill, Jeff. 2006. *Essential Mathematics for Political and Social Research*. ISBN-13: 978-0521684033

Homework Assignments

There will be six homework assignments composed of followup questions from in-class tutorials, as well as exercises from the textbook. Starting with homework 2, students are required to typeset their assignments using LaTeX. Students might consider using knitr or R markdown to integrate LaTeX and R. For each homework, students must also submit a zip archive including all R code and data necessary to allow complete replication of results. Students can revise and resubmit homework assignments once (within one week of receiving original grades) to improve scores.

Final Project

Students will assemble and analyze data, producing a detailed discussion (including visualizations) of results. Students are free to choose any data sources they wish, but must merge at least two datasets together, and preferably will either aggregate observations or duplicate observations via many-to-one merging. All papers will be graded on proper use of statistical methods—including data management, simple statistics, t-tests, linear regression and diagnostics thereof, and visualization of results—as well as on spelling, grammar, and style. To facilitate grading with respect to these criteria, students also must submit replication packages containing annotated R code and raw data files; these materials must allow the instructor to replicate all data management and analysis. Additional information about final project requirements will be made available in class and on Blackboard.

Grading

Grades are tabulated as a weighted sum of: attendance and participation in class (10%), homework assignments (30%), and the final project (60%). Final grades are recorded as follows:

90% or above	A
85 to 89.99	B+
80 to 84.99	B
75 to 79.99	C+
70 to 74.99	C
65 to 69.99	D+
60 to 64.99	D
below 60	F

Grades as calculated are final. There will be no individual extra credit, although I might offer the entire class extra credit assignments. Additionally, I do not raise grades due to job or scholarship requirements, or simply because a student was close to receiving a higher grade. Typically, I will not even respond to emails asking for this type of preferential treatment. Of course, I am willing to double-check for errors in grade calculations. Finally, I do not accept late assignments without both (1) a credible excuse for delay, and (2) advance notice (unless impossible) that an extension is needed. Once homework answers are posted online, I will not accept additional submissions.

Incompletes

An incomplete grade is an exception and I will assign such a grade only if two criteria are simultaneously met: (1) the student is unable to complete the course due to a serious personal illness or tragedy, which is adequately documented; (2) the student has completed 50% of the course requirements and merely needs extra time to finish the remaining work. I will not assign an incomplete simply to allow extra time for students who fail to complete their work on time.

Plagiarism

Plagiarism is a serious academic offense and will be treated as such. USC has severe penalties for cases of plagiarism. Should I determine that plagiarism has occurred, I will determine whether the seriousness of the situation warrants (1) a penalty to the assignment, up to assigning a score of 0 for the work, (2) a penalty to the course, up to assigning an 'F,' or (3) a more severe penalty in accordance with the approved university procedure.

Accommodating Disabilities

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

Schedule

The schedule below is based on an estimate of the time required to cover each topic. I might adjust things slightly if topics require more or less time. I will announce any changes in advance on Blackboard.

Week 1 (August 26): Course introduction

*Before class: read info on DA-RT: **here**; W&G ch 1 through section 1.4*
During class: R, LaTeX, and workflow tutorial 1

Week 2 (September 2): Introduction to data

Reading: Diez et al. chapters 1 and 2; W&G ch 1 section 1.5-ch 4

Week 3 (September 9): Data pt II

Reading: W&G ch 5-21
During class: R, LaTeX, and workflow tutorial 2

Week 4 (September 16): Introduction to probability

Reading: Diez et al. ch 3
Homework 1 due (uploaded to Blackboard) at the start of class

Week 5 (September 23): Probability continued

Reading: W&G ch 26-29
During class: R, LaTeX, and workflow tutorial 3

Week 6 (September 30): Distributions of random variables

Reading: Diez et al. ch 4
Homework 2 due (uploaded to Blackboard) at the start of class

Week 7 (October 7): Distributions continued

Proposals for final project due (uploaded to Blackboard) at the start of class

Week 8 (October 14): Foundations for inference

Reading: Diez et al. ch 5
Homework 3 due (uploaded to Blackboard) at the start of class

Week 9 (October 21): Inference for categorical data

Reading: Diez et al. ch 6

Week 10 (October 28): Inference for numerical data

Reading: Diez et al. ch 7
Homework 4 due (uploaded to Blackboard) at the start of class

Week 11 (November 4): Introduction to regression

Reading: Diez et al. ch 8
Data sources/revised proposals for final project due (uploaded to Blackboard) at the start of class

Week 12 (November 11): Regression continued

Reading: Diez et al. ch 9 through section 9.4; W&G ch 22-25
Homework 5 due (uploaded to Blackboard) at the start of class

Week 13 (November 18): Logistic regression and advanced techniques

Reading: Diez et al. ch 9 section 9.5

Week 14 (November 25): Thanksgiving break—no class

Homework 6 due (uploaded to Blackboard) Wednesday, 12/2/2020, at 6 PM

Final paper due (uploaded to Blackboard) Wednesday, 12/9/2020, at 6 PM