POL 3085: Quantitative Analysis in Political Science

Fall 2019

Lecture:	W,F 8:15 - 9:30	
	Carlson School of Mgmt 2-215	
Lab:	Section 002: F 10:10 – 11:00	Section 003: F 11:15 – 12:05
	Blegen 440	Blegen 440
Instructor:	Carly Potz-Nielsen	
Email:	potzn001@umn.edu	
Office Hours:	R 12:00 - 2:00 733 SS,	
	by appointment 748 SS	
TA:	Hannah McVeigh	
Email:	mcvei012@umn.edu	
Office Hours:	W 10:00-12:00, 1214 SS	

Overview: This course is focused on providing a practical introduction to the use of quantitative statistical methods to examine and evaluate questions of interests. Research is an endeavor of answering question. More broadly, research is about teaching an audience something new and contributing to the base of knowledge. In this class, students will learn how to ask research questions, how to construct a theoretical answer, and how to evaluate that answer using quantitative data analysis. Students will learn how to conduct basic analyses using a statistical software and how to present their results via various mediums, such as memos, handouts, blogposts, and op-eds.

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

- Identify research puzzles and structure research questions

- Use quantitative data to provide evidence for or against a claim

- Examine relationships and describe data using statistical techniques

- Apply basic statistical analysis using the open-source software R

- Present and communicate statistical evidence through a variety of mediums, including written memos, discussions, and visual representations in a clear and informative way

Course Structure: This class consists of two lecture sessions and one lab session a week. Lecture will introduce and discuss concepts. Lab will work through applying these methods using the statistical software R. R is a free, downloadable software that we will use throughout the class to perform analyses. Documentation on how to download and install R on personal computers can be found on the course website.

Required:

Kellstedt, Paul M. and Whitten, Guy D. "The Fundamentals of Political Science Research." 3rd Edition. 2018. Cambridge University Press.

A copy is on reserve for this class in the library.

It is recommended that students either use a **USB drive** or set up a Google Drive for this course. Students should contact the instructor immediately if there are extenuating circumstances that would prevent them from providing their own USB drive and arrangements will be made to provide them with one.

Grading and Evaluation

Participation (30pts):
The material covered in this course is cumulative, meaning that small questions in week one, can ripple to giant misunderstandings in week ten. Successful students will therefore regularly ask questions and engage with the course material. It should be noted that engaging with the course material is not equivalent to attending class. Students can participate by going to office hours, contributing in class activities, discussing material with the instructor, emailing questions about the class, or asking for assistance with R code or course material.

Lab Participation (120pts):
R is only learnt through working through and breaking code. Successful R users must develop habits of precise, intentional, and annotated code. Therefore, each week lab will focus on introducing and working through R commands. Each lab worksheet will have a set of questions at the end of the lab that will direct students to apply the code for themselves. The TA will work through the general R commands in lab, then time will be given for students to adjust and apply the commands to answer a set of questions. These will be due by Sunday at 23:59 following the lab. Each week a random sample of labs will be pulled and graded. Each student will receive grades on at least 3 labs (at 30 pts each), selected randomly throughout the semester.

Problem Sets (5 at 30 pts each):
There will be 5 problem sets assigned throughout the course. They will focus on linking the theoretical points from class to their application in a real research setting. Emphasis will be placed on format as well as content. Problem sets will be due by the beginning of class on the day that they are due. Each problem set will be given out at least a week in advance of the due date. Collaboration in small groups is permitted, but each student must turn in their own assignment. If students work in groups, then all members of the group should be listed at the top of each homework assignment.

*Problem sets should be saved as **.pdfs**, with the file title including your last name, the class, and the homework assignment separated by an underscore, i.e. Potz-Nielsen_POL3085_HW1. All R scripts should be uploaded separately as **.R** files.*

Midterms (2 at 200 pts each):
There will be two midterm exams. Both will be closed book/note, bluebook exam (bluebooks provided) covering conceptual material in the course. The exam will consist of defining key concepts and applying them to address research puzzles.

Research Project and Presentation (300 pts):
The purpose of the final project is to demonstrate students ability to apply the methods learned in this class and communicate what they tell the audience about the question of interest. The final project will consist of an 8-10 page paper (200pts) and an in-class presentation (60pts). Datasets for the analysis will be provided. A draft proposal (20pts) for the final paper will be due on **October 9th** and a formal proposal (20pts) will be due on **November 8th**.

Grade Breakdown (out of 1000 possible points):

Points	Graded Item	Due Date
150	Problem Sets	Beginning of class
200	Midterm 1	October 30
200	Midterm 2	December 11
300	Research Paper	December 18
150	Participation	

Missed Exams and Late Work:
There is a penalty of 5 points for each day an assignment is late. However, late penalties will be waived for problem sets if the student emails the Instructor before the *original* time an assignment is due and organizes an alternative due date. All assignments should be submitted by the midterm. Late lab assignments will not be accepted. Missed exams or extensions on research papers must be cleared with instructor one week before due date. It is the students responsibility to keep track of outstanding assignments.

Grade Disputes:
Questions about grades are welcome and encouraged. Disputes should be addressed in person, outside of class, within two weeks of when the assignment or exam was handed back. Any disputes after that period need to be accompanied with a written memo of where and why the points should be earned.

Useful References:

∗ Li, Quan. "Using R for Data Analysis in Social Sciences: A research project-oriented approach." 2019. New York, NY : Oxford University Press. ∗

Monogan, James E. III. "Political Analysis Using R." 2015. Springer. Available for free from library website.

Powner, Leanne C.. "Empirical Research and Writing: A Political Science Students Practical Guide." 2015. Sage Press.

Wheelan, Charles. "Naked Statistics." 2013. W.W. Norton & Company.

Quick R website: http://www.statmethods.net/

University Procedures:

Student Conduct Code:
The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community. As a student at the University you are expected adhere to Board of Regents Policy: Student Conduct Code. To review the Student Conduct Code, please see: http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.

`pdf`. Note that the conduct code specifically addresses disruption of the academic environment, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach and/or a students ability to learn."

Use of Personal Electronic Devices in the Classroom:
The University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom. For complete information, please reference: `http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html`.

Scholastic Dishonesty:
You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: `http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html`. The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: `http://www1.umn.edu/oscai/integrity/student/index.html`. If you have additional questions, please clarify with your instructor for the course.

Makeup Work for Legitimate Absences:
Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. `http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html`.

Appropriate Student Use of Class Notes and Course Materials:
Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: `http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html`.

Grading and Transcripts:
The University utilizes plus and minus grading on a 4.000 cumulative grade point scale. The two grading systems used are the ABCDF and S-N. Political science majors and minors must take POL courses on the ABCDF system. An S grade is the equivalent of a C- or better. Inquiries regarding grade changes should be directed to the course instructor. Extra work in an attempt to raise a grade can only be submitted with the instructors approval. For additional information, please refer to: `http://policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html`.

Incompletes:
The instructor will specify the conditions, if any, under which an Incomplete will be assigned instead of a grade. No student has an automatic right to an incomplete.

Department of Political Science Policy: The instructor may set dates and conditions for makeup work using a "Completion of Incomplete Work" contract form. All work must completed no later than one calendar year after the official last day of the class.

Sexual Harassment:
"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy: http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf University of Minnesota employees must report sexual misconduct they learn about in accordance with University policy. More information on mandated report can be found here: https://diversity.umn.edu/eoaa/reporting

Equity, Diversity, Equal Opportunity, and Affirmative Action:
The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf.

Disability Accommodations:
The University of Minnesota is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact DS at 612-626-1333 to arrange a confidential discussion regarding equitable access and reasonable accommodations. If you are registered with DS and have a current letter requesting reasonable accommodations, please contact your instructor as early in the semester as possible to discuss how the accommodations will be applied in the course. For more information, please see the DS website: https://diversity.umn.edu/disability/.

Mental Health and Stress Management:
As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: http://www.mentalhealth.umn.edu.

Academic Freedom and Responsibility:
Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.

Students are responsible for class attendance and all course requirements, including deadlines and examinations. The instructor will specify if class attendance is required or counted in the grade for the class.

Class Schedule:

Sept. 4   Course Plan and Asking Research Questions

References:
∗ Kellstedt and Whitten Chpt. 1
∗ Powner From Research Topic to Research Question (p 1-15)
∗ Kevin Drum. Social Science is Hard. Mother Jones (July 24, 2012):
http://www.motherjones.com/kevin-drum/2012/07/social-science-hard

Sept. 6   Answering Questions and Building Theories: Structure and Answers
           Lab: Intro to R and RStudio

References (9/6 - 9/11):
∗ Kellstedt and Whitten Chpt. 2 and 3
∗ Popper, Karl R. Science as Falsification. Conjectures and Refutations (1963)

Sept. 11   Evaluating Causal Theories:

Sept. 13   Measuring Variables: Defining Concepts and Variation
           Lab: Data Introduction

References :
∗ Kellstedt and Whitten 6.1 - 6.2

Sept. 18   Issues of Measurement: Concepts to Measure

References:
∗ Kellstedt and Whitten 5
∗ Jose Antonio Cheibub, Jennifer Gandhi, and James Raymond Vreeland.
Democracy and dictatorship revisited. Public Choice (2010): p. 67-101.
∗ Seva Gunitsky. How do you measure democracy? The Monkey Cage.
https://www.washingtonpost.com/news/monkey-cage/wp/2015/06/23/
how-do-you-measure-democracy/?utm_term=.5e51ba7d12aa

Sept. 20   Research Design: Identifying Causality
           Lab: Recoding Variables

References (9/20 - 9/27):
∗ Kellstedt and Whitten 4.1-4.2
∗ Basic Research Designs Center for Innovation in Research and Teaching
(CIRT) Grand Canyon University.
https://cirt.gcu.edu/research/developmentresources/tutorials
/researchdesigns

Sept. 25   Guest Lecture: Thomas R. Vargas
           Research Design: Experiments:

References:

∗ Ritter, Joseph A. and David Beal. Detecting Racial Profiling in Minneapolis
Traffic Stops: A New Approach CURA Reporter Summer/Spring 2009: 11-17

Problem Set 1 Due

Sept. 27   Research Design: Small-n Design and Observational Design
Lab: Transforming Variables

References:
∗ Kellstedt and Whitten 4.3
∗ Bennett, Andrew. "Case study methods: Design, use, and comparative
advantages." Models, numbers, and cases: Methods for studying international
relations (2004): 19-55.
∗ Collier, David. "The comparative method." Political Science: The State of
Discipline II, Ada W. Finifter, ed., American Political Science Association (1993).

Oct. 2   Describing Data: Descriptive Statistics and Variation

References:
∗ Kellstedt and Whitten 6.3 - 6.6
∗ Descriptive Vs. Inferential Statistics: Know the Difference
https://sciencestruck.com/descriptive-vs-inferential-statistics

Problem Set 2 Due

Oct. 4   Statistical Inference I: Using Data to Learn about the Population
Lab: Univariate Graphs and Descriptive Statistics

References (10/4 - 10/11):
∗ Wheelan, The Central Limit Theorem: The Lebron James of Statistics
Naked Statistics, Chapter 8.
∗ Better Explained. A Brief Introduction to Probability and Statistics.
https://betterexplained.com/articles/a-brief-introduction-to-
probability-statistics/
∗ (Optional) Clive Thompson. The Surprising History of the Infographic. July 2016.
Smithsonian Magazine.
http://www.smithsonianmag.com/history/surprising-history-infographic
-180959563/?no-ist

Oct. 9   Statistical Inference II: Using Data to Test Theory

References:
∗ Kellstedt and Whitten Chpt. 7
∗ David M. Lane. Confidence Intervals on the Mean.
http://onlinestatbook.com/2/estimation/mean.html
∗ John D. Cook. Why isnt everything normally distributed?

https://www.johndcook.com/blog/2015/03/09/why-isnt-everything-normally-distributed/
∗ (Optional) Tall Life
https://tall.life/height-percentile-calculator-age-country/

Draft Proposal Due

Oct. 11   Confidence Intervals
          Lab: Bivariate Graphs

          References:
          ∗ How (not) to interpret confidence intervals
          http://www.timvanderzee.com/not-interpret-confidence-intervals/

Problem Set 3 Due

Oct. 16   Margins of Error and Interpreting Polls

          References (10/16 - 10/18):
          ∗ Hypothesis Testing: Single Mean and Single Proportion
          http://www.webassign.net/idcollabstat2/Chapter9.pdf

Oct. 18   Evaluating Categorical Distributions: χ^2 comparisons
          Lab: Bivariate Statistics

          References: (10/18 - 10/23):
          ∗ Hypothesis Testing: Single Mean and Single Proportion
          http://www.webassign.net/idcollabstat2/Chapter9.pdf

Oct. 23   Evaluating Continuous Distributions: t-tests

          References (10/23 - 11/8):
          ∗ What Is a t-test? And Why Is It Like Telling a Kid to Clean Up that Mess in the Kitchen?
          https://blog.minitab.com/blog/statistics-and-quality-data-analysis/what-
          is-a-t-test-why-is-it-like-telling-a-kid-to-clean-up-that-mess-in-the-kitchen
          Problem Set 4 Due

Oct. 25   Review
          Lab: Check-in

Oct. 30   **Midterm 1**

Nov. 1   Logic of Bivariate Hypothesis Testing: t-tests and p-values
          Lab: Bivariate Hypothesis Testing

          References (11/1 - 11/6):
          ∗ Kellstedt and Whitten Chpt. 8
          ∗ Jim Frost. How to correctly interpret p-values. 2014.

http://blog.minitab.com/blog/adventures-in-statistics-2/how-to-correctly-
interpret-p-values
∗ (Optional) Guess the Correlation. http://guessthecorrelation.com/
∗ "Tutorial: Pearson's Chi-square Test for Independence"
https://www.ling.upenn.edu/~clight/chisquared.htm
∗ Describing Bivariate Relationships
http://ciosmail.cios.org:3375/readbook/rmcs/ch11.pdf

Nov. 6   Bivariate Relationships: Covariation and Correlation

            References:
            ∗ IV. Describing Bivariate Data
            http://onlinestatbook.com/chapter4/bivariate.html

Nov. 8   Bivariate Regression
            Lab: Bivariate Regression

            References:
            ∗ Kellstedt and Whitten Chpt. 9

            Paper Proposal Due

Nov. 13   Multivariate Regression

            References:
            ∗ Kellstedt and Whitten Chpt. 10.1-10.4, 11.1-11.2
            ∗ Wheelan, Regression Analysis: The miracle elixir. Naked Statistics, Chapter 11.

Nov. 15   Interpreting and Presenting Regressions
            Lab: Multivariate Regression

            References:
            ∗ Statistical vs. Substantive Significance
            ∗ Kellstedt and Whitten Chpt. 10.5-10.10
            https://achimkemmerling.wordpress.com/2013/04/30/statistical-
            vs-substantive-significance//
            ∗ Presentation of Regression Results
            https://www.csus.edu/indiv/v/vangaasbeckk/courses/145/sup/regressionresults.pdf

            Problem Set 5 Due

Nov. 20   Assumptions of Regression

            References:
            ∗ Kellstedt and Whitten Chpt. 11.4 -11.6

Nov. 22   Poster Feedback
             Lab: Assumptions of Regression

             References:
             ∗ Kellstedt and Whitten Chpt. 12

Nov. 25   Posters Due to Printers

Dec. 4   Poster Presentations, Section 002

Dec. 6   Poster Presentations, Sections 003
             Lab: Final Project Workshop

Dec. 11   **Midterm 2**

Dec. 18   **Final Research Paper Due**