POL 3085: Quantitative Analysis in Political Science
Summer 2017

Instructor: Carly Potz-Nielsen
Time: Tuesday and Thursday 9:15 AM - 12:15 PM
Meeting Room: Social Sciences Building 628
Office Hours: Wednesdays 10:00-12:00, or by appointment
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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 questions; 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. The course will emphasize communicating statistical evidence across multiple platforms in a clear, comprehensive, and accurate way.

Course Objectives:
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 an open-source software R
- Present and communicate statistical evidence through a variety of mediums, including written reports, oral discussion, and social media outlets, in a clear and informative way

Course Structure:
Each class will be divided into two parts: lecture and lab. Lecture will introduce and discuss concepts and motivate the reasoning behind using quantitative methods to address research puzzles. 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 Text:
Kellstedt, Paul M. and Whitten, Guy D. "The Fundamentals of Political Science Research." 2nd Edition. 2013. Cambridge University Press.

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

Students will need a **USB drive** for this course. This will be used every class period throughout the semester. 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:
Engaging with the course material and in class is essential to keeping up with the quick pace of a summer session. It should be noted that engaging with the course material is not equivalent to attending class. While attendance will factor into a broader participation grade, emphasis is on encouraging 'active learning.' Participation credit is not limited to speaking in class; it can be earned by coming to office hours, engaging in class activities, discussing material with the instructor, emailing questions about the class, or asking for assistance with R code or course material.

Lab Exercises:
R is only learnt through working through and 'breaking' code. Successful R users must develop habits of precise, intentional, and annotated code. Therefore, each class will consist of lecture as well as a lab, which 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 instructor 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 within 24 hours of each lab (12:00pm the following day).

Problem Sets:
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. All 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 and will be graded within a week of their collection. 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.

Midterm:
There will be one midterm exam on **July 6th**. It will be a closed book/note, bluebook exam (bluebooks provided) covering the first half of the conceptual material in the course. The exam will consist of defining key concepts and applying them to address research puzzles.

Final Project and Presentation:
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 and an in-class presentation. Within the paper, there will be a set of questions that you must address when communicating the results of your research project. Datasets for the analysis will be provided. A draft proposal for the final paper will be due on **June 29th** and a formal proposal will be due on **July 20th** and are together worth 20% of the final grade for the paper.

Grade Breakdown:

% of Final Grade	Graded Item	Due Date
20%	Problem Sets	Due at the beginning of class
15%	Lab Exercises	Due within 24 hours of lab
20%	Midterm	July 6th
30%	Final Paper	August 5th
10%	Paper Presentation	August 3rd
5%	Participation	

Missed Exams and Late Work:
Since this course is only 8 weeks, work will not be accepted after one week following the original due date. Problem sets, proposals, and final papers lose a half letter grade every 24 hours after the due date. Late lab exercises will not be accepted. If there is a legitimate excuse for an absence, it should be presented before the absence and it is the student's responsibility to arrange to complete the assignments.

Grade Disputes:
Questions about grades are welcome and encouraged. Disputes should be addressed in person, outside of class, within a week 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:
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 Student's 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 disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

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*.

Students are encouraged to bring laptops to class, but they are expected to be used for purposes relevant to that day's class. It is useful, but by no means necessary, to use a personal machine during lab to minimize the chance of work being lost. Appropriate uses of laptops during lecture include taking notes and searching for information pertinent to a class discussion (presumably, to share with the class) and instructor.

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 instructor's 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

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 require or counted in the grade for the class.

Class Schedule:

June 12   Course Plan and Asking Research Questions
            Lab: Downloading R

            Reference:
            ● 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

June 15   Scientific Method and Theory Building
            Lab: Intro to R

            Reference:
            ● Kellstedt and Whitten Chpt. 2 and 3
            ● Popper, Karl R. "Science as Falsification." Conjectures and Refutations
              (1963)

June 20   Research Design: Testing Theories
            Lab: Data Introduction

            Reference:
            ● 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/researchdesig
              ns
            ● 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

June 22   Observational Data: Data Structure and Levels of Measurement
            Lab: Identifying and Recoding Variables

            Reference:
            ● Kellstedt and Whitten 4.3-4.4, 5.8

June 27   Issues of Measurement
            Lab: Transforming Variables

            Reference:
            ● Kellstedt and Whitten 5.1 - 5.7

- 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

Problem Set 2 Due

June 29   Describing and Summarizing Data
Lab: Measures of Central Tendency and Dispersion

Reference:
- Kellstedt and Whitten 5.9 - 5.12

Draft Proposal Due

July 4   NO CLASS

July 6   **MIDTERM EXAM**

July 11   Statistical Inference I: Using Data to To Learn About the Population
Lab: Univariate Graphs and Statistics

Reference (for both 7/11 and 7/13):
- Kellstedt and Whitten Chpt. 6
- 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

Problem Set 3 Due

July 13   Statistical Inference II: Using Data to Test Theory
Lab: Univariate Statistical Significance

Reference:
- David M. Lane. "Confidence Intervals on the Mean." http://onlinestatbook.com/2/estimation/mean.html
- John D. Cook. "Why isn't 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/

July 18   Bivariate Relationships and Hypothesis Testing
             Lab: Bivariate Relationships and Statistical Significance

             Reference:
             ● Kellstedt and Whitten Chpt. 7
             ● 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/

             Problem Set 4 Due

July 20   Bivariate Regression
             Lab: Bivariate Regression and Model Fit

             Reference:
             ● Kellstedt and Whitten Chpt. 8

             Project Proposal Due

July 25   Multivariate Regression
             Lab: Multivariate Regression

             Reference:
             ● Kellstedt and Whitten Chpt. 9

             Problem Set 5 Due

July 27   Violating the Assumptions of Linear Regression
             Lab: Violating Assumptions

             Reference:
             ● Kellstedt and Whitten Chpt. 10

August 1   Review for Final Project
             Lab: Troubleshooting Challenge

             Reference:
             ● Kellstedt and Whitten Chpt. 12

August 3   PAPER PRESENTATIONS
August 5   FINAL PAPER DUE