POLS 560: Quantitative Methods

Spring 2017
Lecture: M 8:10-10:00pm W 6:10-10:00pm, 35-217C (Kennedy Library)

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COURSE DESCRIPTION & OBJECTIVES:

This course is a graduate level requirement in the Master of Public Policy program. The goal of this course is statistical literacy. To be statistically literate is to be able to make sense of statistics, i.e. to think critically about the information being presented; to understand the context; and to be able to tell the story in the data.

At the end of this course, students should be able to:

1. Understand the role of quantitative analysis in the social sciences.
2. Read and understand statistical results in political science and public policy research.
3. Create and manage a dataset.
4. Select and run the appropriate statistical tests for addressing their own research questions and hypotheses.
5. Interpret and present statistical test results relating to their own research questions and hypotheses.
6. Be proficient in the use of the statistical software programs Excel and R.

The main challenge of this course lies in estimating, implementing and evaluating the connections between statistical knowledge and policy topics about which you are passionate. Statistics help you to understand and learn from the past, make sense of the present, and make inferences about the future. The value of statistics is only as great as your ability to accurately understand, interpret and evaluate the available information.

Being statistically literate allows you to access and use data more effectively for informed decision making, including being able to:

- evaluate number-based claims in the media
- recognize words that imply much but assert very little
- understand statements involving rates and percentages
- critically evaluate statistically-based arguments involving public policy
- identify consequences, implications or impacts of specific policies.

Statistical literacy is relevant to everyone. However, the level of competency and the type of information required can differ, i.e. people who are required to analyze data, interpret it and communicate the findings will have a need for more advanced skills than someone who needs to assess whether the information provided to them in a media advertisement is meaningful.

COURSE FORMAT AND ORGANIZATION:

CLASS REQUIREMENTS:

Homework	15%
Statistics Paper	45%
Midterm	20%
Final	20%
Participation	5%

This equals 105%. Of course, you cannot score 105% (this is a statistics class after all), so your lowest assignment will be worth 5% less than given in this syllabus (excluding participation). For example, if your lowest grade is for the midterm, it will only be worth 15% of your final grade, not 20%.

COURSE EXPECTATIONS:

Much of this will be commonsense, but it never hurts to be upfront about what I am expecting. This course is designed as a seminar. As such, successful class time requires the active participation of each student. I expect us, as a course and as individuals, to critically examine what we read and discuss through questions, debates, and problems.

The best way to understand statistics, and to use a statistical package is to actually do it (learn by doing, so to say). Most weeks you will have little homework assignments. You will also be assigned some data management problems (set by me), and some R problems (again mainly set by me). These problems will be set on Wednesday, and will be due before the start of the next Monday's class. We may spend some time in class (generally on Wednesday) working on these problems. You MAY work together on these projects, unless specifically told you cannot. I think that working in a group can be very useful, if you approach it as a learning experience, rather than one of just getting the right answer. Any and all work you submit must be yours (i.e. you must understand the answer yourself). I will drop your lowest homework grade from your final score (however, you must submit all homework assignments). For information on labs and availability please refer to this website: http://lib.calpoly.edu/learningcommons/labs/

I expect students to attend each seminar, prepared and ready to discuss readings and topics. I also expect students to treat each other and me with respect – this includes things like making sure cell phones are turned off before class, letting me know if you need to leave class early or won't be able to attend. This also means that I expect assignments to be turned in on time. Most of the assignments are either brief enough to be completed in class within the given time or announced early enough in the quarter that turning in work late should not be an issue. However, emergencies do occur. I ask that you let me know as soon as you can if you have a situation which may necessitate an extension or other solution.

CLASS PAPER:

The paper will be due at the start of the last class of the quarter. The paper is to be emailed to me (I do not want a hard copy) in Microsoft Word format. I will not accept a pdf, nor any other type of electronic document. It should be between 15 and 20 pages long (although I am a little flexible on that), including graphs, figures, excluding title, abstract page, and bibliography. The paper will be in 12 point, Times New Roman font, double spaced, and with one-inch margins. Students must use APSA or APA citation style. Any papers not submitted in the correct style will be deducted a whole grade point (10 points out of 100). You will also need to submit the literature review section of the paper by the end of week 4.

THE STRUCTURE AND FORMAT OF YOUR RESEARCH PAPER

By now you should have come across published research, so you should have some idea of how articles are structured. Political science papers and articles all basically follow the same structure:

Abstract – a brief statement of the question and results

Introduction – a description of the research question, telling the reader why this research is important, and what it finds

Literature Review –reviews the state of the current research and places research project in the context

Theory, Model, and Hypotheses – your explanation of what is going on. Also, what you will test

Methods – how you will test your hypotheses

Results – what you find

Conclusion – what we now know, and what way forward for research in this area.

In this class I am most interested in Methods, Results, and Conclusions…That said, I expect a full research paper!

Below are the guidelines for your grade on the paper.

Dataset: I must be able to replicate the creation of the dataset and every variable, transformed or otherwise (so record where and when you got each and every variable).

Good papers will be generally ones which are well written, with fewer (not less) grammatical and basic errors. The easiest way of getting a good grade here, is to have the paper written as early as possible, and have a classmate proofread the paper.

Literature Review: A better paper will show that you have synthesized the literature, and have presented it in a logical way. See almost any peer-reviewed publication.

Theory, Model, and Hypotheses: A better paper will logically link these three things. You should present your hypotheses in a formulistic way. This might not read well, but I want to make sure you can correctly formulate testable hypotheses. The second part is the most important. You will be graded on a couple of things.

Methods: This is going to be a little strange, as the best method for your question might be for you to do qualitative work, but you MUST use OLS regression. The main thing is to set up the problem correctly. A good paper will show why OLS regression will get at the question. Also, it will go through how the variables are constructed, and why they are both valid and reliable.

Results: First you must summarize you data. Then you must correctly present and analyze your regression results. This means that you must create correct tables and figures. Better papers will show how the relationship between variables works (or does not) in reality.

Conclusion: You should tell the reader about the results and draw the appropriate conclusion. Then a good paper will point the way forward for future research.

COURSE POLICIES:

Use of Polylearn and Cal Poly E-mail: We will use Polylearn heavily for this class. Please check the site regularly for updates. Also be sure to check your Cal Poly e-mail address or have mail forwarded to your regular e-mail account (as this is the official channel of communication at Cal Poly).

Assignments: The due dates for the assignment are on the syllabus. Detailed instructions for each assignment will be given out in class. The format for written assignments is double-spaced, 12pt Times New Roman font, and one-inch margins, unless otherwise specified on the assignment page. Failure to adhere to this format may result in point deductions.

Week	Topic	Assignments
Week 1 (4/3)	Overview; quality→quantity; data management in Excel	HW1: Read the SLO Vital Signs summary report, play with software, read the codebook for the SLO CAP data and write a paragraph explaining what policy-related variables you are interested in exploring
Week 2 (4/10)	Data management in R; Modeling with summary statistics	HW2: Write a summary of how you brought your data into an R directory and set up your R workspace (include all code)
Week 3 (4/17)	Graphing and presenting data	HW3: Develop a causal hypothesis between two variables of interest, then create a single graph that best summarizes the relationship between the two, in both Excel and R
Week 4 (4/24)	Probability and statistical inference	Paper Lit Review Due 4/26

Week 5 (5/1)	Significance testing	Midterm 5/1
Week 6 (5/8)	Comparing means and relationships	HW4: Create summary statistics and confidence tests for several (at least three) samples/groups of interest for your paper
Week 7 (5/15)	Non-parametric tests and categorical data	HW5: Summarize tests for substantive and statistical differences between groups
Week 8 (5/22)	Linear modeling	HW6: Estimate an OLS model with DV of interest and 2-3 IVs
Week 9 (5/29)	Diagnostic tests	HW7: Diagnose goodness-of-fit and summarize your research findings
Week 10 (6/5)	Non-Linear extensions	**Final Papers Due 6/7**
Finals Week	Final exam	

COURSE MATERIALS:

Required Resources

An Adventure in Statistics, Andy Field https://www.amazon.com/Adventure-Statistics-Reality-Enigma/dp/1446210456

Other Resources

Tufte, E.R. (2006). The Cognitive Style of PowerPoint: Pitching Out Corrupts Within (2nd Edition). Graphics Press.

Angeli, E., J. Wagner, E. Lawrick, K. Moore, M. Anderson, L. Soderlund, A. Brizee (2010). APA Formatting Guide. Retrieved from http://owl.english.purdue.edu/owl/resource/560/01/ (link available via Polylearn)

Texts often serve as the basis for our class discussion and exercises. Each week, we may supplement the class discussion with readings that illustrate the concepts, go more in depth, and provide a basis for discussion. Additional readings can be accessed via Polylearn.

I reserve the right to amend the syllabus throughout the quarter. All revisions will be announced in class.

CAMPUS POLICIES

PLAGIARISM AND CHEATING

Cheating (according to the Cal Poly Campus Administrative Manual: obtaining or attempting to obtain, or aiding another to obtain credit for work, or any improvement in evaluation of performance, by any dishonest or

deceptive means) and plagiarism (according to the Cal Poly Campus Administrative Manual: using the ideas or work of another person or persons as if they were one's own without giving proper credit to the source) are serious offenses in a university, and may result in a failing grade for a particular assignment, a failing grade for the course, and/or suspension for various lengths of time or permanent expulsion from the university.

Any instance of cheating or plagiarism will be referred to the Vice President of Student Affairs through the Office of Student Rights and Responsibilities. The Cal Poly rules and policies are listed in the catalog, as well as at the Office of Student Rights & Responsibilities website (osrr.calpoly.edu).

The Department of Political Science also has its own Academic Integrity Policy which is different than the campus policy and can be found at http://cla.calpoly.edu/pols/advising/advising.html. I encourage you to read the Department's policy and the Cal Poly policy. If you have questions about what may constitute plagiarism, ask me beforehand!

DISABILITIES

Cal Poly will provide reasonable accommodations for persons with documented disabilities. If you have a disability that may have some impact on your work in this class and for which you might require accommodations, please see me as soon as possible. These accommodations will be provided only to students who have been certified as needing them through the university's Disability Resource Center (DRC). Disabilities covered by law include but are not limited to learning disabilities and hearing, sight or mobility impairments. You will need to provide documentation of your disability to your instructor. It is your responsibility to acquire the necessary certification and inform me in a timely manner.