POLI 281: Quantitative Research in Political Science

University *of* North Carolina *at* Chapel Hill

Fall 2018

1 Course Information

- Instructor: Daniel Gustafson
- Email: gustafson@unc.edu
- Course Time: Tuesday/Thursday 11:00 AM–12:15 PM
- Course Room: Phillips—Room 206
- Office: 303 Hamilton Hall
- Office Hours: Tuesday/Thursday 9:15 AM–10:45 AM or by appointment

2 Course Description

This course is designed to achieve two objectives: (1) introduce you to research and quantitative analysis in political science, and (2) help you become critical (but not cynical) consumers of quantitative analysis used in political and policy-oriented reporting. Throughout the course, we will discuss the complexities of generating a good research design, starting with theory building and operationalizing concepts of interest to political scientists. We will discuss the challenges and limitations of gathering good data to test these theories as well as various statistical tools that can be used to evaluate our theories. Additionally, we will tackle the challenge of what conclusions we can draw from these. Throughout the course, we will use what we have learned to think critically about the use of quantitative research and the inferences drawn from that research by analysts, reporters, politicians, and policy advocates. As such, not only will you be learning to do your own analysis this semester, but also learning to evaluate such information when it's presented in the media.

You should take this course if:

- You are a political science (or other social science) concentrator.

- In addition to developing your knowledge of statistical concepts, you want to learn the computational skills needed to manipulate and analyze data.
- You are willing to spend considerable time *both inside and outside* of the classroom each week to keep up with course materials.
- You would like to use and/or understand quantitative methods in the future.

2.1 Changes to the Syllabus

I reserve the right to make changes to this syllabus at any time. If changes are made, students will be informed through email and verbally in class, and a new syllabus document will be posted on Sakai.

3 Course Requirements & Grading

Your grade for the course will be determined by performance in four areas: class participation, problem sets, a critical analysis project, and exams.

3.1 Grades

Final grades for the course will be based on the following scale. I reserve the right to make adjustments to individual grades based on overall performance in the course and/or extenuating circumstances. There will be NO extra credit provided.

A: 93-100	C: 73-76
A-: 90-92	C-: 70-72
B+: 87-89	D+: 67-69
B: 83-86	D: 63-66
B-: 80-82	D-: 60-62
C+: 77-79	F: 59 or below

3.2 Course Grade Breakdown

The proportion of each assignment as part of your overall grade is as follows:

- In-Class Participation and Assigned Work: 20%
- Problem Sets: 15%
- Critical Analysis Project: 35%
  - Proposal: 5%

  - Preliminary Analysis: 5%
  - Presentation: 10%
  - Paper: 15%
- Exams: 30%
  - Midterm Exam: 10%
  - Final Exam: 20%

3.3 In-Class Participation & Assigned Work: 20%

Class time will be divided between lecture and in-class activities. The way you are going to learn best, especially when it comes to working with statistical software, is through practice. Active involvement in activities is absolutely crucial to success in this class—not to mention, an easy way to boost your participation grade (and thus your overall grade). We will be doing a lot of in-class work, both individually and in groups. While attendance is not graded directly, absences will hurt your grade as you cannot earn participation points if you are not in class. If you know you are going to be absent for an excused reason, email me before class and give me any documentation I need to excuse you (i.e. doctor's notes, University notes, etc.). **When your absence is excused, you can make up the in-class work for credit. When your absence is unexcused, you cannot make the in-class work up and you will receive a zero.**

3.4 Problem Sets: 15%

Homework assignments will be assigned throughout the semester. The problem sets will be posted to Sakai and are due by the posted due date. Late homework will be subject to a 10 point (of 100) penalty each additional day it is late. **Late homework will no longer be accepted after the answer key is posted to Sakai.**

3.5 Critical Analysis Project: 35%

The research project is a primary focus of this course and, as such, makes up just over a third of the overall grade. This project will allow you to directly apply the lessons from this course to a political issue or question that you care about. For the project, you will be assigned to a group of 4-5 students. Your group will work together to select a relevant political issue or question, theorize about some factors that might explain that issue or help answer the question, choose a (provided) data set appropriate for the question, and analyze the data to see whether your expectations were supported. Each member of the group will receive *approximately* the same grade on all parts of the research project; I expect each member, in turn, to make an equal contribution throughout the process. You will be asked to evaluate

your group members and yourself at each stage of the process and the evaluations provided will have an impact on your grade. Therefore, it's in your best interest to do your part. The project and overall distribution of points are divided into four parts:

- **Project Proposal (5%)**: Each group must turn in by email a two-page, double-spaced paper proposal by September 27. This proposal should include a brief description of the issue or question you plan to examine. Make sure to address why this topic is interesting to you and/or important within political science. This proposal should include an initial description of your research question, theory, and hypotheses. Please make an appointment to talk with me during the first few weeks of class if your group is having any trouble figuring out what topic you would like to pursue.
- **Preliminary Analysis (5%)**: Each group must turn in a preliminary data analysis, which includes the key statistics used to test your hypotheses, by November 20 This assignment, totaling approximately two or three double-spaced pages, requires a brief description of the data used, a brief explanation of the statistical methods you used, the relevant statistical outputs you computed, and an indication of whether and why the outputs support or oppose your paper's hypotheses.
- **Presentation (10%)**: At the end of the semester, each group will make a PowerPoint presentation about its research. The dates of the presentations are November 29 and December 4. Each presentation should be approximately 12-15 minutes, and time will be left for questions and answers after each group presents. Presentation grades will be based on the appropriate application of concepts we have learned in class to the discussion of your research project, the accuracy of those concepts, the level of critical thinking displayed in your presentation, and your ability to answer questions in response to your presentation.
- **Paper (15%)**: The final research paper is due by email on December 7 by 5:00 PM. This paper should be approximately 10 pages, double-spaced, not counting any tables, figures, or the bibliography. We will talk more in class about citation style and my expectations for the specific sections of the paper. The paper grade will be based on the quality of your writing, the critical thinking you display throughout the paper, the persuasiveness of your theory and analysis, and how well you apply concepts from class lectures, discussions, and readings. Each group will turn in one paper.

3.6 Exams: 10% + 20% = 30%

There will be one midterm and a final exam. The midterm is worth 10% of your final grade, and the final exam is worth 20%. The midterm will be on October 16 and the final will be on December 13. The format of each exam will be discussed more completely in class when the exam date is closer.

3.7 Policy on Unexcused Absences & Exams

You are required to be present for all scheduled exams. The only allowable exception to this policy is a documented emergency. If at all possible you should contact the instructor before the exam to discuss the emergency, provide documentation, and schedule the make-up.

4 Expectations

4.1 Communication

I am very happy to meet with students outside of class time. Whether it be to discuss concerns about the course, remediation with the material, or simply to engage further with the topic, please feel free to stop by Hamilton 303 during my office hours. If you are unable to meet during my office hours, which are listed at the top of this syllabus, please email me to set up a time to talk. Email is the best mode of communication with which to reach me. While I do my best to respond to emails as quickly and thoroughly as possible, please expect a response within 24 hours and plan accordingly.

Please note that email is only for brief communications. If you have long and complicated questions, come to my office hours. University Policy stipulates that no grades can be sent over email. *After I have graded and returned your assignments, there is a twenty-four hour moratorium before I will answer questions about that assignment.*

4.2 Class Discussions & Classroom Civility

All conversation during class must be civil, reasoned, and respectful of others' opinions. An important component of this course is discussing ideas with, learning from, and working together with your peers. As such, I want to create an environment where you feel comfortable, confident, and excited about sharing your thoughts and applying what you have learned to issues you care about. I encourage students to challenge themselves to think about, voice, and debate new ideas, all while maintaining norms of civil discourse. I know we are up to this challenge.

4.3 Technology Use

The use of cell phones or other mobile communication devices is strictly prohibited during this class, without exception. Laptops are required for class periods in which we are using R. On lecture-days, laptops will be prohibited.

4.4 Students with Disabilities

Students with disabilities needing academic accommodation should (1) contact the office of Accessibility Resources & Service at UNC: ars.unc.edu, (2) bring a letter to me indicating the need for accommodation and what type. This should be done during the first week of class.

4.5 Academic Dishonesty

According to UNC's Instrument of Student Judicial Governance, "It shall be the responsibility of every student enrolled at the University of North Carolina to support the principles of academic integrity and to refrain from all forms of academic dishonesty." Failure to abide by this policy may result in punitive action taken against the offending students. Consult the UNC Writing Center's handout on plagiarism (http://writingcenter.unc.edu/handouts/plagiarism/) to learn more on how to avoid academic dishonesty.

4.6 Honor Code

All students participating in the class are assumed to be familiar with and adhering to the UNC Honor Code. I treat violations of the Honor Code seriously. More information is available at studentconduct.unc.edu.

4.7 Collaborative Group Membership

As explained above, students will work on the research project, including the presentation and final paper, as a group. Though time will be given in class for group members to work together on the various sections of the research project, you will still need to devote a substantial amount of time to the group project outside of class. I expect all members of the group to contribute equally to the project, and each component of the project should reflect contributions from each group member. In other words, do not simply divide up the components of the project among the members of the group. While collaborative work poses some challenges, the benefits you will gain from learning how to work together successfully as a team will serve you well in all facets of your life, from the classes you take in the future to the career you pursue after graduation. When it comes to group work, two problems often occur: 1) one member of the group dominates the project, or 2) some members of the group "free ride" by relying on other group members to do their work for them. I will try my best to prevent both, by regularly checking in with groups about the status of their projects. If problems within the group do arise, I encourage you first to discuss them openly and honestly among yourselves to see if some resolution can be found. If problems persist, please see me.

5 Course Materials

5.1 Required Materials

There is one required book for this course available in the UNC Bookstore. We rely heavily on this textbook so it is absolutely essential that you buy it. Any other course materials will be made available electronically on the course Sakai website.

- Imai, Kosuke. *Quantitative Social Science: An Introduction.*

Please note that this textbook has a lot of online materials. We are going to make use of many of them. Heres the student website you'll need to access these materials:

- qss.princeton.press/student-resources-for-quantitative-social-science/

5.2 R

Much of the hands-on work we will do in this class requires us to use computers, so I ask that you bring your laptops to class each day. Specifically, we will make use of R, a free statistical software used to analyze data and create graphics, over the course of the semester. RStudio is a popular text editor that allows you to open, edit, and save R text files, making it much easier to work with R. I will use RStudio to demonstrate in class, and I recommend you download and use it as well. To access these programs:

- R Statistical Software: Download the precompiled binary distributions of the base system and contributed packages for either Windows or Mac at cran.us.r-project.org/.
- RStudio: Download the free "RStudio Desktop" at www.rstudio.com/products/rstudio/

5.3 Suggested Materials & Additional Resources

There are a number of free supplemental resources available through UNC that you may want to explore for additional assistance. For additional assistance with R, James Monogon's Political Analysis Using R provides instructions and explanations on how to calculate and understand various statistics using R. The full e-book is available via the UNC library website. In addition to this book, the Odum Institute at UNC can be a crucial resource for you. On Thursdays from 2:00–3:30, there will be R Open Labs, beginning on September 6 in Davis Library that help you learn R. There are also a couple short video courses available. Citations and links to these resources are here:

- Monogan III, James E. *Political Analysis Using R.* Springer, 2015.
- Odum R Open Labs: ropenlabs.web.unc.edu
- Odum Video Short Course on R: www.youtube.com/user/OdumInstitute

Additional help may be found at the Odum Institute's Statistics Help Desk. The help desk is located near the stairs on the second floor of Davis behind the GIS Research Hub desk. It is staffed by a graduate student from 9 AM to 6 PM Monday through Friday. A listing of the individuals who work at Odum and specifically for the Fall work schedule will be posted online.

6 Tentative Course Schedule[1]

Readings and assignments are due the date of class listed. Homework assignment due dates will be given throughout the semester.

Date	Topic	Readings & Assignments
August 21	Introduction & Overview	
August 23	Theory Building	Download R & RStudio
August 28	Introduction to Analysis in R	Imai Chapter 1 (1–31)
August 30	Introduction to Analysis in R	
September 4	Causality and Descriptive Statistics	Imai Chapter 2 (32–69)
September 6	Causality in R	
September 11	Applied Political Science Research	Imai Chapter 3 (75–116)
September 13	R Practice	
September 18	Prediction & Linear Regression I	Imai Chapter 4 (123–148)
September 20	Linear Regression II	
September 25	Linear Regression in R	Imai Chapter 4 (156–170)
September 27	Multiple Regression	**Research Proposal Due**
October 2	Multiple Regression in R	
October 4	Regression with Interaction Terms	
October 9	Interaction Terms in R	
October 11	Midterm Review	
October 16	**Midterm Exam**	
October 18	Fall Break	No Class
October 23	Probability	Imai Chapter 6 (242–306)
October 25	Random Variables	
October 30	Uncertainty I	Imai Chapter 7 (314–342)
November 1	Uncertainty II	Imai Chapter 7 (342–361)
November 6	Uncertainty III	
November 8	Project Group Work	
November 13	Hypothesis Testing	
November 15	Regression with Uncertainty	Imai Chapter 7 (361–390)
November 20	Regression with Uncertainty in R	**Preliminary Analysis Due**
November 22	Thanksgiving Break	No Class
November 27	Project Group Work	
November 29	Group Presentations	
December 4	Group Presentations	
December 13	**Final Exam** (12 PM)	

[1] I reserve the right to modify this syllabus over the course of the semester. All changes to the syllabus will be clearly communicated in class and posted on Sakai.