PSCI 2075: Quantitative Research Methods

Spring 2019

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Office Hours:	Mondays 3:00-5:00 (and by appt.)

TAs:	Courtney Johnson	Christina Ladam	Ian Shapiro	Stephanie Wise
TA Office Hrs	W, 9:30-11:30 KTCH, 412	W, 11:30-12:30 2-3:00, KTCH 382	W, 12-1:00 2-3:00, KTCH 215	TH, 1-3:00 KTCH, 412

MLC	Carey Stapleton (Methods Lab Coordinator)
MLC Office Hrs	T,W,TH, 10-5 KTCH 233

Class	Day	Time	Room	Instructor
Lecture 010	M/W	1:00-1:50	1B20 VAC	Dr. Sokhey
Section 011	M	12:00-12:50	0135 STAD	Ms. Johnson
Section 012	W	12:00-12:50	0004 CLUB	Ms. Johnson
Section 013	W	3:00-3:50	0240 HALE	Mr. Shapiro
Section 014	W	11:00-11:50	0135 STAD	Mr. Shapiro
Section 015	M	2:00-2:50	136C STAD	Ms. Ladam
Section 016	W	2:00-2:50	136C STAD	Ms. Wise
Section 017	M	3:00-3:50	0209 CLRE	Ms. Ladam
Section 018	TH	3:30-4:20	0143 EDUC	Ms. Wise

1 Course Description

How should we evaluate the claims made by politicians, policy-makers, members of the media, or even our friends and family? Many social scientists do this by using data, and increasingly, quantitative data (i.e., information that can be represented by/analyzed using numbers). You encounter such data—even if you might not realize it—when you read the results of a poll, make a purchase, or simply search for something online. This course is designed to help you understand how data is used to, among other things, make decisions, write and evaluate policies, and sell you goods and services. It is also designed to arm you

with the skills and confidence needed to produce your own quantitative analyses (thereby making you more valuable to potential employers).[1]

Learning quantitative methods skills is not easy—it takes practice, persistence, and patience. To help make this a smoother process, this course will follow a "learning-by-doing-" format, meaning that much of our time will be spent working through exercises and material in small groups (both in the large class, and in recitations). In general, most weeks will involve one day of lecture by me on ideas and concepts, and one day of "flipped class," where you work on exercises in small groups using the R statistical environment. The format of recitation sessions will also vary, with some weeks involving review/the covering of material in a more traditional manner, and some weeks being "flipped" for group work. In addition to consulting the TAs and me, you should take advantage of the Methods Lab Coordinator (MLC)—Carey Stapleton—for help with R and other computing problems.

My objectives for this course are to help you:

1. Become an informed consumer of data
2. Become a producer of quantitative analyses
3. Gain familiarity with the R statistical environment
4. apply course knowledge/skills as thoughtful (and potentially active) members of our democratic society.

Please note: This is a rigorous course, and includes a number of readings and exercises that are advanced/difficult. Students should expect to spend roughly 8-12 hours per week on reading assignments (in addition to attendance in lecture and recitation). Readings (and webcasts, etc.) are to be completed ahead of the class meeting for which they are assigned.

Also, over the semester as we go through examples, we may tackle subjects that evoke passion and controversy. You may disagree with others, and you may feel uncomfortable when you are confronted with certain information, opinions, or arguments. Working through and respecting differences is an important part of both higher education and democratic process — please try to be respectful of others and civil in tone when you ask questions or make comments.

2 Course Requirements and Evaluation

2.1 Prerequisites

There are no prerequisites for this course. You will need a laptop that can run the R statistical environment, and you will need to bring your laptop to the main class and your recitation section.[2] We will learn and use the R statistical environment in this class, but it is not expected that you have prior experience with this application.

2.2 Required Texts

Please purchase the following from the merchant of your choice:

1. Pollock, Philip. 2016. *The Essentials of Political Analysis*, 5th edition. Sage. ISBN 978-1-5063-0583-7 (**EPA**)

[1] My thanks to David Brown and Andy Philips for sharing their syllabi and course materials — their approaches inform this course.

[2] If you do not have a laptop/a laptop that can run R, you may use computer labs on campus. Note: there are also options for renting laptops from the university.

2. Pollock, Philip and Barry C. Edwards. 2018. *An R Companion to Political Analysis*, 2nd edition. Sage. ISBN: 978-1-5063-6884-9 (**RC**)

Announcements, course materials, and submission of assignments will take place through the course website on *Canvas*. Note: I reserve the right to make changes to the syllabus — material may be added, dropped, and re-arranged based on the pace and performance of the class. Please familiarize yourself with *Canvas*, and check it regularly for updates. The TAs and I will also communicate with the class via email, and students are expected to check their CU email on a daily basis.

3 Grading and Grade Components

The system used to assign final course grades will be:

- A : 94-100
- A-: 90-93
- B+: 87-89
- B : 84-86
- B-: 80-83
- C+: 77-79
- C : 74-76
- C-: 70-73
- D : 60-69
- F : 59 and below

Final grades will be calculated based upon the following,[3] and you must complete *all portions* of the course to receive a passing grade:

1. **Exams (Individual Assignments)**: "Midterm" (20%) + "Final" (25%): **45%**

   There will be two longer individual assignments in the form of a midterm and a final exam. Each of these will be focused on the course material/skills covered in assigned readings, group exercises, lectures and recitation sections. Because the material in this course builds on itself, you should consider the final exam to be cumulative in nature. For both the midterm and the final, your work should be your own, and you will have a 24 hour window in which to complete the exam and submit it via a dropbox on *Canvas*. Make-up exams will only be administered for legitimate excuses (illness, serious personal emergency, etc.)—these are granted at my discretion, and always require documentation. The registrar's office has scheduled our class' final exam for Monday, May 6th; the final exam will be administered during that 24 hour period (please plan accordingly).

2. **Group Assignments**: 6 group assignments at 5% each: **30%**

   In the first week of class you will be assigned a small group (from fellow students in your recitation). You will work with this small group over the semester on a series of six assignments. Group assignments will be due roughly every 2 weeks (and are to be submitted via *Canvas*) by 11:59 pm on the Friday of the week in which they are due.[4] Late group assignments will not be accepted.

3. **Recitation Grade**: 5% Participation + 10% Attendance + 10% Quizzes and Exercises: **25%**

[3] Extra credit opportunities *may* arise throughout the semester — stay tuned.
[4] The exception to this is the final group assignment, which will be due by 11:59 pm on the last day of regular classes.

One-third of your class time will be spent in a weekly recitation section. Recitations will reinforce the material/skills covered in the main class, and cover additional/complementary material (especially R-related items). Some recitation sessions will be devoted to additional group work/exercises, and some will take the form of more traditional class time (for review/lecture on material). Because recitations are designed to cover material (that will not be covered in the main class) and to provide additional time for small group work, it is essential that you regularly attend (and actively engage) these sessions. Accordingly, **participation** in your recitation counts for 5% of your final course grade; this will be tracked and assigned by your TA (full points require consistency and effort).

Attendance in recitation counts towards 10% of your final course grade. You are allowed three unexcused recitation absences for any reason, but each additional unexcused absence beyond this will result in the loss of 1% of your final course grade, up to the 10%. Note: Because you may miss three weeks of recitation for any reason, additional absences will only be excused under exceptional circumstances (serious family emergency, hospitalization, etc.). If you have a cold, have a conflict, etc., use one of your granted absences.

The final portion of your recitation grade will come from **quizzes and exercises** that will take place in your section (10% of your final course grade). There will be 5 quizzes/exercises over the course of the semester (each worth 2%);these may address the material/skills covered up to and including that week's material, and should be viewed as a measure of your grasp of the course. There will be no make-ups for missed quizzes. All judgments about legitimate excuses and any exceptions to this policy are made at the discretion of the recitation instructor.

Note: There will often be more discussion/open dialogue in recitation sections than we can (reasonably) have in the large class. Accordingly, I ask you to please treat your instructor and colleagues with respect when asking questions, making comments, and otherwise participating in class activities.

4 Course Policies

4.1 The Classroom Environment

Please be respectful of others (and your instructors) when attending the main class and recitations — try to avoid late arrivals, early departures, ringing cell phones, and conversation not related to the course. Moreover, while using laptops will be an essential part of this class, I ask that you put phones away and minimize distractions on your computer (excessive web browsing, games, etc.). If you are texting or causing a distraction, you may be asked to leave class.

4.2 Contacting Me or the Teaching Assistants

I/we are excited to be working with you this spring. If you have questions, please send an email to me or the teaching assistants and we will reply as soon as possible (usually within 24 hours; if you do not hear back in 48 hrs., please email again). If your question requires a lengthy explanation/discussion, please come to office hours or make an appointment. Whenever you contact us, it is important to be professional, meaning that written communication must adhere to the following (if an email or note does not meet these criteria, you may not receive a response):

1. Please address me or the teaching assistants respectfully.
2. Please clearly identify yourself and your section.
3. Please use capital letters, periods, and appropriate grammar.
4. Please include information that helps us to respond to your question (i.e., take the time to explain your question, give sufficient detail, etc.)

4.3 Grading Policies and Standards

We will return graded material as promptly as possible. While we try to be very careful in grading, we are aware that we sometimes make mistakes. If you receive an exercise or exam back and believe that a mistake has been made, we will be happy to check—and perhaps re-grade—your assignment. Please hold on to your exam (assignment) for at least 24 hours after it has been returned before you ask for a re-grade. Any re-grade request must be made in writing (this consists of a single paragraph explaining why the original grade is inappropriate), and must be submitted within one week from the time the assignment was returned to you (after one week has passed, we will not re-grade any exams or papers). Under most circumstances, we will re-grade the entire exercise or exam — note that this means that your grade may go up, go down, or remain the same.

4.4 Special Accommodations/Disability

I am more than happy to make special arrangements for students with documented disabilities that have been documented through Disability Services (colorado.edu/disabilityservices). If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or injury, see Temporary Injuries guidelines under the Quick Links/Students Tab at the Disability Services website and discuss your needs with me.

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please see full details at: http://www.colorado.edu/policies/observance-religious-holidays-and-absences-classes-andor-exams. Please notify me about potential conflicts at least 2 weeks in advance of exams/due-dates.

4.5 Discrimination and Harassment

The University of Colorado at Boulder policy on Discrimination and Harassment (http://www.colorado.edu/policies/discrimination-and-harassment-policy-and-procedures), the University of Colorado policy on Sexual Harassment, and the University of Colorado policy on Amorous Relationships applies to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at http://hr.colorado.edu/dh/Pages/default.aspx.

4.6 Academic Honesty

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the Honor Code. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, threatening behavior, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions from the Honor Code. Additional information regarding the Honor Code policy can be found online and at the Honor Code Office. If you violate the honor code, you will receive a "zero" on the assignment/portion of the course grade in question.

4.7 Professional Courtesy and Learning Environment

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the student code.

5 (Provisional) Course Schedule

5.1 Part 1

Learning Objectives

- Gain familiarity with with the R statistical environment.
- Think about concepts, and how we move from concepts to measures.
- Practice with descriptive statistics, basic data manipulation and basic data visualization.
- Generate and Test Hypotheses.
- Design research to make inferences.

Topics and Reading Assignments

Week 1: 1/14-1/18. Introductions; Introduction to R

M 1/14: Introduction to the class, syllabus.

W 1/16: Introduction, Ch. 1 of *Essentials of Political Analysis (EPA hereafter)*

Recitation: Class Intro.; Installing/exploring R; Ch.1 *R Companion (RC hereafter)*

Week 2: 1/21-1/25 Descriptive Statistics

M 1/21: No Class (MLK)

W 1/23: Ch.2, EPA

Recitation: Ch.2, RC

Week 3: 1/28-2/1. Descriptive Statistics (continued)

M 1/28: Transforming Variables; Ch.3, RC

W 1/30: Group Work in Class

Recitation: Review of material/group work time

First Group Assignment Due 2/1, 11:59 pm

Week 4: 2/4-2/8. Hypotheses and Comparisons

M 2/4: Hypotheses; Ch. 3, EPA

W 2/8: Group Work in Class

Recitation: Ch. 4, RC

Week 5: 2/11-2/15. Research Design

M 2/11: Controls and Confounds, Ch.4, EPA

W 2/13: Group Work in Class; Ch. 5, EPA

Recitation: Ch.5, RC

Second Group Assignment Due 2/15, 11:59 pm

Week 6: 2/18-2/22. Statistical Inference

M 2/18: Populations and Sample Statistics, Ch.6, EPA

W 2/20: Group Work in Class (reinforcing ideas)

Recitation: Review of material on inference

Week 7: 2/25-3/1. Tests of Significance

M 2/25: The Logic of Testing; 1st half of Ch.7, EPA (pgs.156-170)

W 2/27: Group Work in Class

Recitation: Ch.6, RC

Third Group Assignment Due 3/1, 11:59 pm

Week 8: 3/4-3/8. Review

M 3/4: Review of Material to Date/Catch-Up

W 3/6: No Class — Midterm Administered

Recitation: Review

Midterm Due 3/6, 11:59 pm

5.2 Part 2

Learning Objectives

- Understand how to evaluate basic relationships in data
- Understand how statistical techniques are used in conjunction with research design
- Be able to identify, use and interpret regression analysis
- Visualize and present results for outside readers

Topics and Reading Assignments

Week 9: 3/11-3/15. Measures of Association

M 3/11: When to use what, 2nd half, Ch.7, EPA (pgs. 170-182)

W 3/13: Group Work in Class

Recitation: Ch.7, RC

Week 10: 3/18-3/22. Correlation, Bivariate Regression

M 3/18: Correlation, Ch. 8, EPA (pgs. 183-198)

W 3/20: Group Work in Class

Recitation: First half of Ch.8, RC (pgs. 117-122)

Fourth Group Assignment Due 3/22, 11:59 pm

Week 11: 3/25-3/29. Spring Break (No Classes)

Week 12: 4/1-4/5. Regression Continued

M 4/1: Dummy and Multiple Regression, Ch.8, EPA (pgs. 198-203)

W 4/3: No Class (Work on Group Projects)

Recitation: 2nd half of Ch. 8, RC (pgs.123-127)

Week 13: 4/8-4/12. Regression Continued

M 4/8: Interactions and Diagnostics, Ch.8, EPA (pgs.203-214)

W 4/10: Group Work in Class

Recitation: Ch.9, RC (pgs. 151-154)

Fifth Group Assignment Due 4/12, 11:59 pm

Week 14: 4/15-4/19. Visualizing Analysis

M 4/15: Visualization of Correlation and Regression, Ch.9, RC

W 4/17: Group Work in Class

Recitation: Ch.9, RC

Week 15: 4/22-4/26. Logistic Regression

M 4/22: Basics/Logic, 1st half of Ch.9, EPA (pgs.215-230)

W 4/24: Group Work in Class

Recitation: 1st half Ch. 10, RC (pgs.163-172)

Week 16: 4/29-5/3. Logistic Regression (cont.); Wrap-Up

M 4/29: 2nd half of Ch.9, EPA (pgs. 231-243);Ch. 10, EPA

W 5/1: Group Work in Class

Recitation: 2nd half of Ch. 10, RC (pgs.172-183)

Sixth Group Assignment Due, 5/2 (last day of classes), 11:59 pm

Final Exam To be administered (online), May 6