

University of Notre Dame  
Political Science 40811  
**Quantitative Political Analysis**  
Spring 2023

DeBartolo Hall, Room 108  
MW 9:30 AM – 10:45 AM  
Office hours: M 1:00 PM – 4:00 PM

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This course is designed to achieve three objectives: (1) introduce you to research and quantitative analysis in political science, (2) help you become critical consumers of quantitative analysis used in political and policy-oriented reporting, and (3) give you the ability to answer questions of social scientific importance using data. Throughout the course, we'll discuss the complexities of generating good research designs, starting with how to ask interesting questions and how to measure concepts of interest to social scientists. We'll 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. Throughout the course, we'll use what we've learned to think critically about the use and abuse of data 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.

The target audience for this course is undergraduate students with interest in the social sciences (not only Political Science), who want to use quantitative approaches to solve important social problems while simultaneously developing marketable, analytical skills. This course is cross listed with MDSC and may count toward one of the two elective courses required for the Data Science Minor sequence completion. This course is also one of the two "core" courses required for completion of the Political Methodology Specialization for the Political Science Major.

### **Required Materials**

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. Please let me know if you do not have regular access to a laptop computer. Throughout the semester we will make use of the R statistical computing environment to analyze data. RStudio is a popular 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: Download precompiled binary distributions at <http://cran.us.r-project.org>
- RStudio: Download RStudio Desktop at <http://www.rstudio.com/products/rstudio>

The textbook recommended for this course has extensive online materials for learning to use R. I would recommend the online or paperback edition. Because this textbook was published within the last year, few if any used copies will be available. If price inhibits your purchasing this textbook, please contact me before or at the beginning of the semester:

- Elena Llaudet and Kosuke Imai. 2022. *Data Analysis for Social Science: A Friendly and Practical Introduction*.

## 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.

## Class Attendance Policy

Class will be held synchronously every week from 9:30 a.m. to 10:45 a.m. Considering these uncertain and unprecedented times, I will not have a hard and fast attendance policy. However, having taught this class across multiple semesters, I would highly suggest attending class as frequently as possible. Learning to code in statistical programming software is like learning a new language, it can be very challenging. This class will cover a large amount of material very quickly. Being present, asking questions, and tuning in to lectures is the surest way to be successful.

## Schedule of Graded Assignments

5%	Feb. 14 <sup>th</sup>	Problem Set #1: Objects, Vectors, and Data Structures
5%	Feb. 14 <sup>th</sup>	DataCamp Completion Check
5%	Feb. 26 <sup>th</sup>	Problem Set #2: Conditionals, Control Flow & Loops
25%	Mar. 6 <sup>th</sup>	Midterm Exam
5%	Apr. 10 <sup>th</sup>	Problem Set #3: Interpreting Bivariate & Multivariate Regression
5%	Apr. 24 <sup>th</sup>	Problem Set #4: Probability, Hypothesis Testing & Confidence Intervals
25%	May 1 <sup>st</sup>	Final Examination Date
25%	May 8 <sup>th</sup>	Final Project Due @ 9:00 A.M.

A completion grade for DataCamp practice exercises will constitute 5% of a student's final grade. All DataCamp assignments will be checked for completion on a single date (Feb.14<sup>th</sup>) where each student's reported progress will be recorded for a grade. For example, 100% completion would translate to a grade of 100%.

Four graded problem sets will constitute 20% of a student's final grade, with each assignment worth 5%. All graded problem set will be scored out of 50 potential points. Please ensure your assignment has been submitted correctly, work that is submitted late will be docked half a letter grade for each day tardy. Graded problem sets must be turned in *before* the class in which they are due. I require electronic submission to Canvas. I have a very flexible extension policy for graded problem sets: any student who reaches out via email to request an extension will be granted a 24-hour extension; no explanation required. Extensions requested *after* an assignment due date will not be granted. There will be no opportunities for extra credit. All graded work must be individual, but I encourage students to seek help from classmates on any ungraded assignments.

The midterm and final exams constitute 50% of a student's final grade. At the end of the semester, exams will be re-weighted such that the *higher scoring exam* will constitute 30% of a student's final grade and the *lower scoring exam* will constitute 20%. The midterm and final exams will be open note, open laptop, and partially take-home. Students **will be permitted** to use notes, class work, and homework answer keys, in addition to the RStudio help environment during the exam. Students **will not be permitted** to use Wi-Fi during *any portion of the exam*. Questions on R syntax

constitute a considerable portion of each exam, students who fail to bring a laptop to the exam will be provided a paper copy of the exam and will not be permitted to take the exam at an alternative time. Exam questions that must be completed during class time will be noted on the exam; although the exam is take-home the expectation is that it could be finished within class time.

The written project deliverable for this course is a politically-oriented, data-supported blog post similar to the kinds of discussions featured on [FiveThirtyEight](#), [The Duck of Minerva](#), [Pew Data Labs](#), [The UpShot](#), [Mischiefs of Faction](#), and [The Monkey Cage](#) (currently affiliated with WaPo but becoming independent once again this year). This project will be discussed in greater depth during the semester. This project will be composed of an eight-page final deliverable where the proposed research question is explored through a data-driven investigation (25% of final grade).

## **Expectations**

### *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 JNH 2057 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. Office hours are an important resource that should be utilized to improve understanding of materials or ask more personalized questions. Office hours before an exam will be held at regular times and, unless noted by me, no additional office hours will be held - so plan accordingly. After I have graded and returned your assignments, there is a twenty-four hour moratorium before I will answer questions about that assignment.

### *Students with Disabilities*

Students with disabilities needing academic accommodation should visit the following link <https://dulac.nd.edu/academic/disabilities/> to learn about proper protocols and channels for requesting academic accommodations.

### *Academic Integrity*

This class follows the binding Code of Honor at Notre Dame. The graded work you do in this class must be your own. In cases where you collaborate with other students, make sure to fairly attribute their contribution to your project. Students should familiarize themselves with these guidelines: <http://nd.edu/~hnr/code/docs/studentguide.pdf>.

Programming is a skill that takes time and practice to develop. Whenever you encounter a new problem, you will have to grapple with it and reach an understanding of what it is asking before you can reach a solution. Discussing the problem with other people is permitted and even encouraged. When it comes time to write your code to solve the problem, all work must be your own. Do not copy anyone else's code, and do not share your code with others. Identifying plagiarized code is surprisingly easy, even after renaming variables or rearranging individual

pieces of code. Some in-class work is collaborative, and collaborative writing of code is permitted in these cases.

### Schedule of Readings and Assignments

Date	Concept	Required Readings & Assignments
Jan 17	Introduction & Expectations	
Jan 22	<b>R:</b> Objects	DataCamp: Intro to R (1) Recommended Reading: Llaudet & Imai, pp. 1-1.6
Jan 24	<b>R:</b> Vectors & Factors	DataCamp: Intro to R (2,4) Recommended Reading: Llaudet & Imai, pp. 1.7- 1.8
Jan 29	<b>R:</b> Data Structures	DataCamp: Intro to R (3,5)
Jan 31	<b>Lecture:</b> Experiments	AJPS: Do Politicians Racially Discriminate Against Constituents? A Field Experiment on State Legislators, Butler & Broockman (2011, pp. 463-470) Recommended Reading: Llaudet & Imai, pp. 2-2.4
Feb 5	Catch-Up Class	
Feb 7	<b>Activity Class</b>	
Feb 12	<b>R:</b> Conditionals	
Feb 14	<b>Lecture:</b> Surveys	APSR: Resurgent Mass Partisanship: The Role of Elite Polarization, Hetherington (2001, pp. 619-624) Recommended Reading: Llaudet & Imai, pp. 3-3.2
Feb 19	<b>R:</b> Descriptive Statistics	Recommended Reading: Llaudet & Imai, pp. 3.3-3.4
Feb 21	<b>Lecture:</b> Relationships	Llaudet & Imai, pp. 3.5-3.7
Feb 26	No Class	
Feb 28	<b>Lecture:</b> Observational Data <b>* class held online</b>	JOP: The Symbolic and Substantive Representation of LGB Americans in the US House, Hansen & Treul (2015, pp. 955-963) Recommended Reading: Llaudet & Imai, pp. 5-5.2, 5.5;
Mar 4	<b>Activity Class</b>	
Mar 6	<b>Midterm Exam</b>	
Mar 11	No Class – Spring Break	
Mar 13	No Class – Spring Break	
Mar 18	<b>Introduction to Final Project</b>	
Mar 20	<b>Lecture:</b> Bivariate Regression (non-binary)	Recommended Reading: Llaudet & Imai, pp. 4-4.4.1
Mar 25	<b>Lecture:</b> Bivariate Regression (binary)	Recommended Reading: Llaudet & Imai, pp. 4.6
Mar 27	<b>Lecture:</b> Multivariate Regression	Recommended Reading: Llaudet & Imai, pp. 5.3-5.5
Apr 1	No Class – Holiday	
Apr 3	<b>R:</b> Interpreting Linear Regression in R	
Apr 8	<b>Activity:</b> Predicting Income	
Apr 10	<b>Lecture:</b> Probability	Recommended Reading: Llaudet & Imai, pp. 6-6.5
Apr 15	<b>Lecture:</b> Hypothesis Testing	Recommended Reading: Llaudet & Imai, pp. 7-7.3
Apr 17	<b>R:</b> Interpreting Significance in R	Recommended Reading: Llaudet & Imai, pp. 7.4

Apr 22	<b>Activity:</b> Immigration	APSR: Economic Explanations for Opposition to Immigration: Distinguishing between Prevalence and Conditional Impact, Malhotra, Margalit, and Mo (2015, pp. 391-400)
Apr 24	Project Workday	
Apr 29	Review	
May 1	<b>FINAL EXAM</b>	