Syllabus: Quantitative Political Analysis II

COURSE INFORMATION	*Term:* Fall 2020	*Instructor:* Jack Reilly
	Level: Intermediate	*Office:* Social Sciences 205
	Meet: T/F 1-2:20 (Class) R 7-8 (Lab)	*E-mail:* jreilly@ncf.edu
	Room: ACE 329	*Office Hours:* Tues 10-11, Weds 1-3, by appt
	Syllabus Revision: August 24, 2021	*Appointments:* jacklreilly.com/appointments

DESCRIPTION

This course is designed for all students who intend to conduct quantitative research in political and social science. It will also be useful to other students interested in quantitative analysis. We will take a pragmatic approach to data analysis, focusing both on formal statistical analysis and on the actual practice of utilizing and managing social science data. Statistically, we will cover a number of topics, including multiple regression, regression with categorical independent variables, interaction terms, regression diagnostics, and regression with categorical dependent variables (logistic regression.) For data, we will use a variety of major political and social science datasets, including the American National Election Studies, the General Social Survey, the Cross National Election Project, the Comparative Study of Electoral Systems, and others.

COURSE STRUCTURE

This will be the most applied "stats" course you will ever take. We have two main components to the class: a theoretical track, introducing relevant statistical techniques and methods, and an applied track, in which we learn about writing code for statistical analysis software (Stata), conduct analyses, and replicate previous studies.

PREREQUISITE

An introductory class in statistics (Quantitative Political Analysis I, Introduction to Statistics, Dealing with Data I, Introduction to Biostatistics, etc). Students should already be familiar with the concept of hypothesis testing and bivariate regression to take the class. This course is recommended for students who intend to take Econometrics in the spring. Upper-division work in a social science is highly recommended before taking the course.

Materials

BOOKS

Required

- Lewis-Beck and Lewis-Beck, 2015. Applied Regression: An Introduction, Second Edition. Sage Green Book #22.
- Tufte, 1974. Data Analysis for Politics and Policy. (ebook: `http://www.edwardtufte.com/tufte/ebooks`)
- Acock, 2016. A Gentle Introduction to Stata (any edition fourth or newer should do)

Recommended

- Long, 2009. Workflow of Data Analysis Using Stata. Stata Press.
- Berry, 1985. Multiple Regression in Practice. Sage Green Book #50.
- Gelman, Hill, and Vehtari, 2020. Regression and Other Stories. Cambridge.

The primary books for the class are Lewis-Beck^2, Tufte, and Acock, which are readable and cover the core course material in a relatively accessible fashion. Lewis-Beck^2 and Tufte primarily cover the conceptual material; Acock covers Stata, the statistical software we will be

using. What they give in accessibility, however, they give up slightly in comprehensiveness and depth. Berry & Feldman provides slightly more depth for our later material, but significantly more depth comes from the recently released Gelman, Hill, and Vehtari, which doubles as one of the best modern treatments of applied regression and provides a comprehensive treatment of our course material, as well as material for a successive class, in one volume.[1] Its depth comes at a cost, however, as the authors are somewhat eager to introduce relatively complex additional concepts quickly and early. There are reading assignments in the class for following along with either the combination of smaller books and with Gelman, Hill, and Vehtari - you may choose which track to read (or do both).

Finally, Long provides an excellent overview of workflow and pragmatic statistical practice considerations regardless of the software you choose; it just so happens that the language he focuses on is Stata, as well.

STATISTICAL COMPUTING & SOFTWARE

A primary component of the class is learning how to effectively and practically use statistical software. The main software package we will use, Stata, is the standard package used by practicing political scientists, and is commonplace in sociology and economics as well. It is also frequently used by political think tanks, policy analysts, financial analysts, businesses, and statistical consultants.[2] New College has licenses available for use in NCF computer classrooms as well as the computers in the Quantitative Social Science Lab (ACE 228), the ARC, HNS 108, and the Bon House Lab.New College has also made Stata available for student use through the virtual desktop client (`vdi.ncf.edu`), which you can access from your own computer anywhere with an internet connection. A guide to using the VDI for Stata, created by Professor Fidalgo, may be found on the course canvas page.

If you want to use Stata on your personal computer, you can purchase Stata as a temporary license (six month or year) or as a perpetual license. If you wish to do this, make sure you buy the right version (in short, you probably don't need more than the basic edition, Stata/BE). I strongly recommend this for the class if you plan on using your own computer exclusively on campus. A six-month Stata license costs $48, and you can request a week long student trial version here: `https://www.stata.com/customer-service/short-term-license/`. [3]

Course Requirements

OVERVIEW

Satisfactory completion of the course requires completion of the following:

1. Daily Reading & Preparation
2. Assignments
   (a) Problem Sets (4)
   (b) Replications (4)
3. Exams (2)
4. Final Project
   (a) Pre-Registration Paper
   (b) Final Presentation

[1] It does so with examples in R, rather than Stata, as well.

[2] If you prefer to complete the course using the free and open-source R statistical language, you may do so (or may do so in addition to completing it in Stata for an additional mod tutorial credit). However, we will not have time to go over R solutions in detail in class, and formal instruction will be limited, so it is recommended that you have prior experience in R, as well as some significant stick-to-itiveness, before choosing this path.

[3] Think of the $48 price to rent the software as textbook expense. Books for this class are otherwise quite inexpensive; all can be purchased for under $20 combined on Amazon as of this writing.

ASSIGNMENTS

There are two kinds of assignments in this class: generic problem sets, testing statistical know-how and abilities, and replications, which require you to come as close as you can to replicating an existing piece of analysis (to be assigned by the professor). For each kind of assignment, you will be evaluated not only on whether your answers are mathematically correct, but also on coding style and the clarity of your presentation of statistical results.

All assignments are due on the Friday of each class week, at the beginning of class, electronically. As we will go over assignments in class the day they are due, late assignments will not count for credit. Assignments are due to me via canvas.

You may miss two regular assignments without any kind of penalty or comment in your narrative evaluation (aka, you get two "freebies". Don't use them too early!). Freebies cannot be used for tests or the final presentations. Double weight assignments cost two freebies to miss.

EXAMS

There are two exams in this class. The course is cumulative; each exam is comprehensive. The **first exam** is **Friday, October 8, 2021**, and the **second exam** is **Friday, November 12, 2021**. Exams may have in-class and take-home portions.

FINAL PROJECT

You will be required to conduct an original research project using an existing social science dataset and present it to the class. Presentations will take place during the last week of class.

Course Expectations & Guidelines

ETIQUETTE & DECORUM

A college course, especially a small one, is fundamentally a community. Be courteous to fellow students and the professor. Don't let yourself be distracted by your cell phone in class. If you disagree with something someone says, do so respectfully. Engage with each other and remember: your shared goal is to learn from each other as well as the professor.

COVID19

In keeping with the policies of the College, the Florida State University System, and the CDC:

- Getting fully vaccinated against COVID-19 is strongly recommended.
- Wearing face coverings indoors and in crowded outdoor spaces is expected on our campus.
- Stay home if you feel sick or if you have a positive COVID test (vaccinated or not). *If you have any covid symptoms (fever or chills, cough, shortness of breath, sore throat, fatigue, congestion or runny nose, headache, muscle or body aches, nausea or vomiting, diarrhea, or loss of taste or smell) immediately contact Student Health or* `wellness@ncf.edu`.
- Should you become sick or need to take a longer period of absence, I will happily work with you to ensure your success in the class.

OFFICE & CONSULTATION HOURS, APPOINTMENTS

I encourage you to chat with me at any point if you have questions about the course, the readings, college, political science, data science, etc. You have a variety of options available to you to consult with me: in person, over zoom, or on the phone. (If you'd like to meet in person, but prefer outdoors to indoors, please let me know and I will do my best to accommodate you.) For any of those, you can go to my website here: http://jacklreilly.com/appointments and sign up for an appointment at your convenience. At minimum, I am always available Tuesdays, from 10-11, for appointments (and typically many other times, as well.)

Second, I maintain "drop-in" hours every Wednesday from 1-3 in my office, Social Sciences 205 (Social Sciences is the small pink building on Dort Promenade before you cross College Drive to get to College Hall) - for these, there is no need to schedule an appointment, just come by. And don't be bashful! Come say hi! I'd like to get the chance to get to know you.

For all in-person meetings, please observe college expectations regarding face coverings.

E-MAIL Students can generally expect a response to all e-mails within 24 hours (and typically sooner), excepting weekends. If your email requires a long response (more than two or three sentences), expect me to encourage you to schedule an appointment with me so that we can more effectively discuss the matter.

Class Schedule

OVERVIEW There are two main tracks to the course. The first track, the conceptual track, will cover topics related to the linear regression model. This includes some or all of the central limit theorem, hypothesis testing, bivariate regression, multiple regression, regression with categorical independent variables, interactive effects, multicollinearity, nonspherical errors, and an introduction to regression with categorical dependent variables (the generalized linear model.) The second track, the workflow of data analysis, focuses on the practical components of statistical analysis. Topics include replication, coding and writing style, debugging, annotation, automation, presentation, graphics, data cleaning, storage, and management. Generally speaking, we will cover material from the first track on the first day of the week and material from the second on the second day of the week.

TOPICS OUTLINE (Subject to change)

W	Conceptual	Workflow	Work
1	DIAGNOSTIC QUIZ	Stata Crash Course: Coding Style	Diagnostic Quiz
2	Crash Course: Regression Inference	Cleaning & Recoding Data	A1: Stata Basics
3	Multiple Regression	Large Across Time Surveys	A2: Regression
4	Categorical Interactions	Weights	Replication I*
5	Continuous Interactions	Predicted Values & Marginal Effects	A3: Interactions
6	Transformations	Graphics I	Replication II
7	Outliers & Error Terms	EXAM	Exam I
	FALL BREAK		
8	Logistic Regression	Predicted Probabilities	Replication III
9	Interactions & Logits	AMEs, AEMs, MEMs, oh my!	Replication IV
10	Ordinal & Multinomial Logits	Graphics II	A4: Ordinality*
11	HLMs	EXAM	Exam II
	PROJECT SECTION		
12	Advanced Stata	Catchup, Project Meetings	Pre-Registration 1
13	Presenting Work	T(OF)URKEY TIME!	PUMPKIN PIE
14	Presentations	READING DAYS	Presentations
F	FINALS		

$*$ = *double weight assignment*

ADDITIONAL RESOURCES

Not required for the course, but useful for further study

- Introductory Statistics
  - Kellstedt and Whitten, 2013. The Fundamentals of Political Science Research. Cambridge.
  - Wheelan, 2014. Naked Statistics.
  - Gonick and Smith, 1993. The Cartoon Guide to Statistics.
  - Lewis-Beck, 1995. Data Analysis: An Introduction. Sage Green Book #103.
  - Jaccard and Turrisi, 2003. Interaction Effects in Multiple Regression. Sage Green Book #72.
  - Aldrich, 1984. Linear Probability, Logit, and Probit Models. Sage Green Book #45.
  - Agresti and Finlay, 2008. Statistical Methods for the Social Sciences. Pearson.
  - Huff and Gels, 1993. How to Lie with Statistics.
  - Pampel, 2000. Logistic Regression: A Primer. Sage Green Book #132.
  - Fox, 1991. Regression Diagnostics Sage Green Book #70
  - http://students.brown.edu/seeing-theory/
  - http://www.reed.edu/psychology/stata/index.html
- More Advanced Statistics
  - Fox, 2015. Applied Regression Analysis and Generalized Linear Models. (also the R companion)
  - Long, 1997. Regression Models for Categorical and Limited Dependent Variables. Sage.
  - Long and Freese, 2014. Regression Models for Categorical Dependent Variables Using Stata, 3rd Edition. Stata Press.
  - Shalizi, 2015. Advanced Data Analysis from an Elementary Point of View. Online.
  - McElreath, 2015. Statistical Rethinking.
  - Gelman and Hill, 2006. Data Analysis Using Regression and Multilevel/Hierarchical Models.
  - Monogan, 20xx. Political Analysis Using R.
  - James et al. 2017. An Introduction to Statistical Learning.
- Graphics
  - Healy and Moody, 2014. "Data Visualization in Sociology". *Annual Review of Sociology.*
  - Healy, 2018. Data Visualization: An Introduction. https://socviz.co
  - Tufte, 2001. The Visual Display of Quantitative Information, 2nd ed.
- Workflow & Data Management
  - Bowers, 2011. "Six Steps to a Better Relationship With Your Future Self" *The Political Methodologist.*
  - Healy, 2018. The Plain Person's Guide to Plain Text Social Science. http://plaintext.co/

Campus Academic Resources

Writing Skills Clear writing and argumentation is a critical element to success in college (not to mention, life generally). That said, writing is hard, and students come to college with very different levels of preparation for college level and professional writing. Regardless of your skill and comfort with writing, I strongly recommend exploring the options for writing (and revising!) assistance at the Writing Resource Center. You can schedule an appointment through the writing center here: https://ncf.mywconline.com

Quantitative Skills Like writing skills, quantitative literacy is an integral element to success in college (not to mention, life generally). That said, math is (also) hard, and students come to college with very different levels of preparation for college level and professional data literacy. While this course will cover many aspects of data literacy, should you desire additional support beyond what I and/or the course TA can provide, I recommend exploring the options for assistance at the Quantitative Resource Center. The QRC is located in the Academic Resource Center (ARC), located on the first floor of the Jane Bancroft Cook Library.

Student Success Center Having trouble figuring out how to manage it all? In addition to your faculty mentor and professors, New College has peer to peer coaching and group workshops available at the Student Success Center. The SSC helps you develop the skills necessary for success in college. We offer one-on-one appointments with trained peer coaches, group study sessions, recurring appointments, workshops, printable resources, regular newsletters, and referrals to other campus services. You can find more information here: https://www.ncf.edu/academics/student-success-center/

New College Academic Policies

Covid19 You can find the College's Covid19 response page here: `https://www.ncf.edu/covid-19/`.

You can find the official State University System of Florida guidelines here: `https://www.ncf.edu/wp-content/uploads/2021/08/Fall-2021_SUS-Health-Policies-Final.pdf`

You can find the CDC's Covid recommendations here: `https://www.cdc.gov/coronavirus/2019-ncov/index.html`

Student Accessibility New College of Florida is committed to creating a learning environment that meets the needs of its diverse student body. If you are a student with a disability, or think you may have a disability, you are encouraged to initiate a conversation with the office of Student Disability Services (SDS). SDS works with students with disabilities to identify reasonable accommodations and plans ways to implement these with your faculty members. Please visit their website for additional information: `https://www.ncf.edu/student-disability-services/`. You may also contact Student Disability in-person (HCL3), via phone at 941-487-4496 OR via email at `disabilityservices@ncf.edu`. Students are welcome to discuss privately any concerns related to barriers to both fully participating and learning in this course. Students with accommodations are highly encouraged to meet with their primary or partner instructor as soon as possible.

Title IX New College of Florida is committed to equal access to education pursuant to Title IX of the Educational Amendments of 1972. The law protects all individuals on our campus from gender-based discrimination or exclusion or instances of sexual misconduct. All full-time

faculty, full-time staff, and resident advisors are Responsible Employees required to report any known instances of sexual misconduct or gender discrimination to the Title IX Coordinator. Please contact our Title IX coordinator (titleix@ncf.edu) or see the website (https://www.ncf.edu/campus-life/title-ix/) for more information.

EQUITY, DIVERSITY, AND EQUAL OPPORTUNITY

New College's commitment to excellence can only be realized in a learning environment that is inclusive, characterized by openness to diverse perspectives, and marked by mutual respect. Anything short of this aspiration is inconsistent with our commitment. Equal access, and the opportunity to participate fully in all of our programs and facilities, without regard to race, color, creed, religion, political ideology, national origin, age, marital status, disability, public assistance status, veteran status, gender identity, gender expression, or sexual orientation, is essential to that commitment and will be the standard to which we expect all members of our learning community to adhere.

ACADEMIC INTEGRITY

Academic integrity is essential to maintaining a vibrant, healthy, and engaging learning environment for which we all must take responsibility. The New College faculty considers academic dishonesty to be a serious violation of community standards. Students are expected to refrain from acts of academic dishonesty, which may include:

1. cheating and/or plagiarism (such as: presenting the intellectual work of others as one's own; failing to cite sources; improper paraphrasing via failing to use own words even if a citation is given; partial, incomplete, or inaccurate citation of work of others);
2. unauthorized multiple submissions (submission of the same work for different academic activities, without the approval of the instructor);
3. false citation (false citation of a source or knowingly attributing work to a source from which the referenced material was not obtained);
4. falsifying data (fabricating or altering data to deliberately mislead; for example, changing data to get better experiment results is academically fraudulent);
5. falsifying information, signatures, or initials on official and academic forms.

If you are in doubt about what practices are permissible in an examination, you should consult the professor prior to sitting for the exam. If you lack understanding of how, in a paper or other presentation, to distinguish your thoughts from those of others, the faculty can refer you to standard guidelines and discuss specific questions.