Empirical Methods

IC 215

Instructor Info —

David Muchlinski

Office Hrs: Tues & Thurs 2-3p

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Course Info ——

Prereq: None

T & R

9:30-10:45

Lecture Room

Lab Info ——

TA Info ——

Overview

In this course will learn how to scientifically analyze the structural, strategic, and cultural drivers of international affairs. We will learn how to go from observing the occurrence of individual political events to theorizing why these and other similar events transpired. We will master the art of measuring political concepts like "power", "democracy", and "human rights". Thinking probabilistically, we will discover how to critically parse evidence in order to test the validity of our explanations for these phenomena. In short, we will begin to understand politics not as the mysterious realm of random human activity, but the strategic domain of the struggle for power.

Material

Required Texts
Agresti, A. *Statistical Methods for the Social Sciences*. 5th Edition. Pearson Education Limited. 2018. ("SMSS")

Other Texts
Any other required reading will be provided on Canvas.

Grading Scheme

25%	Homework Assignments (10 Points Each)
10%	In Class Activities (10 Points Each)
20%	Midterm Exam (100 Points)
25%	Research Project (100 Points)
20%	Final Exam (100 Points)

Grades will follow the standard scale: A = 90-100; B = 80-89; C = 70-79; D = 60-69; F $<$60. Curving is at the discretion of the professor and will ONLY be utilized to insure a normal grade distribution with a mean centered around 70%. "Rounding" of grades will ONLY be done if a student is 0.5% or less away from the higher letter grade, and ONLY if they have completed 8 or more homework assignments.

Learning Objectives

- Understand how scientific theories are differentiated from everyday "theories" and opinions
- Develop skills in learning how to accurately measure political science variables
- Become proficient in utilizing computer software to test hypotheses and analyze quantitative data
- Learn what makes political science a legitimate scientific discipline
- Combine skills learned during the semester by writing a research report

FAQs

? What are Empirical Methods?

! Empirical means something that verified by observation or experience. Methodology is the study of the methods used in a particular field. So empirical political science methodology is concerned with using scientifically valid means of observing, measuring, and verifying observations related to the study of international politics.

? What will we be Doing?

! Learning how to develop the knowledge to systematically and critically evaluate verifiable facts about the world of international affairs. Also learning why what we do as political/social scientists is different from what the chattering pundit class does on TV.

? How will we be Doing This?

! With statistics, mostly.

? Are there any Extra Requirements for this Course?

! Yes. Students are required to download the R and/or R Studio statistical software package(s) on their personal computers. We will be using this software for all exams and homework.

Research Project

Students will choose a research topic of interest to them by the beginning of week 7. The datasets for these research projects will be provided on Canvas. More detailed instructions will follow.

Exams

Students will be asked to analyze datasets using the proper statistical tests using the R statistical software. Exams will be completed in class and during the allotted time. More detailed instructions will accompany each exam.

Make-up Policy

First things first: if you feel sick, or your are sick, please *do not come to class*! You can always get notes from other class mates. That said, make-up exams or assignments will only be allowed for students who have a substantiated excuse approved by the instructor *before or on the due date*. Sending an e-mail without confirmation or simply showing up to class with a post-hoc explanation is not acceptable. No make ups will be given for students who miss an in-class assignment. Make up exams or assignments due to sickness must be confirmed with a physician's documentation.

Homework

There will be 10 homework assignments throughout the semester. Unless otherwise noted, these assignments are to be submitted *before the beginning of the next class period*. Assignments submitted late will be penalized at a rate of 10% per day late. All assignments are to be submitted electronically through the Canvas course portal. Hard copies will not be accepted.

Additional Credit

Students will have some limited opportunities to obtain additional credit to compensate for missed assignments or low grades. There will be one midterm exam review session, and a final exam review session, which will contain problem sets that will be counted as additional credit. Like all additional credit, these opportunities are voluntary and will not count against a student's final grade if they choose not to participate.

Diversity and Inclusivity Statement

The Institute does not discriminate against individuals on the basis of race, color, religion, sex, national origin, age, disability, sexual orientation, gender identity, or veteran status in the administration of admissions policies, educational policies, employment policies, or any other Institute governed programs and activities. The Institute's equal opportunity and non-discrimination policy applies to every member of the Institute community. The Institute's affirmative action program, Title IX program, and related policies are developed in compliance with applicable law. Pursuant to Title IX, the Institute does not discriminate on the basis of sex in its education programs and activities. As such, the Institute does not tolerate any kind of gender-based discrimination or harassment, which includes sexual violence, sexual harassment, and gender-based harassment. Inquiries concerning the Institute's application of or compliance with Title IX may be directed to the Title IX Coordinator, Burns Newsome, burnsnewsome@gatech.edu, 404-385-5151. Additionally, inquiries concerning the application of applicable federal laws, statutes, and regulations (such as Title VI, Title IX, and Section 504) may be directed to the U.S. Department of Education's Office of Civil Rights at www2.ed.gov/ocr.

Accommodations for Students with Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Office of Disability Services at Suite 123, Smithgall Student Services Building, 353 Ferst Drive, 404-894-2563 (Voice); 404-894-1664 (TDD). For more information on Georgia Tech's policy on working with students with disabilities, please see review the Office of Disability Service's web page at `https://policies.ncsu.edu/regulation/reg-02-20-01/`.

The Office of Disability Services collaborates with students, faculty, and staff to create a campus environment that is usable, equitable, sustainable and inclusive of all members of the Georgia Tech community. Disability as an aspect of diversity that is integral to society and Georgia Tech. If students encounter academic, physical, technological, or other barriers on campus, the Disability Services team is available to collaboratively find creative solutions and implement reasonable accommodations.

Academic Integrity

Academic dishonesty in the form of cheating or plagiarism will not be tolerated. In brief, plagiarism is defined, for the purposes of this class, as: copying, borrowing, or appropriating another person's work and presenting it as your own in a paper or oral presentation, deliberately or by accident. Acts of plagiarism will be reported in accordance with the Honor Code. In order to avoid being charged with plagiarism, if you use the words, ideas, phrasing, charts, graphs, or data of another person or from published material, then you must either: 1) use quotation marks around the words and cite the source, or 2) paraphrase or summarize acceptably using your own words and cite the source. The plagiarism policy is not restricted to books, but also applies to video and audio content, websites, blogs, wiki's, and podcasts. Plagiarism includes putting your name on a group project to which you have minimally contributed. For information on Georgia Tech's Academic Honor Code, please visit `http://www.catalog.gatech.edu/policies/honor-code/` or `http://www.catalog.gatech.edu/rules/18/`. Any student suspected of cheating or plagiarizing on a assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations. The student will also receive a grade of zero on the assignment at the professor's discretion.

Class Schedule

MODULE 1: Political Science and Probability Theory

Week 1: T	First Meeting and Distribution of the Syllabus	No Required Reading
Week 1: TH	Why Should I Care About Methodology?	"Tech Suffers from lack of humanities, says Mozilla head". *The Guardian*. Canvas.
		"Why we still need to study the humanities in a STEM world'". *Washington Post* Canvas.
		"'I made Steve Bannon's psychological warfare tool': meet the data war whistleblower". *The Guardian*. Canvas.
		"How Google Flu Trends Works". Howstuffworks.com. Canvas.
		Lazer, David & Kennedy, Ryan (2015). "What can we Learn from the Epic Failure of Google Flu Trends?" *Wired*. Canvas.
		An Expert on Concentration Camps Says That's Exactly What the U.S. Is Running at the Border *Esquire*. Canvas.
Week 2: T	I Know What I Know	Sagan, C. (2007). The fine art of baloney detection. Paranormal Claims: A Critical Analysis. Canvas.
		Zimmer, Carl (2017). "Why We Can't Rule Out Bigfoot: How the Null Hypothesis Keeps the Hairy Hominid Alive." *Nautilus*. Cavnas.
		The Conversation (2012) "No, You're not Entitled to your Opinion". Canvas
Week 2: TH	How Do I Know What I Know?	Wired (2015). The Science of Why no one Agrees on the Color of this Dress.
		Time (2018). The Definition of a Kilogram Just Changed. That's a Major Milestone in the Grand History of the Metric System
		MIT Technology Review (2019). A Quantum Experiment Suggests there's no such thing as Objective Reality.
		Weinberg, Justin (2019). Philosophers On a Physics Experiment that "Suggests There's No Such Thing As Objective Reality".
		Homework Visit this website `http://tylervigen.com/discover` and select two variables to discover their relationship to each other. Write a one paragraph explanation describing that relationship and why or why not these two variables are causally related to one another.
Week 3: T	How do I Learn What I Don't Know?	SMSS Ch. 1.
		How Do We "Prove" A Well-Established Theory Like Gravity? *Quora* Canvas
		What is Darwin's Theory of Evolution? *LiveScience* Canvas.
		What Explains U.S. Mass Shootings? International Comparisons Suggest an Answer *New York Times* Canvas

Week 3: TH What is Theory?	John Snow's Data Journalism: the Cholera Map that Changed the World *The Guardian* Canvas.
	"How A Tea Party Turned Into A Scientific Legend" *Gizmodo*. Canvas
	Fearon, James (1995). Rationalist Explanations for War. in Art and Jervis International Politics. Canvas.
	Jervis, Robert. (1978). Cooperation Under the Security Dilemma. in Art and Jervis International Politics. Canvas.
	Homework: Choose a dataset on Canvas that you will analyze for your semester research project. There are five datasets saved in .csv format (open using Excel) that you can choose from. See each dataset's corresponding codebook for a description of the information contained in each file. Provide a one paragraph write up to Canvas identifying which dataset you chose as well as your expectation regarding what kind of relationship might exist between the dependent and independent variables.
Week 4: T Theory & Measurement I	SMSS Ch. 2,
	"Open data and (15 million!) New Measures of Democracy" The Monkey Cage Canvas
	Przeworski, A., & Limongi, F. (1997). Modernization: Theories and Facts. *World Politics*, 49(2), 155-183. Canvas
	"America Is Not a Democracy" The Atlantic. Canvas
	Acemoglu, D., & Robinson, J. A. (2005). Economic Origins of Dictatorship and Democracy. Cambridge University Press. Ch. 2 Canvas
	Homework Visit the Varieties of Democracy Website at `https://www.v-dem.net/en/` and explore it. Click on the "Analysis" tab. Select one: Electoral, Liberal, Participatory, Deliberative, or Egalitarian Democracy as the "Indicator" to view on the "Variable Graph". Select two major regions of the world (i.e. Western Europe, Africa, Latin America, etc...) where it asks you to select a region, and write one paragraph showing how democracy differs between those two regions. Describe which measure of democracy you are measuring in your graph. Include the graph in your assignment by clicking on the square three black lines at the top right corner of the graph, and select "save as".
Week 4: TH Theory & Measurement II	Timeline: Remembering the Scopes Monkey Trial *NPR* Canvas
	Climate Change: How Do We Know? *NASA* Canvas
	Gurr, T. R. (2015). Why Men Rebel. Routledge. Ch.1-2 Canvas
	Goldberg, J. (2017). The Politicization Of Scientific Issues. *Skeptical Inquirer*. Canvas
	Homework Respond to the survey questions distributed electronically. We will use your answers to produce some data visualizations in class next week using `R`.

Week 5: T	Descriptive Statistics I	SMSS Ch. 3
Week 5: TH	Descriptive Statistics II	Lewis, M. (2004). Moneyball: The Art of Winning an Unfair Game. WW Norton & Company. Ch.2 Canvas
Week 6: T	Intro to Probability I	SMSS Ch 4.
Week 6: TH	Intro to Probability II	Medium (2016) "Which Percent are You? The Actual Income Distribution in the United States" Canvas
		Pew Research Center (2014) "Political Polarization in the American Public: How Increasing Ideological Uniformity and Partisan Antipathy Affect Politics, Compromise and Everyday Life". pp. 1-4. Be sure to take advantage of the do-it-yourself data visualizations! Canvas
		The Atlantic (2014). "Yes, Polarization Is Asymmetric - and Conservatives Are Worse." Canvas
		In-class Assignment We will utilize the second half of the class today to gain a more thorough understanding of distributions and how distributions govern much of our everyday life.
		Homework: Based on your choice for your semester research project, download one of the five datasets posted to Canvas. Use R to produce summary statistics for the dependent variable for your chosen dataset. Provide a one paragraph written report describing the dataset you have chosen, and the mean, variance, and standard deviation of your selected dependent variable. Also turn in the R code used to conduct this analysis.
Week 7: T	Statistical Inference I: Estimation	SMSS Ch. 5
Week 7: TH	Statistical Inference I: Estimation	Slate (2016) "How Do Trump Supporters See Black People? 'Less evolved,' our survey shows." Canvas
		Norris, Pippa (2016) "It's not just Trump. Authoritarian populism is rising across the West. Here's why". Washington Post Monkey Cage Blog. Canvas
		Resnik, Brian and Zarracina, Javier (2018). "This cartoon explains why predicting a mass shooting is impossible: Increased mental health screening couldn't accurately predict who will commit mass violence." Vox. Canvas
		Albright, Johnathan (2016). "The #Election2016 Micro-Propaganda Machine". Canvas

MODULE 2: Hypothesis Testing

Week 8: T	Asking Good Research Questions	Ghering, John and Christenson, Dino. *Applied Social Science Methodology: An Introductory Guide*. Ch 2, pp. 14-30 and Ch. 11, pp. 167-181 Canvas
		Zuckerman, A. S. (2009). Advancing Explanation in Comparative Politics Social Mechanisms, Endogenous Processes, and Empirical Rigor. in Licbach M. I, and Zuckerman, A. eds. Comparative Politics: Rationality, Culture, and Structure. Second Edition. Canvas

Homework Using the dataset you have chosen for your semester research project, identify the research question the dataset seeks to answer. Then, using the information you have just read about this week, identify a possible answer (explanation) and a theoretical framework you can utilize to answer that question. Write a one page explanation of your research question, explicitly laying out the theoretical framework you will be using to answer that question. Make sure you describe the causal mechanism you expect to be critical to answering your research question.

Week 8: TH	Exploratory Data Visualization	New York Times (2018) "Income Mobility Charts for Girls, Asian-Americans and Other Groups. Or Make Your Own." Canvas
		New York Times (2015) "Seeking a Fair Distribution of Migrants in Europe" Canvas
		Washington Post (2018) "The terrible numbers that grow with each mass shooting" Canvas

Week 9: T	Significance Testing I	SMSS Ch. 6
Week 9: TH	Significance Testing II	Ghering, John and Christenson, Dino. *Applied Social Science Methodology: An Introductory Guide*. Ch 20, pp. 302-312 Canvas

Homework Using your chosen dataset, develop a hypothesis that you will test against the data. Provide both the null and alternative hypotheses in a one paragraph write up.

Week 10: T	Midterm Exam Review Period	
Week 10: TH	Midterm Exam	

Week 11: T	Comparing Two Groups I	SMSS Ch. 7
Week 12: TH	Comparing Two Groups II	Broockman, D., & Kalla, J. (2016). "Durably reducing Transphobia: A field experiment on door-to-door canvassing". Science, 352(6282), 220-224. Canvas
		Five Thirty Eight (2016). "How Two Grad Students Uncovered An Apparent Fraud - And A Way To Change Opinions On Transgender Rights." Canvas

Homework Using your chosen dataset, utilize a t-test to determine if the difference in means between two meaningful groups in your data is statistically significant. Prepare a one paragraph write up of the description of the test, and provide a write up of the results in a second paragraph. Also provide the R code you used to conduct this statistical test.

MODULE 3: Regression

Week 13: T	Categorical and Ordinal Variables I	SMSS Ch. 8
Week 13: TH	Categorical and Ordinal Variables II	SMSS Ch. 12

Homework Use an ANOVA test to examine if the values for the dependent variable you have chosen to analyze for your semester project are different across different categorical levels of one or more of your independent variables. Discuss your results, including discussions of statistical significance, in a one paragraph write up.

Week 14: T	Regression I	SMSS Ch. 9

Week 14: TH	Regression II	Lewis-Beck, Colin, and Michael Lewis-Beck (2015). Applied regression: An introduction. Vol. 22. Sage publications. Canvas

In-class Assignment We will use an example dataset (not one available on Canvas) to work through a regression example during class. We will put all of our skills to work. We will seek to understand the nature of the question we are asking, explain the question using a testable theoretical framework, and derive our testable hypotheses. We will then test our hypotheses using a regression model. Be sure to bring your laptop to class today.

Week 15: T	Multiple Regression I	Miller, Steven (2017). "Reading a Regression Table: A Guide for Students". Canvas

"10 Things to Know About Reading a Regression Table" Evidence in Governance and Politics Canvas

Week 15: TH	Multiple Regression II	No required reading. Finish your research reports.

Homework Turn in your final research report to Canvas by 1700 (5:00pm).

Study Week	Final Review Day

TBD	Final Exam