

## **POLS 3316 Statistics for Political Scientists**

Tuesday/Thursday, 10:00-11:30 AM, Room: M122

University of Houston

Department of Political Science

Fall 2018

### **Instructor**

Ling Zhu

Associate Professor

Department of Political Science

Email: lzhu4@central.uh.edu

Office: PGH 436

Phone: 713-743-2649

Office Hours: Tuesday/Thursday, 1:00-4:00pm, or by appointment.

### **Teaching Assistants**

Naomi Nubin

Ph.D. Student

Department of Political Science

Email: nnnubin@uh.edu

Office: PGH 434

Office Hours: TBA

Hui Zhou

Ph.D. Student

Department of Political Science

Email: hzhou13@uh.edu

Office: PGH 434

Office Hours: Friday, 1:00-3:00pm.

### **Course Description**

Statistical (quantitative) methods are mathematical models and techniques used in the systematic analysis of raw research data. Political scientists use statistical methods and data analysis to gain systematic understanding of human behavior patterns and complex political phenomenon (e.g. the allocation of government fiscal resources, political representation, complex policy making processes, interactions between citizens and government, etc.). This course provides an introduction to the scientific study of politics. The focus of this course is twofold. First, it seeks to teach undergraduate students in political science and related social science disciplines key approaches to research design. Second, it introduces students various statistical tools to manage, visualize, and analyze data in order to answer substantive questions about politics. The course is designed to help students become better “consumers” of information and academic political science research, and to help students to start their own journeys in producing scientific research on politics. In addition, this course

introduces students various statistical analyses of quantitative data in political science, applied to elections, public policy, and economics, and facilitates students' usage of computer software for evaluating quantitative data. Our class meets twice a week on Tuesdays and Thursdays. Tuesday sessions will be lectures focusing on the theoretical and conceptual foundations. Thursday sessions are organized as in-class statistical labs for students to learn and practice specific data analysis techniques.

## **Learning Objectives**

POLS3316 is an introduction to quantitative research methods and statistical models in political science. This is the course where students will be asked to become familiar with substantive questions in the study of politics. Rather than providing specific opinions about politics, we will be focusing on understanding research (causal) questions and applying appropriate research design and statistical analysis to further scholarly discussions. By the end of the semester, students are expected to learn:

1. how to establish a valid research question;
2. thinking about the world and complex political phenomena in terms of variables and causal explanations;
3. critically evaluating scholarly work based on the merits of research design;
4. how political scientists collect and manage empirical data;
5. how to match proper statistical methods to relevant research questions;
6. how to develop their own research projects using one or more methods discussed in this class;
7. writing a research paper that puts together the synopsis and critical evaluation of existing research and students' own original knowledge on a topic of interest.

Regarding statistical methods and computer software, students in this class will learn the following skills using R and RStudio:

1. data management (import, inspect and prepare data);
2. data visualization;
3. descriptive statistics;
4. basic inferences with correlation, covariance, and bivariate association;
5. linear regression models and diagnostics with continuous variables;
6. generalized linear models with bivariate outcomes, ordinal outcomes, and count data;
7. statistical forecasting using time-series analysis.

## Software, Statistical and Otherwise

My teaching assistants and I will only support two software packages, **R** and **RStudio**. Both are available on the machines in the political science computing lab. All lectures and statistical labs will be instructed using **R**. **R** is a statistical environment and high-level programming language for data analysis and visualization. It is the GNU version of the **S** language. **R** is a free and open-source software. The current (July 2018) version of **R** is 3.5.1. **R** is an object-oriented language. Unlike **Stata** and most other statistical packages, it operates by assigning values to objects in the workspace. In the lecture notes, handouts, etc., **R** commands and outputs will be marked by “**R Code**” and “**R Output**”, respectively.

---

—R Code—

```
Age<-cps2011$age
summary(Age)
```

---

—R Output—

```
Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
0.00  15.00   34.00   34.99  52.00   85.00
```

The Comprehensive R Archive Network (CRAN) is the to-go spot for all things R-related. You may also consider using **RStudio**, which is an integrated development environment for **R**. It includes a console, syntax-highlighting editor that supports direct code execution, as well as tools for plotting, history, debugging and workspace management.

## Textbooks and Readings

In this class, we will primarily use two main textbooks listed as “required” below. Kellstedt and Whitten (2013) offers the conceptual foundation of political science research. We will use this book as the roadmap of developing the scientific studies of politics (i.e. political science research). Monogan (2015) is the “manual” for learning statistical analysis using **R**. I listed two additional recommended books (not required to purchase), particularly for students who (think they) are afraid of statistics and/or academic research. Sigelman et al. (2010) is an excellent collection of the humorous literature in political science. Through our weekly schedules, some of the essays in this book will be assigned as additional weekly readings, which serves as empirical examples of existing work on various political topics (e.g. public policy analysis, elections, legislatures, voting behavior, party competition, etc.). You may find these essays in sharp comparison with the vast majority of academic publications that are full of statistical jargons. This edited volume will make you laugh first and then think. Salkind (2017) is (hopefully) a “cure” of numberphobia and/or mathematics anxiety. This book will be a good companion to the Monogan book on **R**.

1. Kellstedt, Paul M. and Guy D. Whitten. 2013. *The Fundamentals of Political Science Research*, second edition, Cambridge University Press (required).
2. Monogan, James E. 2015. *Political Analysis Using R*, Springer (required).
3. Sigelman, Lee, Kenneth Newton, Kenneth J. Meier, and Bernard Grogman ed. 2010. *Wit and Humor of Political Science*. ECPR Press (recommended).

4. Salkind, Neil J. 2017. *Statistics for People Who (Think They) Hate Statistics*, sixth edition, Sage Publication (recommended).
5. Additional readings and lab handouts (listed in the subsequent weekly course calendar and distributed weekly through Blackboard Learn).

### **Course Requirements**

1. Class attendance and active participation in class discussion.
2. Read the assigned readings and lab handouts prior to each class meeting.
3. Practice Problem Sets. Starting in Week 3, there will be five take-home practice problem sets. The goal of homework problem sets is to help you to practice various data analysis techniques covered in our statistical labs. Each problem set will be distributed on a Thursday class (after the lab session) and due by the subsequent Monday noon. We will then go over the problem sets on the following Thursday.
4. Exams. There will be two take-home written exams, one in October (Exam 1) and one December (Exam 2). Students will have one week to finish each exam.
5. Research paper. In the final paper assignment, students are to analyze the causes or effects of a political phenomenon, using concepts and statistical methods learned in this course. I expect a 15-page (double-space) mini research paper by the end of the semester. The research paper should contain a brief introduction of the research question, a concise and critical overview of the existing literature, an original data analysis component, and students' own insights into the topic of interests. When writing the research paper, students should follow the Chicago Manual of Style, <http://www.chicagomanualofstyle.org/home.html>. Students should submit their final papers via Blackboard Learn (Turn-it-in submission link). The final research paper is due on Blackboard by noon, December 6 (Thursday). I encourage students to work along the following optional deadlines to seek feedback for their research projects. Students who successfully meet each of the following optional deadlines will receive 2-point bonus credit in their final grade.
  - September 14 (noon), submitting a one-page introduction of the research topic.
  - October 5 (noon), submitting a two-page long literature review.
  - October 19 (noon), submitting a four-page roadmap for research design, variable descriptions and data analysis plan.
  - November 16 (noon), submitting a four-page summary of preliminary results.
  - November 30 (noon), submitting a full draft.

### **Attendance and Late Policy**

1. Attendance. Absence from the class will only be accepted in extenuating circumstances with a university-accepted excuse. If you know in prior that you cannot attend the class, please inform the professor before the scheduled class-time. If there is an emergency, in which you need to leave early, you should avoid disturbing the class.

2. Exam Policy. Students are required to take and turn in exams at the scheduled time. During the exam period, students ARE NOT allowed to discuss exam questions with others. Students are allowed to email the professor if they need any clarification of the exam questions. The professor will share the answer to each clarification question with the entire class.
3. Late Policy. Late work will be penalized by one letter grade for each day after the deadline. For example, an A-paper turned in one day late will become a B-paper. Late work would only be accepted without grade-penalty if the student has university-accepted excuses.
4. Valid E-Mail Address. The University of Houston considers your e-mail address in PeopleSoft the official method of contact between you and the University. As a prerequisite of this course, you must have a valid e-mail address in PeopleSoft. You may not claim an incorrect or blank e-mail address as an excuse in the case of missed communications from the instructor or TA.
5. Blackboard Learn. This course will use Blackboard Learn to distribute lecture notes, additional required readings, and grades.
6. Lap-top in Classroom. I encourage each student to bring his/her own laptop to class. We will use R on Thursdays for various data examples. Lab handouts will contain relevant data examples and replication code written in R language. Students may also check out laptops from the UH Library Equipment Services.

## Grading

1. Attendance, 10%
2. Homework problem sets, 25% (5% each)
3. Take-home Exam 1, 20%
4. Take-home Exam 2, 20%
5. Final paper, 25%
6. Maximum possible bonus credit, 10%
7. Final Grades
 

A	=	94 (Excellent)
A-	=	93-90
B+	=	89-86
B	=	85-83
B-	=	82-80 (Good)
C+	=	79-76
C	=	75-73
C-	=	72-70 (Average)
D+	=	69-66
D	=	65-63
D-	=	62-60 (Poor passing)
F	=	59-0 (Failing)

## **Academic Integrity**

As commonly defined, presenting the words or work of others' as your own is plagiarism. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues, without which research cannot be safely communicated. Plagiarism is also a violation of the UH Academic Honesty Policy. If you are uncertain of what constitutes academic dishonesty, you should contact me prior to submitting the assignment and/or check the UH Academic Honesty Policy from the university website: <http://www.uh.edu/provost/policies/honesty/>. Students are expected to adhere to the UH Academic Honesty Policy. Cheating or plagiarism in course assignments, exams, and the final paper will lead to a grade of F.

## **Americans with Disability Act (ADA)**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you need special accommodations and assistance due to a disability, please contact the Center for Students with DisABILITIES (CSD Building 568, Room 110) and the Learning Support Services (LSS, 321 Social Work Building), or call 713-743-5411 to make appropriate arrangements.

## **University of Houston CAPS Statement**

Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS ([www.uh.edu/caps](http://www.uh.edu/caps)) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the "Let's Talk" program ([www.uh.edu/caps/outreach/lets\\_talk.html](http://www.uh.edu/caps/outreach/lets_talk.html)), a drop-in consultation service at convenient locations and hours around campus.

## **Course Calendar**

### **PART I. THE SCIENTIFIC STUDY OF POLITICS**

Week 1: Introduction (August 21 & 23)

1. August 21 (Tuesday): Course overview, no required readings.
2. August 23 (Thursday): Introduction: The Scientific Study of Politics
  - Kellstedt and Whitten, Chapter 1.
  - Monogan, Chapter 1.
  - Adams, Mike. 1999. "The Dead grandmother/Exam Syndrome." *Annals of Improbable Research*, 5(6): 3-6.
  - Manteltasche, Dagobert. 2002. "Owls and Larks, Knotters and Simplifiers: The Origins of Modern Political Science." *European Political Science*, 2(1): 36-42.
  - Lab 1. Getting Start with R and RStudio.

Week 2: Building a Theory (August 28 & 30)

1. August 28 (Tuesday): The Art of Theory Building
  - Kellstedt and Whitten, Chapter 2.
  - Sigelman, Lee. “Are Democrats Stupid?” in Sigelman et al. ed. pp.167-171.
  - Conybeare. 1983. “Tariff Protection in Developed and Developing Countries: A Cross-Sectional and Longitudinal Analysis.” *International Organization*. 37(3): 441-467.
2. August 30 (Thursday): Lab 2. Getting Data Ready: Import, Inspect, and Prepare Data (by Hui Zhou)
  - Monogan, Chapter 2.
  - Lab handouts

Week 3: Evaluating Causal Relationships (September 4 & 6)

1. September 4 (Tuesday): Roadmap for Theory Building
  - Kellstedt and Whitten, Chapters 3 & 4
2. September 6 (Thursday): Lab 3. Visualizing Data
  - Monogan, Chapter 3.
  - Lab handouts
  - Distribute Problem Set 1, due by Monday (September 10) noon.

## **PART II. Descriptive Analysis**

Week 4 (September 11 & 13): Describing and Evaluating Variables

1. September 11 (Tuesday): Evaluating Measurement and Variations
  - Kellstedt and Whitten, Chapter 5
  - Clifford. 2018. “Reassessing the Structure of Presidential Character.” *Electoral Studies*. 54 (August): 240-247.
  - King et al. 2004. “Enhancing the Validity and Cross-Cultural Comparability of Measurement in Survey Research.” *American Political Science Review*, 98: 191-207.
2. September 13 (Thursday): Lab 4. Descriptive Statistics: Central Tendency and Dispersion
  - Monogan, Chapter 4.
  - Lab handouts
  - Review Problem Set 1.
  - Distribute Problem Set 2, due by Monday (September 17) noon

Week 5 (September 18 & 20): Probabilities and Statistical Inference

1. September 18 (Tuesday): Populations, Samples, and Statistical Inference
  - Kellstedt and Whitten, Chapter 6

2. September 20 (Thursday): Lab 5. Probability Statistics and Basic Inferences
  - Monogan, Chapter 5.
  - Lab handouts
  - Review Problem Set 2
  - Distribute Problem Set 3, due by Monday (September 24) noon.

Week 6 (September 25 & 27): Bivariate Hypothesis Testing

1. September 25 (Tuesday): Bivariate Hypothesis Testing
  - Kellstedt and Whitten, Chapter 7
  - Mantelstasche and Besser-Wisser, “The Schartz-Metterclume Method.” in Sigelman et al. ed. pp.129-132.
  - Sigelman. “The Presidential Horoscope: Predicting Performance in the White House.” in Sigelman et al. ed. pp. 225-231.
  - Fauvelle-Aymar and Stegmaire. 2013. “The Stock Market and Presidential Approval.” *Electoral Studies*, 32(3): 411-417.
2. September 27 (Thursday): Lab 6. Bivariate Associations, Difference of Means, and Contingency Tables
  - Monogan, Chapter 5
  - Lab handouts
  - Review Problem Set 3

### **PART III. Basics of Regression Analysis**

Week 7 (October 2 & 4): Bivariate Regression Models (1)

1. October 2 (Tuesday): Bivariate Regression Models
  - Kellstedt and Whitten, Chapter 8 (8.1-8.4)
  - Frankel. 1999. “Does Trade Cause Growth?” *American Economic Review*, 89(3):379-399.
2. October 4 (Thursday): Lab 7. Estimating Bivariate Regression Models
  - Monogan, Chapter 6, 6.1
  - Lab handouts

Week 8 (October 9 & 11): Bivariate Regression Models (2)

1. October 9 (Tuesday): Bivariate Regression Models: Assumptions and Diagnostic Analysis
  - Kellstedt and Whitten, Chapter 8 (8.5)
  - Yong and Sigelman. 2008. “The Dakota Effect.” *PS: Political Science & Politics*, 41(2): 349-353.
2. October 11 (Thursday): Lab 8. Regression Diagnostics
  - Monogan, Chapter 6.2

- Lab handouts
- Distribute Exam 1.

Week 9 (October 16 & 18): Multiple Regression: Basics

1. October 16 (Tuesday): Modeling Multivariate Reality
  - Kellstedt and Whitten, Chapter 9
  - Sigelman, Lee. 1990. "Toward a Stupidity-Ugliness Theory of Democratic Electoral Debacles." *PS: Political Science & Politics*, 23(1): 18-20.
  - Berggren et al. 2010. "The Looks of A Winner: Beauty and Electoral Success." *Journal of Public Economics*, 94(1-2): 8-15.
  - Lawson et al. 2010. "Looking Like a Winner: Candidate Appearance and Electoral Success in New Democracies." *World Politics*, 62(4): 561-593.
2. October 18 (Thursday): Lab 9. Multiple Regression Models
  - Lab handouts
3. Exam 1 due by Friday (October 19), noon.

Week 10 (October 23 & 25): Visualizing Regression Results

1. October 23 (Tuesday): Review Exam 1
2. October 25 (Thursday): Lab 10. Visualizing Regression Results
  - Lab handouts
3. Distribute Problem Set 4, due by Monday (October 29), noon.

## **PART IV. Extensions to Linear Regression Models**

Week 11 (October 30 & November 1): Analyzing Binary Outcomes

1. October 30 (Tuesday): Generalized Linear Models with Binary Outcomes
  - Kellstedt and Whitten, Chapter 11.1-11.2
2. November 1 (Thursday): Lab 11. Binary Outcomes
  - Monogan Chapter 7.1
  - Goldman. 2018. "Fear of Gender Favoritism and Vote Choice During the 2008 Presidential Primaries." *Journal of Politics*, 80(3): 786-799.
  - Lab handouts
  - Review Problem Set 4

Week 12 (November 6 & 8): Analyzing Ordinal Outcomes

1. November 6 (Tuesday): Generalized Linear Models for Ordinal Outcomes
  - Zhu and Wright. 2015. "Why Do Americans Dislike Publicly Funded Health Care? Examining the Intersection of Race and Gender in the Ideological Context." *Politics, Groups, and Identities*, 4(4): 618-637.

- Zhu. 2017 “Voices from the Frontline: Network Participation and Local Support for National Policy Reforms.” *Journal of Public Administration Research and Theory*, 27(2): 284-300.

2. November 8 (Thursday): Lab 12. Ordinal Outcomes

- Monogan Chapter 7.2
- Lab handouts
- Distribute Problem Set 5, due by Monday (November 12), noon.

Week 13 (November 13 & 15): Analyzing Count Data

1. November 13 (Tuesday): Analyzing Count Data

- Maltzman, Sigelman, and Binder, “Leaving Office Feet First: Death in Congress.” in Sigelman et al. ed., pp.191-200.
- Dezhbakhsh, Tohamy, and Aranson. 2003. “A New Approach for Testing Budgetary Incrementalism.” *Journal of Politics*, 65(2): 532-558.

2. November 15 (Thursday): Lab 13. Event Count Models

- Monogan Chapter 7.3
- Lab handouts
- Review Problem Set 5

Week 14 (November 20 & 22): Thanksgiving holiday, no class.

Week 15 (November 27 & 29): Time Series Analysis: Basics

1. November 27 (Tuesday): Analyzing Time Series Data

- Kellstedt and Whitten, Chapter 11.3

2. November 29 (Thursday): Lab 14. Projections and Predictions Using Time Series Data

- Monogan Chapter 9
- Lab handouts
- Distribute Exam 2

Week 16 (December 4 & 6): Final Exam

1. Exam 2 due by Thursday (December 6), noon.
2. Research paper due by Sunday (December 9), noon

Caveat: The aforementioned weekly schedule and assignments in this course may be subject to change.