POS 3703: Scope and Methods (Section 001)

Fall 2023

Professor: Dr. Kevin Aslett

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Days and Times: Tuesday & Thursday 4:30PM-5:50 PM

Classroom: Howard Phillips Hall (HPH) 0310

Office Hours: Tuesday 3:00 – 4:20 PM in Howard Phillips Hall (HPH) 0302I ; Thursday 3:00 – 4:20 PM in Howard Phillips Hall (HPH) 0310

Lab Hours: Thursday 3:00 – 4:20 PM in Howard Phillips Hall (HPH) 0310

Final Exam Date and Time: Thursday, December 7th, 2023 4:00 - 6:50 PM in Howard Phillips Hall (HPH) 0310

COURSE INFORMATION

Course Description:

Equal parts art, programming, and statistical reasoning, data visualization is critical for anyone who seeks to analyze data (big or small). Data analysis skills have become essential for those pursuing careers in politics, policy evaluation and research in fields like political science or broadly any social science. This course introduces students to the powerful R programming language, the basics of creating data-analysis graphics in R, and reasoning about what data visualizations can tell us, and an introduction to basic quantitative analysis in R.

The best way to understand the how and why of data analysis is to work with real-life data and questions. We will focus on a single political science subject: democracy and the relationship between macro-level indicators, such as economic development and the quality of democracy. Scholars who study global democracy are concerned with understanding what institutional changes in democracy result in an improvement in overall quality of democracy. This process is fundamental to political science research and to policies aiming to improve democracy in America and across the globe. In this class, you will gain a strong introduction to data analysis and visualization through reasoning about the empirical and theoretical challenges of visualizing and describing global democracy.

This is a class about making sense of data. Students will investigate relationships and discover patterns. This is an active process, driven by student engagement. Importantly, there will be weekly homework assignments that students must complete to stay on top of the class. In addition, there will be three main assignments: the midterm, a data visualization presentation and the final exam.

Course Objectives:

(1) The development basic coding skills in the R programming language.

(1.1) Producing an easy-to-understand figure

(1.2) Plotting data distributions

(1.3) Running and interpreting a linear regression (Ordinary Least Squares)

(2) The development of basic research skills:

(2.1) Basic statistics

(2.2) How to statistically analyze data and report one's results

(2.3) The ability to digest the report results in the political science discipline.

Required Materials

Students will need a **basic calculator** that performs the following functions: addition, subtraction, multiplication, division, squaring of variables, square root and natural log. One may be purchased at Walgreens or similar store; students do not need a highly complex instrument. Bring it, along with the other course materials, to class each day as it will be used to work problems assigned in class and on the tests. Such calculators may be used during the in-class exams but cell-phone based calculators will NOT be allowed.

Graded Assignments:

Class Participation (10%)

HW assignments (20%)

Lightning Talk Presentation (10%)

Midterm I (15%)

Midterm II (15%)

Final Exam (30%)

Grading Scale

GRADE	PERCENTAGE
A	91.5-100
A-	89.5-91.5
B+	87.5-89.5
B	79.5-87.5
B-	77.5-79.5
C+	75.5-78.5
C	68.5-75.5
C-	66.5-68.5
D+	64.5-66.5
D	57.5-64.5
F	57.5 or less

Course Technologies

Our course website is hosted on Canvas. The main features of Canvas we will be using are the modules. The modules break the course content down into daily agendas. If you're unsure what you're supposed to be doing for a given day and when, visit the day's module on Canvas. The daily modules will also contain details and links to all the homework assignments and readings. I will show you how to submit your assignments and see your feedback during the first week of class.

In this class we will use R to work with data. R is free, open-source and interactive programming language for statical analysis. Rstudio is a versatile editor for working with R code and data that provides more intuitive interface to many features of the language.

Both R and Rstudio are widely available for all major operating systems (Windows, Mac OS, Linux). You should install them on your personal computer prior to attending tutorials. Use these links to download the installation files:

R - https://cran.r-project.org/

RStudio - https://www.rstudio.com/products/rstudio/download/

(choose free desktop version)

Reading

Every class period, except for the first day, students will have readings they should consult. Please don't purchase books until you attend first class. On the first day of class Professor Aslett will explain how to get access.

Required Readings:

- Llaudet, Elena and Imai, Kumai (2023). *Data Analysis For Social Science*. Princeton University Press.

Can be purchased here

Or can be purchased here

- Watkins, J. C. (2019). An introduction to the science of statistics: From theory to implementation (Pages 3-4 ; Pages 24-25).

Accessible for free online here

- King, G., Keohane, R. O., & Verba, S. (2021). *Designing social inquiry: Scientific inference in qualitative research*. Princeton university press.

Accessible for free online here

- Wilke, Claus. Fundamentals of Data Visualization.

Accessible for free online here

- Grolemund, Garrett and Hadley Wickham. R for Data Science. https://r4ds.had.co.nz/

Final Exam Format

You will be asked to define a list of terms that are listed in the textbook as key terms or I have gone over in class as a key term. You will then be asked to answer a number of long answer questions (answers should be about a paragraph) about important research design concepts. I will then ask you to complete a number of data science tasks.

Make-Up Policy

If a student has a valid excuse (medical, religious, university activities, etc.), I will allow students a reasonable amount of time to make-up the assignment or exam. Students must notify me before the due date of an assignment or exam to be allowed to make it up.

Students who represent the university in an authorized event or activity (for example, student-athletes) and who are unable to meet a course deadline due to a conflict with that event must provide the instructor with documentation in advance to arrange a make-up. No penalty will be applied. For more information, see the UCF policy at https://policies.ucf.edu/documents/4-401.pdf

Statement regarding accommodations for active-duty military students

Students who are deployed active-duty military and/or National Guard personnel and require accommodation should contact their instructors as soon as possible after the semester begins and/or after they receive notification of deployment to make related arrangements.

Campus Safety Statement

Emergencies on campus are rare, but if one should arise during class, everyone needs to work together. Students should be aware of their surroundings and familiar with some basic safety and security concepts.

- In case of an emergency, dial 911 for assistance.
- Every UCF classroom contains an emergency procedure guide posted on a wall near the door. Students should make a note of the guide's physical location and review the online version at <https://centralflorida-prod.modolabs.net/student/safety/index>.
- Students should know the evacuation routes from each of their classrooms and have a plan for finding safety in case of an emergency.
- If there is a medical emergency during class, students may need to access a first-aid kit or AED (Automated External Defibrillator). To learn where those are located, see <https://ehs.ucf.edu/automated-external-defibrillator-aed-locations>.
- To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to <www.getrave.com/login/ucf> and logging in. On the "My Account" tab, fill out the information, including e-mail address and cell phone number.
- Students with special needs related to emergency situations should speak with their instructors outside of class.
- To learn about how to manage an active-shooter situation on campus or elsewhere, consider viewing this video (<https://youtu.be/NIKYajEx4pk>).

Title IX Statement

Title IX prohibits sex discrimination, including sexual misconduct, sexual violence, sexual harassment, and retaliation. If you or someone you know has been harassed or assaulted, you can

find resources available to support the victim, including confidential resources and information concerning reporting options at https://letsbeclear.ucf.edu and http://cares.sdes.ucf.edu/.

For more information on diversity and inclusion, Title IX, accessibility, or UCF's complaint processes contact:
• Title IX – OIE – http://oie.ucf.edu/ & askanadvocate@ucf.edu
• Disability Accommodation – Student Accessibility Services
• Diversity and Inclusion Training and Events
• UCF Compliance and Ethics Office & complianceandethics@ucf.edu
• Ombuds Office

Class Schedule

Date	Topic	Readings	Assignment
Aug. 22	Introduction to the course Course requirements Brief Introduction to R	Syllabus	HW 1 Assigned (Aug. 24) HW 2 Assigned (Aug. 25)
Aug. 24	The science in political science	KKV - Ch. 1	HW 3 Assigned (Sept. 1)
Aug. 29	Introduction to R	Llaudet & Imai (1-16)	HW 4 Assigned (Sept. 8)
Aug. 31	*** NO CLASS ***		
Sept. 5	Working with dataframes in R	Llaudet & Imai (16-26) Watkins (Pages 3-4 ; Pages 24-25).	
Sept. 7	Randomized Experiments	Llaudet & Imai (27-38)	HW 5 Assigned (Sept. 15)
Sept. 12	Randomized Experiments (Examples)	Llaudet & Imai (38-50)	
Sept. 14	Inferring Population Characteristics (Two-way Tables)	Llaudet & Imai (50-65)	HW 6 Assigned (Sept. 22)
Sept. 19	Inferring Population Characteristics (Histograms)	Llaudet & Imai (66-78)	
Sept. 21	REVIEW DAY		
Sept. 26	MIDTERM 1		
Sept. 28	Inferring Population Characteristics (Scatter Plots)	Llaudet & Imai (78-98)	HW 7 Assigned (Oct. 13)

Oct. 3	Predicting Outcomes using Linear Regression	Llaudet & Imai (98-107)	
Oct. 5	Natural Logarithm Transformation	Llaudet & Imai (112-120)	HW 8 Assigned (Oct. 20)
Oct. 10	Interpretation of Linear regression	Llaudet & Imai (120-128)	
Oct. 12	Estimating Causal Effects with Observational Data	Llaudet & Imai (128-152)	
Oct. 17	Estimating Causal Effects with Observational Data	Llaudet & Imai (128-152)	
Oct. 19	Internal and External Validity Revisited	Llaudet & Imai (152-162)	
Oct. 24	REVIEW DAY		
Oct. 26	MIDTERM 2		
Oct. 31	Axioms of Probability	Llaudet & Imai (162-169)	HW 9 Assigned (Nov. 10)
Nov. 2	Normal Distribution	Llaudet & Imai (170-179)	
Nov. 7	Population Parameters Versus Sample Parameters	Llaudet & Imai (180-195)	HW 10 Assigned (Nov. 17)
Nov. 9	Quantifying Uncertainty	Llaudet & Imai (195-210)	
Nov. 14	Hypothesis Testing	Llaudet & Imai (210-225)	HW 11 Assigned (Nov. 27)
Nov. 16	Data Visualizations	Wilke (Sections 1-25)	
Nov. 21	** NO CLASS **		
Nov. 28	Lightning Presentations		
Nov. 30	REVIEW DAY		
Dec. 7	FINAL EXAM (4:00 - 6:50 PM)		