Introduction to Political Research
Government 310

Ryan T. Moore*

2025-08-21 at 13:51:54

Course Information

Government GOVT 310
Introduction to Political Research
Section 004: Tuesday and Friday, 11:20–12:35 Eastern
Location: Kerwin Hall 204

Instructor Information

Ryan T. Moore, Ph.D.
Associate Professor of Government
Office: Kerwin Hall 234
Telephone: +1 202 885 6470
Homepage: `http://www.ryantmoore.org`
Email: `rtm` (at) `american` (dot) `edu`
Office Hours: Tuesday 12:45-14:00, Thursday 14:15-15:30, or by appointment

Teaching Assistant Information

Ehsan Habibpour
Ph.D. Student, Department of Government
Email: `eh1156a@american.edu`
Office Hours: Wednesday 15:00-16:00 and by appointment
Location: Café on ground floor, Kerwin Hall

Course Description

This course is an introduction to modern quantitative political research. We will discuss the nature of quantitative research, how to design research to answer different types of political questions, how to analyze quantitative data, how to implement analysis using the R statistical language, and

*Department of Government, American University, Kerwin Hall 234, 4400 Massachusetts Avenue NW, Washington DC 20016-8130. tel: +1 202 885 6470; `rtm` (at) `american` (dot) `edu`; `http://www.ryantmoore.org`.

how to interpret the results of analysis. Specific topics will include causal inference, descriptive statistics, visualization, linear regression models, and statistical testing and inference.

Learning Objectives

This course serves as the introduction to political science research, including the logic of inference, research design, and the basics of quantitative analysis. Students will, thus, learn and apply skills essential to social science research, as a preparation for graduate school or professional work in the field. The assignments are designed to help students understand how political scientists generate knowledge about political phenomena.

Students who successfully complete this course will be able to:

1. Define an original research project dealing with a political problem, using an appropriate methodology
2. Produce a literature review on the subject that summarizes and analyzes the state of knowledge in political science on a research question
3. Perform tests appropriate to different types of data
4. Analyze and interpret the results of the tests
5. Produce a well-written and thorough final research paper that includes a statement of the research question, literature review, study design, and analysis and conclusions
6. Present their research orally to the class and political science faculty

This course satisfies the learning outcomes required of AU Core Quantitative Literacy II (Q2). Students who successfully complete this course will be able to:

1. Translate real-world questions or intellectual inquiries into quantitative frameworks
2. Select and apply appropriate quantitative methods or reasoning
3. Draw appropriate insights from the application of a quantitative framework
4. Explain quantitative reasoning and insights using appropriate forms of representation so that others could replicate the findings

Learning Strategies

Readings

Readings should be completed before the course meeting under which they are listed below. The course readings are primarily from my own notes and the textbook. The textbook engages with some of the most recent, most interesting research in political science and cognate social sciences. My notes provide summaries, exercises, and additional examples; they will structure our class discussion. When you read about a study or method that's interesting to you, find the original paper and read it, too. We will regularly have short quizzes over the reading.

The primary textbook for the course is

Imai, Kosuke and Nora Webb Williams. *Quantitative Social Science: An Introduction in tidyverse*. Princeton University Press, Princeton, NJ, 2022.

The textbook is available for borrowing at the Circulation and Course Reserves desk at Bender Library.

The supplementary Web site with data sets, e.g., is `https://github.com/kosukeimai/qss`. This page also describes packages like `qss`, `qss.student`, `qss-swirl`, and `qss-tidy` that may be helpful.

We assume that you do not have experience analyzing data with code, so we will introduce and develop the relevant ideas and syntax in the course readings, notes, discussions, and assignments. If you're looking for additional support references for foundational concepts in political research, or for learning R, the primary statistical analysis language of the course, consider

Pollock III, Philip H. and Edwards, Barry C. *The Essentials of Political Analysis*. Sage CQ Press, Thousand Oaks, CA, 7th edition, 2024.

Sumner, Jane L. *R for Political Science Research: An Introduction for Absolute Beginners*. Springer, Cham, Switzerland, 2024.

Computers and Notes in Class

For most class meetings, we will focus our attention on statistical concepts. We will also discuss implementation of methods in R, but this will be a secondary focus of class meetings. There will occasionally be time in class to pose your specific questions about R coding. I expect to spend most of our time on handouts that we intend for you to write on directly. We will distribute these through Canvas as PDFs; plan to print or download them to write on digitally. Although the experiments are relatively small, longhand writing appears to be a superior strategy for taking notes under some conditions. See http://j.mp/2uJAp6z for a summary brief. At least, there is no evidence that note-taking via laptop is beneficial in

Mueller, Pam A. and Daniel M. Oppenheimer. The Pen is Mightier than the Keyboard: Advantages of Longhand Over Laptop Note Taking. *Psychological Science*, 25(6):1159–1168, 2014.

In lab sessions, our time will be devoted to conducting applied data analysis with a computer. See below for more detail.

Requirements and Evaluation

Students are required to do the weekly reading, attend class, complete all assignments, and contribute significantly to course discussions about the material.

The student's final course assessment includes several components: problem sets (weighted 20%), labs (10%), reading quizzes (10%), a midterm exam (15%), paper question and dataset (5%), a final paper and the paper's replication code (25%), a roughly 5-minute oral presentation and defense of that paper (5%), and engagement in course conversations through attendance, in-class participation, and Slack participation (10%).

A summary of the course assessments is in Table 1.

If you cannot submit an assignment on time, arrange to submit it early. We encourage you to use office hours to discuss any specific assignments, difficulties, or questions about the course.

Assignment	Weight	Due date
Problem Sets (4)	20%	Sep 16, Oct 17, Nov 21, Dec 2
Labs (2)	10%	Oct 3, Oct 24
Paper question and annotated bib	2.5%	Oct 7
Reading quizzes (14)	10%	(days without others due)
Paper dataset and variables	2.5%	Nov 14
Midterm Exam	15%	Nov 7
Final presentation	5%	Nov 23/24
Final paper and code	25%	Dec 11
Participation	10%	(throughout)
(Attendance, Slack, quizzes, paper idea, presentation review)		
Paper idea		Sep 23

Table 1: Course Assessment Summary

Problem Sets

The four problem sets should be completed outside of class. You should submit a printed out hard copy of your solution set before the start of the class in which the problem set is due. You may also submit your solutions to the course Canvas site. We recommend this additional step as a way to create a backup of your final submission that is time-stamped and visible to the instructors.

You may work with others on the problem sets, but every keystroke of your submission must be your own. You may not copy code or answers from others, but you may develop your code with classmates. This includes all support from resources outside of class (StackOverflow, ChatGPT, etc.). You are responsible for understanding and being able to explain every line of code you submit.

Labs

The lab will take place during class time. During these class meetings, you will work with a randomly-selected partner on a data analysis task. The task will reflect methods we've studied in class, but will require applying them to new data. The instructors will be available to answer questions, but you and your teammate will be responsible for performing, documenting, and submitting your analysis during class time. You will submit your lab to the designated folder on the course Canvas page.

Reading Quizzes

Reading quizzes will take five minutes at the beginning of class, will have roughly five questions, and will be scored 0-5. The student's best 10 reading quiz scores will be counted, and there are no make-up opportunities. Each counted reading quiz counts 1% toward the final mark. You will receive 0.5% simply for completing the quiz in good faith at the appropriate time. The other 0.5% will reflect your score. E.g., if you score 4/5 on a reading quiz, you will earn

$$\underbrace{0.5\%}_{\text{Completion}} + \underbrace{\frac{4}{5} \cdot 0.5\%}_{\text{Score}} = 0.9\%$$

toward the final mark.

Why are there so many reading quizzes? Each one represents a graded, but low-stakes, opportunity to evaluate your understanding of core concepts and techniques. These intend to encourage regular engagement with the course material throughout the semester. Only your ten best quiz scores count.

Midterm Exam

The midterm exam will take place during class time. Expect about 25 multiple choice questions.

Final Project

For the final project, you will engage in original political science research. You will define your own research question, with attention to the intellectual or policy contribution that you will make by answering it.

You will select data sets, pose an appropriate political research question that the data can answer with quantitative methods, analyze the data, write a paper, and present your research. The paper must provide appropriate political, social, and intellectual context for the question you pose. Projects that connect otherwise disconnected data sets often emerge as the most innovative social science work. Start thinking about your project soon. Whatever topic you decide to work on, speak with the instructors early in the semester.

Your project should represent original data analysis, and should address a question of interest to policymakers or the research community. It should represent quantitative social science at the highest level you can muster.

To start finding data, see the resources for papers on my webpage, our Canvas, or the page prepared by our librarian here. Another option is to use data that policymakers want to learn about. In conjunction with The Lab @ DC, a research arm of the Executive Office of the Mayor, our Canvas includes a handful of data sets pertaining to policies and programs of Washington, DC. Topics will include campaign finance and expenditures, ANC budgets, public goods and the 311 request system, transit, and affordable housing. The data are available at http://opendata.dc.gov.

`swirl` Exercises

Modern applied social science requires using a computer to analyze data. We will do so using R, which is free, open-source, powerful, and in high demand by employers. The best way to learn R is to try it.

`swirl` is an R package that is designed to teach you R. Completing the `swirl` exercises can help you learn the techniques of the course. These exercises are not submitted to the instructors. In order to get the `swirl` exercises that are written for our textbook, navigate to https://github.com/kosukeimai/qss-swirl and scroll to the bottom. Instructions for installation and getting started are there.

Software, Statistics, Data, and Literature Support

The primary statistical software for the course is R. See https://t.ly/0Q6VH for help getting started. Additional support for statistical software is available through CTRL and the library. See https://bit.ly/3ABF1w4 for tutorials and https://bit.ly/3ADGIsV for CTRL's calendar. See https://www.american.edu/provost/academic-access/quantitative.cfm to get individual help.

The Department of Mathematics and Statistics offers statistical consulting services, with extensive hours. For the schedule and contact information, see http://j.mp/1EmVqkY.

The library itself offers support for various software. Our librarian is Olivia Ivey, whom I recommend reaching out to as you formulate a question, search for data, and try to put your question in a larger intellectual or policy context. You can book an appointment with Olivia at https://aulib.info/oivey.

The Peer-Assisted Student Support Program offers free, online tutoring in GOVT-310; see https://american.mywconline.net/.

Intellectual Property

Course content is the intellectual property of the instructor or student who created it, and may not be recorded or distributed without consent. You may not donate others' intellectual property to the builders of LLM's.

Students are not permitted to make visual or audio recordings, including live streaming, of classroom lectures or any class related content, using any type of recording devices (e.g., smart phone, computer, digital recorder, etc.) unless prior permission from the instructor is obtained, and there are no objections from any of the students in the class.

Course Evaluation

The course evaluation will take place online towards the end of the semester. Please take time to provide this important feedback.

Replication Policy

Students must retain copies of all `.R` and `.qmd` files that include their data processing and analysis for problem sets, labs, and the final project. In keeping with standard practice in the discipline, these files should be able to be run by others, and should reproduce all results the student submits. Students must submit a replication code file with the final project.

Academic Integrity

Academic integrity is a core value of institutions of higher learning. It is your responsibility to avoid and report plagiarism, cheating, and dishonesty. Please (re-)read the University policy on academic integrity at `http://www.american.edu/academics/integrity/code.cfm`, particularly Sections I and II.

The University Provost and Office of Academic Integrity recently sent out this guidance:

> Dishonesty in papers/exams: our Code requires that all work submitted by students is their own unless otherwise acknowledged. If a student is using AI generated material to substitute for work that is expected to be entirely their own, this could be a violation.

Further Information for American University Students

For further detailed information on the important issues of academic integrity, emergency preparedness, academic support, discrimination, and use of social media, please see here.

SPA Grading Criteria, 2025

Please see the SPA Grading Criteria adopted for 2025 here.

Calendar

26 August

Introduction to quantitative social science.

- ☐ Required reading: This syllabus.

27 August

Optional Drop-in Session.
Installing R, RStudio, and `tinytex`. `swirl` exercises.

14:00 - 16:00, in the Kerwin Café

29 August

Introduction to statistical computing environments. Causal questions.

- ☐ Required reading: Imai, Chapter 1
- ☐ Optional exercises in R: `swirl() INTRO1`

2 September

Causal Inference.
Reading quiz.

- ☐ Required reading: Imai §2.1-2.3, especially §2.3
- ☐ Required reading: Notes `01-causal`
- ☐ Optional reading:

  Marianne Bertrand and Sendhil Mullainathan. Are Emily and Greg more employable than Lakisha and Jamal? a field experiment on labor market discrimination. *American Economic Review*, 94(4):991–1013, 2004.

- ☐ Optional exercises: `swirl() INTRO2`

5 September

Randomized experiments and observational studies.
Reading quiz.

- ☐ Required reading: Notes `02-rand-obs`
- ☐ Required reading: Imai §2.4-2.5

- ☐ Complete the First Two Weeks Checklist
- ☐ Optional reading:

  Miguel A. Hernán. The c-word: scientific euphemisms do not improve causal inference from observational data. *American Journal of Public Health*, 108(5):616–619, 2018.

- ☐ Optional exercises: `swirl() CAUSALITY1`

9 September

Descriptive statistics.
Visualization.
Reading quiz.

- ☐ Required reading: Notes `03-descriptives`
- ☐ Required reading: Notes `04-visualization`
- ☐ Required reading: Imai §2.6-2.7
- ☐ Required reading: Imai §3.1-3.4
- ☐ Optional exercises: `swirl() CAUSALITY2`
- ☐ Optional exercises: `swirl() MEASUREMENT1`

12 September

No class meeting. (Annual meeting of the American Political Science Association.)

- ☐ Required reading: documents in Canvas `Files/admin/`
- ☐ Required reading: documents in Canvas `Files/computing/`

16 September

Bivariate statistics. Survey sampling.

- ☐ Required Problem Set 1 due
- ☐ Required reading: Imai §3.5-3.7
- ☐ Required reading: Notes `05-cor_z`

19 September

Clustering via k-means.
Reading quiz.

- ☐ Required reading: Imai §3.8-3.9
- ☐ Required reading: Final assignment on Canvas
- ☐ Required reading: Final paper template on Canvas
- ☐ Optional exercises: `swirl() MEASUREMENT2`

23 September

Prediction and classification.

- ☐ Required paper idea due
- ☐ Required reading: Imai §4.1
- ☐ Required reading: Notes `07-prediction`
- ☐ Optional exercises: `swirl() PREDICTION1`

26 September

Linear regression I.
Reading quiz.

- ☐ Required reading: Imai §4.2
- ☐ Required reading: Notes `08-linear`
- ☐ Optional exercises: `swirl() PREDICTION2`

30 September

Linear regression II.
Reading quiz.

- ☐ Required reading: Notes `09-linear2`

3 October

Lab I

7 October

Regression + Causal Inference.

- ☐ Required paper question and annotated bibliography due
- ☐ Required reading: Notes `10-linear_exps_RDD`
- ☐ Required reading: Imai §4.3-4.5

10 October

No class meeting. (Fall Break)

14 October

Probability I.
Reading quiz.

- ☐ Required reading: Notes `11-prob_conditional`
- ☐ Required reading: Imai §6.1-6.2.2

17 October

Probability II.

- ☐ Required Problem Set 2 due
- ☐ Required reading: Notes `12-prob_cond_bayes`
- ☐ Required reading: Imai §6.2.3-6.2.4

21 October

Probability III.
Reading quiz.

- ☐ Required reading: Notes `13-rv_dists`
- ☐ Required reading: Imai §6.3
- ☐ Optional exercises: `swirl() PROBABILITY1`

24 October

Lab II

28 October

Probability IV: Random variables and distributions (LLN and CLT)
Reading quiz.

- ☐ Required reading: Imai §6.4-6.5
- ☐ Optional exercises: `swirl() PROBABILITY2`

31 October

Uncertainty I: Standard errors and confidence intervals.
Reading quiz.

- ☐ Required reading: Imai §7.1.1-7.1.4
- ☐ Required reading: Notes `14-uncert_ci_t`
- ☐ Optional exercises: `swirl() UNCERTAINTY1`

4 November

Uncertainty II: Analyzing experiments and the t-test.
Reading quiz.

- ☐ Required reading: Imai §7.1.5-7.1.6

7 November

Midterm exam.

11 November

Uncertainty III: Hypothesis testing.
Reading quiz.

- ☐ Required reading: Notes `15-uncert_nhst`
- ☐ Required reading: Imai §7.2.1-7.2.4 (especially §7.2.3 and §7.2.4)
- ☐ Optional exercises: `swirl() UNCERTAINTY2`

14 November

No class meeting. (Annual meeting of the Association for Public Policy Analysis & Management)

- ☐ Required paper dataset and variables due

18 November

Uncertainty IV: Hypothesis testing.
Reading quiz.

- ☐ Required reading: Imai §7.2.5-7.2.6

21 November

Catch up and review.

- ☐ Required Problem Set 3 due

23 November

- ☐ Final project PDF slides due, uploaded by 20:00.
- ☐ Final project presentation video due, uploaded by 20:00.

25 November

Virtual asynchronous class meeting. Before 12:35,

- ☐ review 2 randomly-assigned presentations
- ☐ provide feedback and suggestions for peer final projects

28 November

No class meeting. (Thanksgiving Break)

2 December

Uncertainty V: Inference about linear regression.

- ☐ Required Problem Set 4 due
- ☐ Required reading: Notes `16-uncert_linreg`
- ☐ Required reading: Imai §7.3-7.4
- ☐ Optional exercises: `swirl() UNCERTAINTY3`

5 December

Uncertainty and Testing Review.
Building regression models.
Reading quiz.

- ☐ Please complete the course evaluation at `set.american.edu`

9 December

Final exam scheduled, 11:20-13:50.
No class meeting.

- ☐ Final paper due to Canvas by 13:50.