Introduction to Political Research
Government 310

Ryan T. Moore*

8 February 2017 at 10:39

Course Information

Government GOVT 310
Introduction to Political Research
Section 003: Monday and Thursday, 8.10–9.25am, Ward 103
Section 002: Monday and Thursday, 9.45–11.00am, Ward 107

Instructor Information

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Office Hours: Wednesday, 10am-noon or by appointment
(Please use https://calendly.com/ryantmoore to schedule times.)

Simon Heuberger
Office Hours Location: Ward ST01 (computer lab on sub terrace) – on Feb 2 and Feb 9 in Anderson B13
Email: sh6943a (at) american.edu
Office Hours: Thursday, noon-2pm
(Please use https://calendly.com/heuberger to sign up for Thursday – just so Simon knows how many people are coming. If you can't make Thursday, email Simon to make an appointment)

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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 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

By the end of the course, you should be able to

- Translate political phenomena into quantitative hypotheses

- Differentiate causal from descriptive statistical analyses

- Understand the value and limitations of specific quantitative methods

- Test substantive hypotheses using quantitative methods

- Conduct original data analysis that uses a technique from the course to answer a relevant political science question

- Use R to import and manipulate data, perform analyses, and produce publication-quality graphics

Learning Strategies

Readings

Readings should be completed before the course meeting under which they are listed below. The course readings are primarily from the textbook. The textbook engages with some of the most recent, most interesting research in political science and cognate social sciences. When you read about a study or method that's interesting to you, find the original paper and read it, too. We will occasionally have short quizzes over the reading.

The text is available on the course Blackboard site. We will use the version from 13 June 2016. We use the text for our class this spring as a special privilege with permission of the publisher. **The text must not be distributed or copied in any way.** The primary textbook for the course is

> Imai, Kosuke. *Quantitative Social Science: An Introduction.* Princeton University Press, Princeton, NJ, 2017.

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 often be time in class to pose your specific questions about R coding, however. As such, you may want to bring a laptop to class to try out new code, to update your code files, etc. That said, I expect to spend most of our time on handouts that you can write on longhand. Although the experiments are relatively small, longhand appears to be a superior strategy for taking notes under some conditions; 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, however, we will meet in the computer lab and our time will be devoted to conducting applied data analysis. 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 four components: problem sets (30%), labs (30%), a final paper and a roughly 10-minute oral presentation and defense of that paper (30%), and engagement in course conversations through attendance, in-class participation, quizzes, and Slack participation (10%). These four components each will be scored 0, 1, 2, or 3, roughly representing the following outcomes:

- 0: absence of a good-faith effort to complete the work; failure to complete the work on time; demonstrates mastery of very little of the material.

- 1: a timely, good-faith effort to complete the work that demonstrates mastery of at least some substantial part of the material.

- 2: a timely submission that demonstrates mastery of most of the material.

- 3: an excellent submission that demonstrates mastery of virtually all of the material.

A summary of the course assessments is in Table 1.

Assignment	Weight	Due date
Problem Sets (4)	30%	Feb 6, Mar 2, Apr 13, Apr 20
Labs (3)	30%	Feb 16, Mar 9, Apr 6
Final paper and defense	30%	Apr 27
Participation	10%	
(Attendance, Slack, quizzes,		Quiz: Jan 30
paper memo, `swirl` exercises)		Memo: Mar 27

Table 1: Course Assessment Summary

No late work will be accepted. 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.

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.

Participation: `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-demand. 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 will help you learn the techniques of the course, and will be needed to participate in class discussions and answer quiz questions.

Problem Sets

The four problem sets should be completed outside of class. You should submit a printed out hard copy of your solution set at the start of the class in which the problem set is due. You may also submit your solutions to the course Blackboard site under Content/Assignments/Problem Sets/[PS number]. You may work with others on the problem sets, but every keystroke of your submission must be your own.

Labs

The three labs will take place in class. 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. You will submit your lab to the designated folder on the course Blackboard page, at Content/Assignments/Labs/[Lab number].

Final Project

For the final project, you will have the exciting opportunity to engage in original political science research using real data that policymakers want to learn about. In conjunction with The Lab @ DC, a research arm of the Executive Office of the Mayor, we will provide you with a handful of data sets pertaining to policies and programs of Washington, DC. Topics will include DC's new $15 minimum wage, voter turnout, campaign finance and expenditures, promoting minority-owned business, the 311 request system, and affordable housing. If you have a strong inclination to work on another topic, speak with the instructor early in the semester. We recommend starting with the data available at http://opendata.dc.gov.

You will select one of these data sets, pose an appropriate political research question that the data can answer with quantitative methods, analyze the data, write a short data analysis report, and present your research to the class in one of the last two meetings. You are welcome to augment the data provided with any other appropriate data you need (this is optional, but this sort of bridging often defines the most innovative social science work). We will begin our detailed discussion of the data when David Yokum, the Director of The Lab @ DC, visits our class to talk about how governments use data analysis and political research to improve the lives of residents and constituents.

You will present your final project to the class in one of our last two scheduled sessions. The best projects will be invited to present their work to city officials, particularly representatives of the Office of the City Administrator, including The Lab @ DC, the Performance Team, and others.

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

the highest level you can muster. You should work with one other student on the final project. Working collaboratively is typical in political science research.

Software and Statistics Support

The primary software for the course is R. See http://j.mp/2e8zBkC for help getting started. Support for statistical software is available through CTRL. See http://j.mp/ZrBr2Z for CTRL's workshop schedule.

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.

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.

Course Evaluation

The course evaluation will take place in class towards the end of the semester. Students who submit the evaluation will earn one percentage point toward the participation grade.

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.

Calendar

19 January

Introduction to quantitative social science.

☐ Required reading: This syllabus.

23 January

Introduction to statistical computing environments.

☐ Required reading: Imai, Chapter 1

☐ Required exercises in R: `swirl() INTRO1`

26 January

Causal Inference I
We will look at `swirl() INTRO2` in class. If you complete it before class, you'll be even better prepared to have your questions answered.

☐ Complete the First Week Checklist

☐ Required reading: Imai §2.1-2.4, especially §2.3

30 January

Randomized experiments and observational studies.
A quiz over Imai, §2.3.

☐ Required reading: Imai §2.5-2.6

☐ Required exercises: `swirl() CAUSALITY1`

2 February

Descriptive statistics.

☐ Required reading: Imai §2.7

☐ Required exercises: `swirl() CAUSALITY2`

6 February

Visualization.

☐ Required reading: Imai §3.1-3.4

☐ Required Problem Set 1 due

9 February

Bivariate statistics. Survey sampling.

☐ Required reading: Imai §3.5-3.6

☐ Required exercises: `swirl() MEASUREMENT1`

13 February

Clustering.

☐ Required reading: Imai §3.7-3.8

☐ Required exercises: `swirl() MEASUREMENT2`

16 February

Lab I (Ward ST01)

20 February

Prediction and classification.

☐ Required reading: Imai §4.1

☐ Required exercises: `swirl()` `PREDICTION1`

23 February

Linear regression I.

☐ Required reading: Imai §4.2

☐ `swirl()` `PREDICTION2`

27 February

Linear regression II.

☐ Required reading: Imai §4.3

☐ `swirl()` `PREDICTION3`

2 March

Regression + Causal Inference

☐ Required reading: Imai §4.4

☐ Required Problem Set 2 due

6 March

(Catch up, review. Visit from David Yokum, director of The Lab @ DC)

9 March

Lab II (Ward ST01)

13 March

Spring Break. No class meeting.

16 March

Spring Break. No class meeting.

20 March

Probability I

☐ Required reading: Imai §6.1-6.2.2

23 March

Probability II.

☐ Required reading: Imai §6.2.3-6.2.4

27 March

Probability III

☐ Required reading: Imai §6.3

☐ Required exercises: `swirl() PROBABILITY1`

☐ Final paper memo due

30 March

Probability IV: Random variables and distributions (maybe LLN and CLT)

☐ Required reading: Imai §6.4-6.5

☐ Required exercises: `swirl() PROBABILITY2`

3 April

Uncertainty I: Standard errors and confidence intervals

☐ Required reading: Imai §7.1

☐ Required exercises: `swirl() UNCERTAINTY1`

6 April

Lab III (Ward ST01)

10 April

Uncertainty II: Hypothesis testing

☐ Required reading: Imai §7.2 (especially §7.2.3 and §7.2.4)

☐ Required exercises: `swirl() UNCERTAINTY2`

13 April

Uncertainty III: Hypothesis testing

☐ Review Imai §7.1 and §7.2 as needed

☐ Required Problem Set 3 due

17 April

Uncertainty IV: Inference about linear regression

- ☐ Required reading: Imai §7.3-7.4

- ☐ Required exercises: `swirl() UNCERTAINTY3`

20 April

(Catch up and review)

- ☐ Required Problem Set 4 due

24 April

Discovery: Selected topics in text analysis, networks, and spatial data

- ☐ Required reading: Imai §5.1-5.3 (OK to read for the big ideas)

- ☐ `swirl() DISCOVERY1` or `DISCOVERY2` or `DISCOVERY3`

27 April

Presentations

- ☐ Final data analysis report due

1 May

Presentations and Conclusions.

3-9 May

Select presentations to DC city policymakers.