

GOVT 10: Quantitative Political Analysis

Instructor: Prof. Brendan Nyhan	Classroom: Reed Hall 104
Office: Silsby 305	Schedule: MWF 11:15 AM–12:20 PM
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Course overview

Political scientists frequently use quantitative methods to study elections, legislatures, wars, and other important political phenomena. This course provides students with an introduction to fundamental concepts in statistical analysis, research design, and causal inference as well as contemporary examples of how those concepts can be applied in the real world. The goal is to enable students to not only become sophisticated consumers of quantitative research in political science but to enable them to conduct their own research using the tools and ideas presented in the class.

Learning objectives

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

- Present data using graphics and descriptive statistics in a clear and informative manner
- Apply basic concepts from probability theory to social science research questions
- Make inferences about population means and proportions
- Correctly conduct and interpret hypothesis tests using p -values and confidence intervals
- Analyze and critique survey sampling methods and social science research designs
- Describe the threats to making causal inferences from observational data and identify how they could change the conclusions of a study
- Understand linear regression in theory and practice (i.e., be able to read and interpret regression tables in academic articles)
- Independently gather, analyze, and interpret your own data

Course materials

The following textbook is required and can be purchased at Wheelock Books:

- David S. Moore. 2010. *The Basic Practice of Statistics*. 5th edition. W. H. Freeman and Company.

Statistical software/consulting

We will use Stata statistical software in this course, which is freely available to students using KeyAccess. Please install Stata 12 on your computer and verify that you can run it successfully as soon as possible. Instructions on how to do so are provided at the following websites:

- Windows:
<http://www.dartmouth.edu/comp/soft-comp/software/downloads/windows/stata.html>
- Mac: <http://www.dartmouth.edu/comp/soft-comp/software/downloads/mac/stata-osx.html>

If you have trouble getting Stata installed, please visit the IT Service Desk at 172 Carson Hall or contact Daniel Gottlieb, M.S., who is a statistical consultant providing Stata support for students in this course. His office is 178F Kiewit (Berry Library) and he is available Tuesday 8 AM–12 PM, Thursday 3 PM–6:30PM, Friday 2:30–6 PM, or by appointment. He can be reached at statistical.consulting@dartmouth.edu or 603/646-6552. You should have Stata working on your computer and ready to use before the tutorial that he will be teaching in class on January 6. Please bring your computer to class that day.

If you have problems using Stata, please consult the following resources in this order:

1. Stata help — Simply type “help <command>” for any Stata command in the command window and the help file for that command will appear. For more help, click on the linked title of the help file (e.g., “[R] summarize”) to open a PDF of the relevant section of the Stata manual. The manual provides more extensive discussion and examples in the “Remarks” section, which appears below the text from the online help file.
2. Consult the Dartmouth Stata FAQ at <http://www.dartmouth.edu/comp/soft-comp/software/statistics/statafaq.html>
3. Google for answers — Extensive resources on Stata are now available online. Someone has probably asked a similar question in the past. UCLA’s Stata resources site at <http://www.ats.ucla.edu/stat/stata/> is especially helpful.
4. Consult Daniel Gottlieb by email at statistical.consulting@dartmouth.edu or make an appointment to meet with him.
5. Contact me by email at nyhan@dartmouth.edu or make an appointment to meet with me.

Assignments and grading

Grading in this class will be based on the components described below. Late work will not be accepted without prior permission. Makeup exams will not be given, and students who miss exams will receive a score of 0 absent extraordinary circumstances.

Homework – 10%

Homework assignments will be distributed throughout the course. These are individual assignments that you should prepare yourself, though you may ask your colleagues for help. Please turn them in to me at the state of the specified date in class with only your Dartmouth ID number and section as identification (i.e., not your name). If you have a printing problem, you are responsible for emailing it to me before class starts.

Midterm exam - 25%

The midterm exam will be held in class on February 6 and will cover the material discussed in class up to that point. Students will be provided with relevant statistical tables and are allowed to use a calculator with no information stored in memory.

Research project - 25%

Working in randomly assigned groups of 4-5 people, students will select a social science research question of interest, design a measurement instrument, collect original data, and conduct a quantitative analysis of their results. These findings will be written up and presented as scientific posters during the final class period in Hinman Forum (the common area on the first floor of the Rockefeller Center). Each group should submit a Powerpoint or PDF file of their poster and replication data/annotated Stata code generating your results to me before the final class period. The best poster in each section as selected by Government Department faculty will receive 1% extra credit toward their overall course grade. Note: Don't worry about whether your hypothesis was supported! Evaluation will be based on research design and analysis, not the statistical significance of your results.

Final exam - 40%

A comprehensive final exam will be held March 10 at 8:00 AM (location TBD). Students will be provided with relevant statistical tables and are allowed to use a calculator with no information stored in memory.

Prerequisites

The course has no prerequisites.

Academic integrity

Students are responsible for understanding the academic integrity rules at Dartmouth. Explanations of integrity rules and principles can be found at <http://www.dartmouth.edu/~uja/>. Ignorance of the Academic Honor Principle will not be considered an excuse if a violation occurs. Beyond any penalties imposed as a consequence of an Academic Honor Principle investigation, any student who is found to have cheated or plagiarized on any assignment will receive a failing grade in the class. Details on citing sources are available at <http://www.dartmouth.edu/~writing/sources>. These academic integrity issues are especially important since we will be conducting original research in the class. Please see me immediately if you have any questions or concerns.

Students with disabilities

Students with disabilities enrolled in this course who may need disability-related classroom accommodations are encouraged to make an appointment to see me before the end of the second week of the term. All discussions will remain confidential, although the Student Accessibility Services office may be consulted to discuss appropriate implementation of any accommodation requested.

Religious observances

Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your participation in the course, please meet with me before the end of the second week of the term to discuss appropriate accommodations.

Course schedule

The tentative schedule for the course is presented below. Please note that certain classes have been replaced with x-periods due to schedule conflicts. This course outline is subject to change; please consult the current version of the syllabus on Blackboard for the most up-to-date information. In particular, additional readings may be added that are relevant to the material being covered.

Introduction—variables and descriptive plots (1/4)

- Take class survey
- Purchase book
- Moore, Chapter 1, “Picturing Distributions with Graphs”

Stata tutorial (1/6)

- Install Stata
- German Rodriguez, “Stata Tutorial”

Central tendency and spread (1/9)

- Moore, Chapter 2, “Describing Distributions with Numbers”
- HW 1 due: 1.24, 1.26, 1.30, 1.32, 1.40

Scatterplots and correlation (1/11)

- Moore, Chapter 4, “Scatterplots and Correlation”

Causation and causal inference (1/13)

- Moore, Chapter 9, “Producing Data: Experiments”
- HW 2 due: 2.16, 2.18, 2.30, 4.28, 4.32, 4.34

Probability (1/17–x-period)

- Moore, Chapter 10, “Introducing Probability”
- Beber and Scacco, “The Devil Is in the Digits” (Blackboard)

Normal distributions and z -scores (1/18)

- Moore, Chapter 3, “The Normal Distributions”
- HW 3 due: 9.12, 9.28, 9.32, 10.36, 10.38, 10.40

Sampling (1/20)

- Moore, Chapter 8, “Producing Data: Sampling”

Research projects/sampling distributions (1/23)

- Moore, Chapter 11, “Sampling Distributions”
- HW 4 due: 3.26, 3.28, 3.30, 3.32, 3.34, 3.44, 8.32
- Assignment: Email me a research proposal by February 1

Confidence intervals/hypothesis tests I (1/24–x-period)

- Moore, Chapter 14, “Introduction to Inference”

Confidence intervals/hypothesis tests II (1/30)

- Moore, Chapter 14, “Introduction to Inference”

Hypothesis tests II (1/31–x-period)

- Moore, Chapter 15, “Thinking about Inference”

Hypothesis tests III (2/1)

- Moore, Chapter 15, “Thinking about Inference”
- HW 5 due: 11.26, 11.30, 11.34, 11.36, 14.34, 14.36, 14.38, 14.42, 14.50 (Stata), 14.56
- Research proposal due (emailed before class)

Midterm exam review (2/3)

- Study!

Midterm exam (2/6)

- Study!

Research projects update/*t*-distributions I (2/7–x-period)

- Moore, Chapter 17, “Inference about a Population Mean”

***t*-distributions II (2/8)**

- Moore, Chapter 18, “Two-Sample Problems”
- HW 6 due: 15.30, 15.36 (Stata), 15.44, 15.50

Midterm debrief/proportions (2/13)

- Moore, Chapter 19, “Inference about a Population Proportion”
- HW 7 due: 17.26, 17.32, 17.34, 17.42, 18.28, 18.32, 18.36, 18.46, 18.48

Comparing proportions (2/15)

- Moore, Chapter 20, “Comparing Two Proportions”

Two-way tables (2/20)

- Moore, Chapter 6, “Two-way Tables”
- HW 8 due: 19.30, 19.32, 19.38, 20.18, 20.26, 20.32

Chi-square tests (2/21–x-period)

- Moore, Chapter 22, “Two Categorical Variables: The Chi-Square Test”

Regression I (2/22)

- Moore, Chapter 5, “Regression”

Regression II (2/24)

- Moore, Chapter 23, “Inference for Regression”
- HW 9 due: 6.18, 22.10, 22.16, 22.30, 22.44

Multiple regression I (2/27)

- Moore, Chapter 27, “Multiple Regression”

Multiple regression II (2/29)

- Moore, Chapter 27, “Multiple Regression”
- HW 10 due: 5.30, 5.32 (a/b only), 5.36

Multiple regression III (3/2)

- Moore, Chapter 27, “Multiple Regression”

Final exam review (3/5)

- Study!
- HW 11 due: 23.34, 23.38, 27.42 (collaborate with your project group!)

Poster presentations (3/7)

- Present your research project (public event held in Hinman Forum)

Final exam (3/10)

- Study!