



Poli 90: Statistics for Politics and International Relations

Time: MW 11:00AM-12:15PM

Location: Carnegie 107

Instructor: Brian Engelsma

Email: Brian.Engelsma@pomona.edu

Course Website: <https://pomona.instructure.com/>

Office Hours: Tues. 11:00AM-1:00PM, or by appointment.

This syllabus is subject to change. Students will be notified of any changes through email.

Course Description: Using data from politics and international relations, this course builds basic numeracy skills for social scientists. It develops knowledge of descriptive statistics and introduces students to inferential (parametric and non-parametric) statistical techniques, including rudiments of multiple regression analysis. Emphasis on computer applications.

Class Texts: There are no required textbooks. All class readings will be made available through Canvas. Please complete all assigned readings before the class in which they are assigned. You are not responsible for readings labeled optional.

Statistical Programs: For this course I will be teaching with R and R Studio. R is a popular programming language used for statistical analyses and data visualizations. It is a free, open-source project, with a vibrant community writing packages and contributing to its development. While it is possible to use R directly or from your computer's command terminal, I suggest downloading a GUI (graphical user interface), such as R Studio, for ease of use. Please download both [R](#) and [R Studio](#) (you need both!) and have them properly installed on your computer.

Additional Resources: Students seeking more in-depth treatments of the materials covered in class may find the following reference materials useful.

- R and Coding:
 - Venables, W.N., D.M. Smith and the R Core Team. 2025. *An Introduction to R*. [Link](#).
 - Owen, W.J. 2010. *The R Guide*. [Link](#).
 - Dalgaard, Peter. 2008. *Introductory Statistics with R*. New York, NY: Springer.
- Mathematical Foundations and Statistics
 - Gill, Jeff. 2006. *Essential Mathematics for Political and Social Research*. Cambridge, UK: Cambridge University Press.

Course Objectives: At the completion of this course, students will be able to:

1. Understand how to apply the scientific method to questions in the social sciences,
2. Develop measures of social and political phenomena, and weigh the relative pros and cons of different measurements,
3. Describe data using statistical and visual approaches,
4. Conduct several different types of hypothesis tests,
5. Estimate and interpret regression models,
6. Interpret and communicate statistical results,
7. Explain the fundamental problem of causal inference and attempts to overcome it,
8. Differentiate between quantitative and qualitative research methods, and experimental and non-experimental methods,
9. Use R to produce statistical analyses and appropriate data visualizations.

Grading:

Final Grades will be calculated with the following weights:

Participation	5%
Problem Sets (x4)	40%
Hackathon	10%
Midterm Exam	20%
Final Project	25%

Note: No extra credit will be offered in this course.

Letter Grade Distribution:

≥ 94.00	A	73.00 - 76.99	C
90.00 - 93.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	60.00 - 66.99	D
80.00 - 82.99	B-	≤ 59.99	F
77.00 - 79.99	C+		

Course Policies:

• **General**

- Any quizzes and exams are closed book, closed notes.
- Late assignments will not be accepted without a legitimate, documented excuse. Please inform me as soon as possible if you anticipate needing any accommodations.
- **No makeup assignments or exams will be given.**

• **Assignments and Evaluations**

- Participation: I expect students to regularly contribute to our in-class discussions with thoughtful questions and comments that engage with course materials. Participation grades will be based on both the quantity and quality of contributions. A high-volume of low-effort contributions will not guarantee a good participation score, nor will occasional high-quality contributions.

- Hackathon: Students will compete in a one-day, “hackathon” style event on November 17th. During this exercise, students will be put into groups of roughly equal size, and given some data related to a recent political event. Groups may, on their own volition, seek out additional data. Your task will be to conduct an appropriate analysis of this event, including statistical summaries, data visualizations, and the estimation of appropriate statistical models. Following the competition, groups will turn in their code and analyses, present their results to the class, and individual students will write up a short, one-page reflection describing their experience.
- Mid-term Exam: There will be a mid-term exam on October 15th. It will be a closed book exam conducted on Canvas. The exam will consist of multiple choice questions, definitions, and short answers. Additional details will be provided in-class.
- Problem Sets: There will be four problem sets throughout the semester. The problem sets will consist of both conceptual and applied questions. You may work with classmates on problem sets, but must declare who you work with, and all turned in assignments must consist solely of your own work.
- Final Project: In lieu of a final exam, you will prepare a 10-12 page research paper, in which you select a question or topic of interest, find appropriate data with which you may consider the topic, and conduct an appropriate set of analyses and visualizations. Exemplary projects will have a well-thought out research question, review of previous empirical research, proposed hypotheses or arguments, and a rigorous set of analyses providing evidence speaking to the reasonableness of those proposed hypotheses or arguments.

• Grades

- Grades in the **C** range represent performance that **meets expectations**; Grades in the **B** range represent performance that is **substantially better** than the expectations; Grades in the **A** range represent work that is **excellent**.
- Grades will be maintained in Canvas. Students are responsible for tracking their progress by referring to the online gradebook.
- If you are dissatisfied with a grade, you may contest your grade by writing a one-page memo within one week of receiving your grade. This memo should describe both what you believe to be the grading error, as well as the grade you feel you deserve. Note that regrade requests should be to correct an error in grading, not to negotiate for a higher grade.

University Resources and Policies:

- **Quantitative Skills Center:** The Quantitative Skills Center (QSC) provides academic support to Pomona College students in courses that feature a large degree of quantitative and/or scientific reasoning through our QSC Partners Program. QSC partners meet one-on-one with students to provide support for a variety of Pomona courses for course specific help. The QSC also offers non-course specific help in general quantitative skills and offers consultations for projects and theses involving quantitative methods. To make an appointment at the QSC, please visit pomona.mywconline.com,

or contact us at qsc@pomona.edu. The QSC is located in SCC (Smith Campus Center) 228.

- **Academic Dishonesty:** I expect all students to uphold the principles of academic integrity throughout the course. Lying, cheating, plagiarism, and other forms of academic dishonesty will not be tolerated under any circumstances. You can read more about the college's academic dishonesty policies at <https://catalog.pomona.edu/content.php?catoid=44&navoid=8860>.
- **The Writing Center:** The Center for Speaking, Writing, and the Image (formerly The Writing Center) is one of the most widely-used academic resources on campus and is a fantastic, free resource for all students. They will be open at full capacity by the end of September, but will be holding limited appointments and drop-in hours as soon as classes begin. Writing, Speaking, and Image Partners meet one-on-one with students to talk about their work and provide feedback at any stage of their preparation process. Trained to think deeply about written, oral, and visual rhetoric and communication, these student peers facilitate conversations about everything from ID1 papers to senior theses, lab reports to creative writing, giving presentations to developing strategies for reading and engaging more deeply and confidently in class discussion. The CSWIM also offers specialized writing and speaking support for multilingual students navigating English as an additional language (email Jenny.Thomas@pomona.edu for more information.) To make an appointment with a Writing, Speaking, or Image Partner, please log onto the Portal and go to Academics Writing Center. They can also pair you with a regular Writing or Speaking Partner for weekly or bi-monthly appointments over the course of the semester. Contact them at writing.center@pomona.edu. They offer both in-person and virtual appointments, and have regular drop-in hours in Smith Campus Center 148.
- **Accessibility & Accommodations:** Students requiring special accommodations may request them through Accessibility Resources and Services. Please inform me of any accommodations with the proper documentation as soon as possible. More information is available online at <https://www.pomona.edu/accessibility/student-accessibility>.
If at any point in the semester your personal circumstances make it difficult for you to keep up with the course, please let me know as soon as possible so I can make sure to provide you with whatever support and accommodations you may need.
- **Inclusion & Basic Needs:** I am committed to creating a learning environment that supports diversity of thought, perspective, experience, and identity. To that end, half of all course texts have at least one author from a group underrepresented in academia. Harassment of any form will not be tolerated. Any speech or act that is blatantly or implicitly discriminatory, intimidating, or predatory will be reported to [Student Affairs](#).

Course Outline:

Any changes to this outline will be announced on Canvas.

Class	Content
Class 1: August 25	• Course Introduction • Readings: 1. Check out Swirl 2. Imai, Koisuke. 2017. <i>Quantitative Social Science</i>. Princeton, NJ: Princeton University Press. Chapter 1. 3. Healy, Kieran. 2019. <i>Data Visualization: A Practical Introduction</i>. Princeton, NJ: Princeton University Press. Chapter 2. 4. Optional: Listen to More or Less. 2024. <i>Debate, Reform, tax evasion and ants</i>. BBC Sounds. Link.
Class 2: August 27	• Social Science: Paradigms, Theories and Hypotheses • Readings: 1. Geddes, Barbara. 2003. <i>Paradigms and Sand Castles</i>. Ann Arbor, MI: University of Michigan Press. Chapter 1. 2. Popper, Karl. "Science as Falsification." Link.
Class 3: September 3	• Measurement: Concepts and Variables • Readings: 1. Trochim, William M., James P. Donnelly and Kanika Anora. 2016. <i>Research Methods: The Essential Knowledge Base</i>. Boston, MA: Cengage Learning. Chapter 5. 2. Optional: Spiegelhalter, David. 2021. <i>The Art of Statistics</i>. New York, NY: W.W. Basic Books. Pages 19-46. 3. Optional: Watch The New York Times. 2014. <i>Verbatim: What Is a Photocopier?</i> Youtube. Link.
Class 4: September 8	• Describing Variables I (Measures of Central Tendency) • Readings: 1. Wheelan, Charles. 2013. <i>Naked Statistics</i>. New York, NY: W.W. Norton and Company. Chapters 2 and 3. 2. Spiegelhalter, David. 2021. <i>The Art of Statistics</i>. New York, NY: W.W. Basic Books. Pages 46-8. 3. Optional: On Simpson's Paradox and ecological fallacies, watch The Economics Dispatch. 2024. <i>Why Rich States Vote Democrat, Even When Rich People Vote Republican</i>. Youtube. Link.
Class 5: September 10	• Describing Variables II (Measures of Dispersion) • Readings: 1. Spiegelhalter, David. 2021. <i>The Art of Statistics</i>. New York, NY: W.W. Basic Books. Pages 49-51. 2. Imai, Koisuke. 2017. <i>Quantitative Social Science</i>. Princeton, NJ: Princeton University Press. Pages 63-68. 3. Optional: Watch López-Alt, J. Kenji. 2024. <i>Ask Kenji Live: What is the Best Way to Cut an Onion?</i>. Youtube. Link.

Class	Content
Class 6: September 15	• Graphing Variables I • Readings: 1. Healy, Kieran. 2019. <i>Data Visualization: A Practical Introduction</i>. Princeton, NJ: Princeton University Press. Chapter 1. 2. Optional: Tufte, Edward. 2001. <i>The Visual Display of Quantitative Information</i>. Cheshire, CT: Graphics Press. Pages 13-15, Chapters 2, 4, 6 and 9. 3. Optional: Watch Stand-up Maths. 2024. <i>UK Election charts are a nightmare</i>. Youtube. Link.
Class 7: September 17	• Graphing Variables II • Readings: 1. Healy, Kieran. 2019. <i>Data Visualization: A Practical Introduction</i>. Princeton, NJ: Princeton University Press. Chapter 3. 2. Imai, Koisuke. 2017. <i>Quantitative Social Science</i>. Princeton, NJ: Princeton University Press. Pages 80-88.
Class 8: September 22	• Research Topics: Fraud, Transparency, and the Replication Crisis • Readings: 1. Bartlett, Tom. 2015. “The Unraveling of Michael LaCour.” <i>The Chronicle of Higher Education</i>. Link. 2. Bueno de Mesquita, Ethan and Anthony Fowler. 2021. <i>Thinking Clearly With Data</i>. Princeton, NJ: Princeton University Press. Chapter 7. 3. Optional: Christensen, Garret, Jeremy Freese, and Edward Miguel. 2019. <i>Transparent and Reproducible Social Science Research</i>. Oakland, CA: University of California Press. Chapter 1. 4. Optional: Check out Data Colada, especially posts about fake data, but lots of other good, interesting topics here. 5. Optional: Listen to <i>Freakonomics</i>. 2024. “Why Is There So Much Fraud in Academia?” Link. • PROBLEM SET 1 DUE
Class 9: September 24	• Probability Theory and Distributions • Readings: 1. Wheelan, Charles. 2013. <i>Naked Statistics</i>. New York, NY: W.W. Norton and Company. Chapters 5, 6 and 8. 2. Optional: Imai, Koisuke. 2017. <i>Quantitative Social Science</i>. Princeton, NJ: Princeton University Press. Chapter 6. 3. Optional: Pearl, Judea, Madelyn Glymour, Nicholas P. Jewell. 2016. <i>Causal Inference in Statistics: A Primer</i>. Chichester, UK: John Wiley & Sons. Pages 7-13. 4. Optional: Spiegelhalter, David. 2021. <i>The Art of Statistics</i>. New York, NY: W.W. Basic Books. Chapters 8 and 9. 5. Optional: Watch 3Blue1Brown. 2023. <i>But what is the Central Limit Theorem?</i> Youtube. Link.
Class 10: September 29	• Simple Hypothesis Tests • Readings: 1. Imai, Koisuke. 2017. <i>Quantitative Social Science</i>. Princeton, NJ: Princeton University Press. Pages 342-360.

Class	Content
Class 11: October 1	• Correlations and Associations, Plotting Two Variables • Readings: 1. Bueno de Mesquita, Ethan and Anthony Fowler. 2021. <i>Thinking Clearly With Data</i>. Princeton, NJ: Princeton University Press. Chapter 2. 2. Imai, Koisuke. 2017. <i>Quantitative Social Science</i>. Princeton, NJ: Princeton University Press. Pages 97-108. 3. Optional: Wheelan, Charles. 2013. <i>Naked Statistics</i>. New York, NY: W.W. Norton and Company. Chapter 4. 4. Optional: Watch The Present Past. 2024. <i>Why Poland is Divided</i>. Youtube. Link. 5. Optional: Listen to More or Less. 2024. “Is reading for pleasure the single biggest factor in how well a child does in life?.” <i>BBC Sounds</i>. Link.
Class 12: October 6	• Research Topics: Causal Inference in the Social Sciences • Readings: 1. Bueno de Mesquita, Ethan and Anthony Fowler. 2021. <i>Thinking Clearly With Data</i>. Princeton, NJ: Princeton University Press. Chapters 3 and 9. 2. EGAP. “10 Things to Know About Causal Inference.” Link. 3. Optional: Spiegelhalter, David. 2021. <i>The Art of Statistics</i>. New York, NY: W.W. Basic Books. Chapter 4. 4. Optional: Pearl, Judea, Madelyn Glymour, Nicholas P. Jewell. 2016. <i>Causal Inference in Statistics: A Primer</i>. Chichester, UK: John Wiley & Sons. Pages 24-29, Chapter 2. 5. Optional: Listen to Car Talk. 2025. “2548: Correlation Run Amok.” <i>National Public Radio</i>. Link, especially first caller. 6. Optional: On mechanisms watch Technology Connections. 2019. <i>The Electromagnet in Your Toaster</i>. Youtube. Link. • PROBLEM SET 2 DUE
Class 13: October 8	• Mid-Term Review
Class 14: October 15	• Mid-Term Exam
Class 15: October 20	• Bivariate Regression I • Readings: 1. Bueno de Mesquita, Ethan and Anthony Fowler. 2021. <i>Thinking Clearly With Data</i>. Princeton, NJ: Princeton University Press. Chapter 5. 2. Wheelan, Charles. 2013. <i>Naked Statistics</i>. New York, NY: W.W. Norton and Company. Pages 185-198. 3. Optional: Spiegelhalter, David. 2021. <i>The Art of Statistics</i>. New York, NY: W.W. Basic Books. Pages 121-132.
Class 16: October 22	• Bivariate Regression II, Handling Your Errors • Readings: 1. Imai, Koisuke. 2017. <i>Quantitative Social Science</i>. Princeton, NJ: Princeton University Press. Pages 139-156. 2. EGAP. “10 Things to Know About Reading a Regression Table.” Link. 3. Optional: Pearl, Judea, Madelyn Glymour, Nicholas P. Jewell. 2016. <i>Causal Inference in Statistics: A Primer</i>. Chichester, UK: John Wiley & Sons. Pages 20-22.

Class	Content
Class 17: October 27	• Multiple Regression I • Readings: 1. Wheelan, Charles. 2013. <i>Naked Statistics</i>. New York, NY: W.W. Norton and Company. Pages 198-207. 2. Bueno de Mesquita, Ethan and Anthony Fowler. 2021. <i>Thinking Clearly With Data</i>. Princeton, NJ: Princeton University Press. Chapter 10. 3. EGAP. “10 Things to Know About Covariate Adjustment.” Link. 4. Optional: Pearl, Judea, Madelyn Glymour, Nicholas P. Jewell. 2016. <i>Causal Inference in Statistics: A Primer</i>. Chichester, UK: John Wiley & Sons. Pages 22-24. 5. Optional: Watch MinuteFood. 2024. <i>This changed the way I think about vegetables</i>. Youtube. Link.
Class 18: October 29	• Multiple Regression II, Fixing Your Effects, Interactions, and Higher Orders • Readings: 1. Imai, Koisuke. 2017. <i>Quantitative Social Science</i>. Princeton, NJ: Princeton University Press. Pages 165-176.
Class 19: November 3	• Model Diagnostics, Visualizing Regression Results • Readings: 1. Wheelan, Charles. 2013. <i>Naked Statistics</i>. New York, NY: W.W. Norton and Company. Chapter 12. 2. Healy, Kieran. 2019. <i>Data Visualization: A Practical Introduction</i>. Princeton, NJ: Princeton University Press. Chapter 6. 3. Imai, Koisuke. 2017. <i>Quantitative Social Science</i>. Princeton, NJ: Princeton University Press. Pages 156-161.
Class 20: November 5	• Research Topics: Qualitative Research, KKV or a Tale of Two Cultures? • Readings: 1. Goertz, Gary and James Mahoney. 2012. <i>A Tale of Two Cultures: Qualitative and Quantitative Research in the Social Sciences</i>. Princeton, NJ: Princeton University Press. Chapter 1. 2. Goertz, Gary. 2017. <i>Multimethod Research, Causal Mechanisms, and Case Studies</i>. Princeton, NJ: Princeton University Press. Chapter 1. • PROBLEM SET 3 DUE
Class 21: November 10	• Limited Dependent Variables (LPMs and MLE) • Readings: 1. Ward, Michael and John Ahlquist. 2018. <i>Maximum Likelihood for Social Science</i>. Cambridge, UK: Cambridge University Press. Chapters 1 and 3.
Class 22: November 12	• Limited Dependent Variables (LPMs and MLE) • Readings: 1. Ward, Michael and John Ahlquist. 2018. <i>Maximum Likelihood for Social Science</i>. Cambridge, UK: Cambridge University Press. Chapters 1 and 3.
Class 23: November 17	• Hackathon • In-Class, Team Activity
Class 24: November 19	• Hackathon: Part Deux! • Presentations and wrap up

Class	Content
Class 25: November 24	• Sampling and Survey Methodology I • Readings: 1. Wheelan, Charles. 2013. <i>Naked Statistics</i>. New York, NY: W.W. Norton and Company. Chapter 10. 2. EGAP. “10 Things to Know About Sampling.” Link. 3. Optional: Watch Vox. 2024. <i>What polls can actually tell us</i>. Youtube. Link 4. Optional: Listen to More or Less. 2024. “Do one in five young Americans think the holocaust is a myth?” <i>BBC Sounds</i>. Link.
Class 26: December 1	• Sampling and Survey Methodology II • Readings: 1. Imai, Koisuke. 2017. <i>Quantitative Social Science</i>. Princeton, NJ: Princeton University Press. Pages 88-96. 2. EGAP. “10 Things to Know About Survey Design.” Link. 3. Optional: Listen to More or Less. 2024. <i>How many Americans live ‘paycheck to paycheck’?</i> BBC Sounds. Link.
Class 27: December 3	• Experimental Research Methods • Readings: 1. Bueno de Mesquita, Ethan and Anthony Fowler. 2021. <i>Thinking Clearly With Data</i>. Princeton, NJ: Princeton University Press. Chapter 11. 2. The World Bank. “Experimental Methods.” <i>Dimewiki</i>. Link 3. Optional: Listen to The Youth Bloom. 2025. “The think tank making impact evaluation skills accessible to every Tanzanian.” <i>Center for Strategic and International Studies</i>. Link. • PROBLEM SET 4 DUE
Final December 10	• Final Paper Due at 5:00PM