

PSCI 200: Data Analysis I

Fall 2021, Tues & Thurs 11:05-12:20, H114

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Course Description

How do we empirically evaluate the claims politicians make? How do we determine whether theories of political behavior are supported by evidence? What do reporters mean when they refer to a poll being accurate to $\pm 3\%$? In this course, students are introduced to data analysis and statistical inference relevant to political science research. Topics will include descriptive statistics, probability, confidence intervals, hypothesis tests, correlation, and regression analysis. Data analysis will be conducted using R and RStudio.

Course Meeting and Credits. This course follows the College credit hour policy for four-credit courses. We will meet in person twice a week: Tues & Thurs, 11:05am-12:20. The Tues/Thurs sessions will be a mix of lecture, practice sessions, and labs. Practice sessions will consist of short (~ 15 min) sessions where students have a chance to practice or implement the techniques just presented in lecture. Labs will provide the opportunity for students to begin working on new homework assignments. The remaining credit hour is fulfilled through independent reading and completion of the homeworks.

Prerequisites: PSCI 200 is intended for students with no (or little) prior experience in statistics. Calculus, matrix algebra, and computer programming are not required and will not be used during the semester. Students are only expected to be familiar with basic (e.g., high school level) algebra.

In that spirit, students may *not* take PSCI 200 if they have either (1) scored a 4 or 5 on the Advanced Placement exam in Statistics or (2) already taken another UR course in statistics,

such as ECON 230, PSCI 205, PSY/CSP 211, or STAT 211/212/213/214. Students who fall into one or both of these categories should ask me for alternative courses to take.

Grading

Course grades will be based on a series of homeworks (72%), a final exam (25%), and class participation/attendance (3%).

Homeworks. Homeworks will typically be handed out (via Blackboard) in class, at which point a short “lab” will be held. The lab allows students to read over the HW, download any data, begin working on the HW, and ask me questions about the HW before taking it home to complete it. Homeworks will normally be due by the start of lecture one week after they are handed out. Students should submit their homework answers, properly formatted, via Blackboard. Homework grades will also be posted on Blackboard. All assignments are to be completed individually. Be sure to read the PSCI 200 course academic honesty policy concerning HW completion.

Late Homework Submissions. It is important that students submit their HWs on time. We do our best to provide grades and answer keys in a timely manner. Late HW submissions can hold up that process, in which case the class will not have as much time to review previous HW answers before starting new HWs.

That said, life happens. If you need to attend a major event – e.g., a conference, a job interview, an athletic tournament for UR, etc – contact me ahead of time. As long as this is a one-time occurrence, you will likely be given permission to turn in the current HW after the deadline. Similarly, if you fall ill, email me immediately and we’ll try to work something out. In either case, you should expect that the deadline extension will be no more than 7 days after the original due date, usually less.

In all other cases, late assignments will be penalized (as a percentage of total points possible) as follows:

Lateness	Penalty
Up to 10 hrs	5%
10 hrs to 24 hrs (≤ 1 day)	10%
24 hrs to 48 hrs (≤ 2 days)	20%
48 hrs to 72 hrs (≤ 3 days)	30%
> 3 days but ≤ 4 days	40%
> 4 days but ≤ 5 days	50%
> 5 days but ≤ 6 days	60%
> 6 days but ≤ 7 days	70%
> 7 days	100%

Examples: Suppose a HW has a total of 20 points possible and, without the penalty, you score 18 out of 20 points.

1. You turn in the HW two hours after class ends. Since the HW was late by two hours, you receive a 5% penalty or 1 point Your HW score is $18 - 1 = 17$ out of 20.
2. You turn in the HW by 9am the morning after the lecture in which it was due. Since the HW was late by more than 10 hours but less than 24 hours, you receive a 10% penalty or 2 points. Your HW score is $18 - 2 = 16$ out of 20.
3. You turn in the HW three and a half days after it was due. Since the HW was more than 3 days late but less than 4 days late, you receive a 40% penalty or 8 points. Your HW score is $18 - 8 = 10$ out of 20.

Readings

Students are responsible for keeping up with the reading each week. Whenever possible, I will post to Blackboard pdf's of any readings or lecture notes. Texts used for this course will include

Required:

- Alan Agresti, *Statistical Methods for the Social Sciences*. 5th edition.

This is the main textbook for the course. The 3rd and 4th editions are perfectly acceptable as well. If you do use the 3rd or 4th edition, please make sure to compare the table of contents to that of the 5th edition and do the appropriate reading each week.

- John Verzani, *SimpleR: Using R for Introductory Statistics*.

This is a free pdf about R, the computer program we'll be using for statistical analysis. It is already available in the Texts folder on Blackboard with added chapter numbering in the table of contents.

Recommended:

- David M. Diez, Mine Cetinkaya-Rundel, and Christopher D. Barr. OpenIntro Statistics (OIS). 4th ed. The pdf is available for free (or donation) at <https://leanpub.com/openintro-statistics>.

Most of the “recommended reading” below consists of articles, with links to an online pdf version (e.g., via JSTOR). To access these, you must be on the UR network or have a VPN connection. From time to time, these articles may become ‘required’ reading for homework assignments.

Statistical Program: R/RStudio

Students will be required to complete homeworks using the R program for statistical analysis. Many new users find RStudio to have a more user-friendly interface. Both R and RStudio are free. If you have a laptop or personal computer, you will likely want to install both. To do so, you can download them from

- [Comprehensive R Archive Network \(CRAN\)](#). This is the original and most up-to-date version of R. Towards the top of the page is a section titled “Download and Install R.” Select your operating system (Mac, Windows, Linux) and follow the links. Note: I strongly recommend that you install this (i.e., R) before you install RStudio.
- [RStudio](#). This is an integrated environment for R. It contains an editor, console, help, and plot window all in one larger window. Just click on the RStudio link at the beginning of this paragraph. Then select the download for the free RStudio Desktop version.

If you already have R and/or RStudio installed on a personal computer/laptop, you should still install the most recent versions. This will help us help you when you are experiencing a problem with R.

Finally, R and RStudio are available on the H114 computers. If you plan on using those computers for the course, please make sure to familiarize yourself with them as soon as possible.

Course Outline

Course topics do not have dates assigned. Students are responsible for keeping up with the readings, lectures, labs, and HWs throughout the semester. As a guidepost, at the end of a topic, I will normally indicate in lecture the subject of the next topic.

1 Course Introduction

Required Reading: Agresti, Ch 1.

2 Introduction to R

Required Reading: Verzani, Ch 1-2

HW 1

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3 Variables, Operationalization, and Measurement

Required Reading: Agresti, Ch 2.1.

Recommended Reading:

- Michael McDonald and Samuel Popkin. 2001. “The Myth of the Vanishing Voter.” *American Political Science Review*, Vol. 95, Issue 4: 963–974. ([JSTOR](#))
- John Woolley. 2000. “Using Media-Based Data in Studies of Politics.” *American Journal of Political Science*, Vol. 44, Issue 1: 156–173. ([JSTOR](#))

4 Descriptive Statistics

Required Reading: Agresti, Ch 3. Verzani, Ch 3.

Recommended Reading: OIS, Ch 2

HW 2

5 Sampling and Surveys

Required Reading: Agresti, Ch 2.2-2.5.

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6 Discrete Probability Distributions, pt I

Required Reading: Agresti, Ch 4.1–4.2.

Recommended Readings: OIS, Ch 3.1, 3.3, 3.4

7 Discrete Probability Distributions, pt II

Required Reading: Agresti, Ch 4.1–4.2.

Recommended Readings: OIS, Ch 3.4, 4.3

HW 3

8 Joint Distributions, Conditional Probability, and Independence

Required Reading: Agresti, Ch 4.1–4.3.

Recommended Readings: OIS, Ch 3.2

9 Continuous Distributions, the Normal Distribution, Z Scores

Required Reading: Agresti, Ch 4.2–4.3.

Recommended Readings: OIS, Ch 3.5, 4.1s

HW 4

10 Sampling Distributions and the CLT

Required Reading: Agresti, Ch 4.4–4.7.

Recommended Readings: OIS, Ch 5.1

11 Confidence Intervals

Required Reading: Agresti, 5.1–5.4, 5.6. Verzani, Ch 9.

Recommended Reading: OIS, Ch 5.2, 6.1.2

HW 5

12 Hypothesis Tests: Proportions, Large Samples

Required Reading: Agresti, Ch 6.1, 6.3, 6.4. Verzani, Ch 10.

Recommended Reading: OIS, Ch 5.3, 6.1

13 Hypothesis Tests: Means

Required Reading: Agresti, Ch 6.2, 6.5. Verzani, Ch 10.

Recommended Reading: OIS, Ch 5.3, 7.1

HW 6

14 Comparing Two Groups

Required Reading: Agresti, Ch 7.1–7.4. Verzani, Ch 11.

Recommended Readings: OIS, Ch 6.2, 7.3

15 Crosstabs & Association

Required Reading: Agresti, Ch 8.1–8.2. Verzani, Ch 12.

Recommended Readings:

- OIS, Ch 6.3-6.4
- Roy Licklider. 1995. “The Consequences of Negotiated Settlements in Civil Wars, 1945–1993.” *American Political Science Review*, Vol. 89, Issue 3: 681–690. ([JSTOR](#))

HW 7

16 Covariance & Correlation

Required Reading: Agresti, Ch 9.1–9.4

17 Bivariate Regression: Estimating a Line with OLS

Required Reading: Agresti, Ch 9.1–9.4. Verzani, Ch 13.

Recommended Readings: OIS, Ch 8.1–8.3

18 Bivariate Regression: Inference and Model Fit

Required Reading: Agresti, Ch 9.5–9.7. Verzani, Ch 13.

Recommended Readings:

- OIS, Ch 8.4
- Edward Tufte. 1973. “The Relationship Between Seats and Votes in Two-Party Systems.” *American Political Science Review*, Vol. 67, Issue 2: 540–554. ([JSTOR](#))

HW 8

19 Multiple Regression: Estimation and Interpretation

Required Reading: Agresti, Ch 10, 11.1. Verzani, Ch 14.

Recommended Readings: OIS, Ch 9.1–9.3

20 Multiple Regression: R^2 and the F-test

Required Reading: Agresti, Ch 11.2–11.5. Verzani, Ch 14.

Recommended Readings:

- OIS, Ch 9.1–9.3
- Mark Duggan. 2001. “More Guns, More Crime.” *Journal of Political Economy*, Vol. 109, Issue 5: 1086–1114. ([JSTOR](#))
- Steven Fish. 2002. “Islam and Authoritarianism.” *World Politics*, Vol. 55, Issue 1: 4–37. ([JSTOR](#))
- Bruce Russett. 1982. “Defense Expenditures and National Well-being.” *American Political Science Review*, Vol. 76, Issue 4: 767–777. ([JSTOR](#))

HW 9

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21 Simple Randomized Experiments

22 Research Design

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23 Final Exam Review

Final exam review held during lecture the last week of class.

24 Final Exam (TBD: Finals Week)

Covers all material to date.

Other Important Items

Course Organization. The course organization may be adjusted/optimized during the semester according to the pace of learning and the priority of topics. Students are responsible for attending lectures and maintaining an awareness of any changes to the course materials, homework requirements, or exam dates.

Student Disability Accommodation. I am happy to work with any student who requires an accommodation due to a disability. However, I am not authorized to grant any accommodations on my own. It is important that students first contact the Office of Disability Resources. They will discuss any barriers a student is experiencing, explain the process for

establishing academic accommodation, and then authorize me to provide a specific level of accommodation. You can reach the Office of Disability Resources at disability@rochester.edu or (585) 276-5075.

Academic Honesty. Students are expected to be familiar with [the University's policies](#) on academic honesty. I have provided additional course-specific academic honesty policies on Blackboard under the Course Academic Honesty tab. If I suspect a student has violated any of these policies, I am required to report the violation. Punchline: don't cheat. If in doubt about what is acceptable behavior concerning completing an exam or homework, just ask me.

During the first week of class, please review both the University policies and the course policies. You must confirm that you have read and accept these policies by completing the Acceptance of Academic Honesty Policy activity ("test") at the bottom of the Course Home Page on Blackboard.

Highlights of the course policy are (but not limited to):

- All homework and exam answers should be your own work.
- You are not allowed to consult material from previous years of PSCI 200, unless the material is specifically provided as review material by the instructor. You are also not allowed to consult online "cheating" sites. However, reading more about a topic in other texts or on other sites (e.g., Wikipedia) is perfectly fine.
- You should not post or share course material (e.g., lectures, homeworks, videos) online without first obtaining the permission of the instructor.

University COVID-19 Statement

<https://www.rochester.edu/college/faculty/resources/syllabi-requirements.html>

The University is committed to protecting the health and safety of the entire community — students, faculty and staff. For this reason, it is mandatory that everyone wear a mask in University buildings and observe appropriate social distancing, including classrooms. Masks have been provided to students, faculty and staff and classrooms have been specifically assigned to allow for social distancing to support these requirements. You must wear a mask appropriately (e.g. over nose and mouth) if you are attending class in person, and you must do this for every class session and for the entire duration of each class session. If you fail to do this, you will be politely reminded of the requirement and then asked to leave if you do not comply.

If you do not want to wear a mask, you may consider taking the course remotely (online). This may require you to complete a set of online requirements different from the in-person requirements, although these will be equivalent in their learning objectives.

Students who refuse to adhere to requirement for mask wearing or social distancing the course will be in violation of the COVID-19 Community Commitment and will be referred to the Student Conduct system through a COVID-19 Concern Report. Such referrals will lead to student conduct hearings and may result in disciplinary action.

Students who feel unable to wear a mask may contact the Office of Disability Resources to explore options for accommodations. Students requiring accommodations may be asked to participate in the course through synchronous or asynchronous learning as part of this accommodation.

Class Recording. I may need to record lectures for students who cannot attend in person. Students should simply assume all lectures are being recorded, regardless of whether I announce it at the start of class or not.

Updated: 8/23/21