

Soc 7 The Power of Numbers: Quantitative Data in the Social Sciences

Fall 2021 | UC Berkeley

Instructor: Professor Linus Huang

Office hours:

- in-person: drop-in, Mondays, 2:15-4PM, 487 Social Sciences Building
- Zoom: Tuesdays, 1-3PM, sign-up on Google Calendar (see front page of course website)

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Final Exam: Monday, December 13, 2021, 8-11 AM.

What will this course be about?

Numbers are all around us in our everyday lives. Some numbers tell us how the economy is doing overall, who is likely to win an upcoming election, or how many people attended a large gathering like an inauguration ceremony. Other numbers tell us who qualifies for a low-interest loan to go to college or to buy a home. Numbers tell us whether it's likely to rain tomorrow, or how long we might expect to sit in traffic if we go out. Certain numbers tell college applicants which schools are better than others. Other numbers tell schools which applicants are better than others. And once a college-bound person enrolls in a school, yet other numbers will represent the quality of that student's academic performance.

Despite their presence everywhere, however, numbers are not always well understood. Some seem so transparent that we don't question them. Others are so hopelessly complex that we don't even try to understand them. Many of the numbers that are widely accepted as common knowledge are not even right. Yet, since numbers have the appearance of precision, they continue to influence the way we understand the world. This is part of their double-edged power. As citizens, professionals, social activists, and civic leaders, we need to develop the numerical literacy to recognize bad numbers and either demand, or produce ourselves, better numbers.

This is an introductory course in dealing with quantitative data—finding it; handling it; analyzing and interpreting it; and reporting it, including in visual form. The core of the course is learning introductory statistical methods, and the content here will not be unlike what you would encounter in introductory statistics courses elsewhere in the University. However, this course is geared toward social science applications and will comparatively speaking move at a more deliberate pace. There will be math! However, you do not necessarily need a strong mathematical, statistical, or computing background to succeed in this course. What you *do* need is curiosity about how numbers “work” (what they do and do not say, why some numbers are misleading, etc.) and a desire to try something new.

By the end of the semester, you will be able to understand, evaluate, use, and produce quantitative data about the social world by:

- critiquing and producing basic graphs
- manipulating and analyzing data in spreadsheets
- calculating and explaining basic statistical measures of central tendency, variation, and association
- applying and explaining basic concepts of sampling and selection
- thinking critically about reported statistics and quantitative social science more broadly

Readings and Resources

All course readings are available in PDF format on the bCourses site. There are no books or paper readers to purchase.

All readings should be completed *prior* to the first class we begin discussing them.

Important: You will need Microsoft Excel on your PC or Mac, if you do not already have it. Thanks to eleventh-hour action, all Berkeley students should have access to Microsoft software.

Grading

Your course grade will be determined by the following components:

- **8 homework assignments** (6% each; 48% of the course grade total), designed to accompany individual topics in the course. The due dates for these homeworks have been targeted to balance giving you an incentive to keep up with the material as we consider it in class, but also allowing us at least one class session to talk about new material before the homework is due. As the scheduling works out at the moment, they are due weekly every Wednesday in the first half of the course (before the midterm exam), and every Monday in the second half of the course (following the midterm exam). There is no homework due the week of the take-home midterm, although we will otherwise proceed with new material in class.
- **an in-class midterm exam** (26% of the course grade) at roughly the halfway point in the course.
- **a final exam** (26% of the course grade). This will be administered in-class during the official final exam time slot for the course, which is Monday, December 13th, 2021, 8-11 AM.

The course grading scale is as follows:

A+	97+	A	93-96	A-	90-92
B+	87-89	B	83-86	B-	80-82
C+	77-79	C	73-76	C-	70-72
D+	67-69	D	63-66	D-	60-62
		F	0-59		

When it comes time to compute overall course grades, I will round to the nearest whole number using standard rounding conventions. It doesn't really matter what the letter grade on the individual assignments are.

There are no surprises in how I calculate course grades. The GRADES section on bCourses will incorporate the weightings above and will accurately keep you apprised of your course progress.

Academic Honesty

The UC Berkeley Honor Code states that “As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others” (<https://teaching.berkeley.edu/berkeley-honor-code>). I expect you will follow these principles. You may not copy specific text or ideas from others, whether from

fellow students, from authors of our readings or other material you find, without specific attribution. To do otherwise is to plagiarize. You may not cheat on any of the homework assignments or exams by bringing in illicit outside material, copying from fellow students, or engaging in other dishonest practices. Violation of these rules will result in an immediate **-0-** on the *entire* assignment in question, plus a report to the Office of Academic Affairs at my discretion.

Mental Health and Wellness

A note from the university:

All students — regardless of background or identity — may experience a range of issues that can become barriers to learning. These issues include, but are not limited to, strained relationships, anxiety, depression, alcohol and other drug problems, difficulties with concentration, sleep, and eating, and/or lack of motivation. Such mental health concerns can diminish both academic performance and the capacity to participate in daily activities. In the event that you need mental health support, or are concerned about a friend, UC Berkeley offers many services, such as free short-term counseling at University Health Services.

An excellent campus website having links to many resources is: <http://recalibrate.berkeley.edu/>.

Another campus website addressing mental health services in specific reference to this time of the coronavirus pandemic is: <https://uhs.berkeley.edu/coronavirus/student-mental-health>.

Remember that seeking help is a good and courageous thing to do—both for yourself and for those who care about you.

Reading, Assignment, and Exam Schedule

All readings for this course are available on bCourses in the READINGS folder of the FILES section. Readings associated with a date are to be completed prior to the class meeting on that day.

Due dates for graded assignments are **highlighted** below.

Introduction			
Introduction: why study numbers?	Aug 25	W	<i>No readings.</i>
	Aug 27	F	
	Aug 30	M	
	Sep 1	W	
Basic spreadsheet operations	Sep 3	F	Labor Day: no class
	Sep 6	M	
	Sep 8	W	
	Sep 10	F	

Descriptive Statistics			
Types of data	Sep 13	M	<i>Read: Agresti §2.1</i>

Measures of centrality	Sep 15	W	<i>Read:</i> <ul style="list-style-type: none"> • Wheelan ch 2 pp. 15-23 • Agresti §3.2
	Sep 17	F	HW #1 due on bCourses
Measures of dispersion	Sep 20	M	<i>Read:</i>
	Sep 22	W	<ul style="list-style-type: none"> • Wheelan ch 2 pp. 23-35 • Agresti §3.3-§3.4
	Sep 24	F	HW #2 due on bCourses
Association	Sep 27	M	<i>Read:</i>
	Sep 29	W	<ul style="list-style-type: none"> • Wheelan ch 4 • Agresti §3.5, §10.1-§10.3
	Oct 1	F	HW #3 due on bCourses
	Oct 4	M	
Midterm review/ <i>buffer day</i>	Oct 6	W	
Midterm exam, in-class	Oct 8	F	

Introduction to Probability

Introduction to probability, and why we should care about it	Oct 11	M	<i>Read:</i> Wheelan ch 5
	Oct 13	W	
	Oct 15	F	HW #4 due on bCourses
Samples & populations	Oct 18	M	<i>Read:</i> Wheelan ch 6
	Oct 20	W	
Distributions & the Central Limit Theorem	Oct 22	F	<i>Read:</i>
	Oct 25	M	<ul style="list-style-type: none"> • Wheelan ch 8 • Agresti §4.3-§4.5
	Oct 27	W	HW #5 due on bCourses

Inferential Statistics

Hypothesis testing	Oct 29	F	<i>Read:</i>
	Nov 1	M	<ul style="list-style-type: none"> • Wheelan ch 9 • Agresti §6.1-§6.6
	Nov 3	W	HW #6 due on bCourses
Comparing two groups	Nov 5	F	<i>Read:</i> Agresti §7.1-§7.3
Confidence intervals	Nov 8	M	<i>Read:</i>
	Nov 10	W	<ul style="list-style-type: none"> • Wheelan ch 10 • Agresti §5.1-§5.4
	Nov 12	F	HW #7 due on bCourses
Association between categorical variables	Nov 15	M	<i>Read:</i> Agresti §8.1-§8.4
	Nov 17	W	
	Nov 19	F	HW #8 due on bCourses

Regression	Nov 22	M	<i>Read:</i> <ul style="list-style-type: none">• Wheelan ch 11• Agresti §9.1-§9.5
	Nov 24	W	Thanksgiving: no class
	Nov 26	F	
	Nov 29	M	
	Dec 1	W	
Logistical regression	Dec 3	F	<i>No readings.</i>

Reading, Review & Recitation week	Dec 6	M	
	Dec 8	W	
	Dec 10	F	

Final Exam, in-class	Dec 13	M	We are in the 8-11 AM timeslot.
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