

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

Fall 2022 | 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 12, 2022, 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. All UC Berkeley students have access to Microsoft Office (including Excel) as part of the technology fees you've already paid.

## Grading

Your course grade will be determined by the following components:

- **8 problem sets** (6% each, 48% total), due roughly weekly. The course content has two major components: **descriptive/inferential statistics**, and **handling and analyzing data** (usually, though not exclusively, in Microsoft Excel). Each problem set will contain a mix of questions covering both components.
- **an in-class midterm exam** (26% of the course grade) at about the one-third 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 12<sup>th</sup>, 2022, 8-11 AM. The morning timeslot was not my idea.

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.

<b>Introduction</b>			
Introduction: why study numbers?	Aug 24	W	<i>No readings.</i>
	Aug 26	F	
	Aug 29	M	
Basic spreadsheet operations	Aug 31	W	<i>No readings.</i>
	Sep 2	F	
	Sep 5	M	Labor Day: No Class

<b>Descriptive Statistics</b>			
Types of data	Sep 7	W	<i>Read:</i> Agresti §2.1
Measures of centrality	Sep 9	F	<i>Read:</i> <ul style="list-style-type: none"> <li>• Wheelan ch 2 pp. 15-23</li> <li>• Agresti §3.2</li> </ul>
	Sep 12	M	<b>Problem Set #1 due on bCourses</b>
Measures of dispersion	Sep 14	W	<i>Read:</i> <ul style="list-style-type: none"> <li>• Wheelan ch 2 pp. 23-35</li> <li>• Agresti §3.3-§3.4</li> </ul>
	Sep 16	F	
	Sep 19	M	<b>Problem Set #2 due on bCourses</b>

Association	Sep 21	W	<i>Read:</i> • Wheelan ch 4 • Agresti §3.5, §10.1-§10.3
	Sep 23	F	
	Sep 26	M	<b>Problem Set #3 due on bCourses</b>
	Sep 28	W	
<b>Midterm exam, in-class</b>	Sep 30	F	

### Introduction to Probability

Introduction to probability, and why we should care about it	Oct 3	M	<i>Read:</i> Wheelan ch 5
	Oct 5	W	
	Oct 7	F	<b>Problem Set #4 due on bCourses</b>
Samples & populations	Oct 10	M	<i>Read:</i> Wheelan ch 6
	Oct 12	W	
Distributions & the Central Limit Theorem	Oct 14	F	<i>Read:</i> • Wheelan ch 8 • Agresti §4.3-§4.5
	Oct 17	M	
	Oct 19	W	
	Oct 21	F	<b>Problem Set #5 due on bCourses</b>

### Inferential Statistics

Hypothesis testing	Oct 24	M	<i>Read:</i> • Wheelan ch 9 • Agresti §6.1-§6.6
	Oct 26	W	
	Oct 28	F	
	Oct 31	M	<b>Problem Set #6 due on bCourses</b>
Confidence intervals	Nov 2	W	<i>Read:</i> • Wheelan ch 10 • Agresti §5.1-§5.4
	Nov 4	F	
	Nov 7	M	
	Nov 9	W	<b>Problem Set #7 due on bCourses</b>
	Nov 11	F	Veteran's Day: No Class
Comparing two groups	Nov 14	M	<i>Read:</i> Agresti §7.1-§7.3
Association between categorical variables	Nov 16	W	<i>Read:</i> Agresti §8.1-§8.4
	Nov 18	F	
	Nov 21	M	<b>Problem Set #8 due on bCourses</b>
	Nov 23	W	Thanksgiving: no class
	Nov 25	F	
Regression	Nov 28	M	<i>Read:</i> • Wheelan ch 11 • Agresti §9.1-§9.5
	Nov 30	W	
	Dec 2	F	

Reading, Review & Recitation week	Dec 5	M	No class during RRR week. There will be an optional review session on the Wednesday of this week at our normal time and place.
	Dec 7	W	
	Dec 9	F	

<b>Final Exam, in-class</b>	Dec 12	M	We are in the 8-11 AM timeslot.
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