
CE 93

ENGINEERING DATA ANALYSIS

FALL 2019

LECTURE: MONDAY AND WEDNESDAY 9:00-10:00 AM @ 3106 ETCHEVERRY HALL

LAB: WEDNESDAY 3-5 AND 5-7 @ 345 DAVIS HALL

INSTRUCTORS

Professor Joan Walker

*Department of Civil and Environmental Engineering & Center for Global Metropolitan Studies
111 McLaughlin Hall*

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Office hours: Monday 1:40 - 3:00 PM

@ 111 McLaughlin

Wednesday 10:00 - 11:30 AM

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Office hours: Tuesday 3:00 - 4:30 PM

@ 412 McLaughlin (ITS Library)

Friday 2:00 - 3:30 PM

CATALOG DESCRIPTION

Application of the concepts and methods of probability theory and statistical inference to Civil and Environmental Engineering (CEE) problems and data; graphical data analysis and sampling; elements of set theory; elements of probability theory; random variables and expectation; simulation; statistical inference. Applications to a wide range of CEE problems involving real data will be developed, using both pre-existing and student-prepared Python codes.

Prerequisites: Data 8 (Can be taken concurrently if you have prior programming experience.)

Units: 3 (No credit will be given after taking Stat28.)

COURSE OBJECTIVES

- Build on the concepts of probability theory and statistical inference introduced in Data 8 with a deeper dive into methods and by applications to CEE problems involving real data.
- Gain experience with Python for performing computational and graphical processing.
- Introduce a variety of CEE problems and data through their statistical/probabilistic analysis.

REQUIRED TEXTBOOK

William Navidi, *Statistics for Engineers and Scientists*, Fourth Edition, McGraw Hill.

COURSE WEBSITE

bCourses.berkeley.edu (with Piazza)

HOMEWORK

Weekly homework assignments will be given. The homework will typically be distributed each Wednesday via bCourses and due the following Tuesday by 5 PM. Homework must be submitted electronically to bCourses. Late homework will not be accepted, but the two homeworks with the lowest grades will not be counted toward the final course grade. In addition to the traditional mathematical problems to work through, you will periodically be asked to complete other assignments to help you explore the application of statistics in civil engineering, for example interviewing civil engineers and attending academic seminars.

LABS

There are 2 hours of lab per week. The labs use Python and work with real data. The objectives are to reinforce concepts and methods covered in lectures and reading and also to give you skills to work with real datasets. Python commands will be reviewed in lab. As each lab session is full, it's important that you attend the session to which you are registered.

The intention of the lab is NOT to introduce an additional homework assignment. Therefore, you are to complete the lab assignment within the lab period and turn in your writeup at the end of the lab period. They will be checked for effort (but not graded).

EXAMS & POP QUIZZES

There will be a 1/3 probability of a quiz at the beginning of each class, based on the throw of a dice. These are intended to consist of one quick and easy question, which will emphasize a key lesson from the prior lecture. The pop quizzes are open note.

There will be three in-class exams on the dates noted under Grading and on the Schedule. You will need a non-smartphone, non-graphing, non-internet connected calculator for the exams. These exams are closed book and note, although a cheat sheet (as described under Grading) is allowed. The exams will be cumulative, but will emphasize the newer material.

There is NO final exam.

CLASSROOM ETIQUETTE

Arrive on time (the potential for a pop quiz helps this). Eating is ok, but choose snacks that are not smelly or loud. Mobile phones must be silenced and put away. If you use a laptop for notes, disconnect it from the internet. No chatting, texting, emailing, surfing, or any other multitasking. Focus and engage for the 50 minutes of lecture. I'm going with my more lenient technology policy and trusting you will step up. If there are issues, I will ban electronics from the classroom.

GRADING

- 20% Homework - no late assignments, 2 lowest scores of 12 assignments will be dropped.
- 10% Lab (turn in work at end of each lab, checked not graded, 1 lab can be dropped)
- 20% In-class Exam #1 (October 2) (one 5"x8" index card, both sides, allowed for notes)
- 20% In-class Exam #2 (October 30) (two 5"x8" index cards, both sides, allowed for notes)
- 20% In-class Exam #3 (December 4) (three 5"x8" index cards, both sides, allowed for notes)
- 10% Participation, including pop quizzes

ACADEMIC INTEGRITY

Berkeley Campus Code of Student Conduct (<http://sa.berkeley.edu/student-code-of-conduct>):

"The Chancellor may impose discipline for the commission or attempted commission (including aiding or abetting in the commission or attempted commission) of the following types of violations by students, as well as such other violations as may be specified in campus regulations:

102.01 Academic Dishonesty: All forms of academic misconduct including but not limited to cheating, fabrication, plagiarism, or facilitating academic dishonesty."

For CE93, instances of academic dishonesty include, and are not limited to, the following:

- **Homework and labs:** You may discuss problems together, but all written work must be original and each student must do their own Python programming. Copying of solutions from any source IS NOT acceptable (and... not in your interest.) Be very careful about plagiarism, particularly; all text must be in your own words and properly cited. See <http://www.plagiarism.org> for more information.
- **Exams:** No discussion, collaboration, copying, or using banned materials are allowed on either the pop quizzes or the three exams.

SCHEDULE (MAY BE ADJUSTED AS NECESSARY)

WEEK # (DATE)	TOPIC	READING	LECTURE # & EXAMS		LAB #	HOMEWORK #
	& approximate schedule	Navidi 4th ed.	Mon	Wed	Wed	Due TUE 5 PM
1 (8/26 - 8/30)	Introduction	1.1		1		
2 (9/2 - 9/6)	Summarizing data	1.2-1.3	<i>holiday</i>	2	1	
3 (9/9 - 9/13)	Probability	2.1-2.3	3	4	2	1
4 (9/16 - 9/20)	...continued		5	6	3	2
5 (9/23 - 9/27)	Random variables	2.4-2.6	7	8	4	3
6 (9/30 - 10/4)	...continued		9	EXAM 1		4
7 (10/7 - 10/11)	Common distributions	4.1-4.8	10	11	5	5
8 (10/14 - 10/18)	Point estimation	4.9-4.12	12	13	6	6
9 (10/21 - 10/25)	Confidence intervals	5.1-5.7	14	15	7	7
10 (10/28 - 11/1)	...continued		16	EXAM 2		8
11 (11/4 - 11/8)	Hypothesis testing	6.1-6.11, 6.15	17	18	8	9
12 (11/11 - 11/15)	...continued		<i>holiday</i>	19	9	10
13 (11/18 - 11/22)	Regression	7.1-7.4	20	21	10	11
14 (11/25 - 11/29)	Multiple regression	8.1-8.3	22	<i>holiday</i>		12
15 (12/2 - 12/6)			23	EXAM 3		
There will be NO final exam.						