

Introduction to Statistical Reasoning

Statistics XL 10

Reg# V8351

Units: 5

Instructor: Mine Çetinkaya

Email: mine@stat.ucla.edu

Office: MS 8359

Office Hours: Tuesdays 5:30pm-7:30pm or by appointment (*During Week 6 office hours will be held on Monday (10/25) 4:30pm-7:30pm*)

Website: www.stat.ucla.edu/~mine (For all course materials)

Dates: September 22 – December 8

Days/Time: Wednesdays 6:30pm – 9:30pm

Course Description:

Introduction to statistical thinking and understanding, including strengths and limitations of basic experimental designs, graphical and numerical summaries of data, inference, regression as descriptive tool.

Goals & Learning Objectives:

The overall goal of this class is to introduce you to the discipline of statistics as a science of understanding and analyzing data and not as a branch of mathematics. This class is designed to provide you with the tools you need for solving real world problems using statistics and a better understanding of the process of scientific research and statistical inference.

We plan to achieve this goal by introducing you to the relevant statistical knowledge, teaching you how to use an open source (i.e. free!) statistical software called R to perform data analysis, and having you engage in problem solving, application, analysis, and synthesis of statistical information through homework, labs, quizzes and exams.

Major topics discussed:

- The basics of exploratory data analysis: description, summary and display
- Principles of experimental design and causal inference
- Observational studies and non-causal inference
- The Normal distribution
- The basics of probability, the mathematical foundation of chance processes

- Central Limit Theorem and sampling distributions
- Statistical inference: confidence intervals and hypothesis testing
- Bivariate correlation and causality

Required Text:

Intro Stats by De Veaux, R. D., Velleman, P.F., and Bock D.E. Addison Wesley, 3rd Edition, 2008, ISBN: 0-321-50045-8

All other course materials will be posted on the class website and/or handed out in class.

Statistical Software:

For the lab portion of this class we will be using statistical software known as R (software is freely downloadable) and some applets from the internet.

Calculator:

You are required to have a calculator that has statistical functions (mean and standard deviation) and to bring it to every lecture and discussion, quizzes and exams. We will not be providing calculators and you will not be allowed to borrow one from another student during an exam.

Lectures:

We will have one lecture a week, Wednesdays from 6:30pm to 9:30pm. We will take one 20-minute break from 7:50pm to 8:10pm.

Since we only meet once a week, missing one class means you would be missing roughly 1/10th of the material we will be covering throughout the quarter. In order to be able to keep up with the pace of the course and not fall behind it is highly recommended to attend the lectures. Moreover, there will be one question on your final that will be nearly identical to an example question we work through in one of the lectures.

Homework and Lab:

There are four homework assignments and one lab assignment to be completed throughout the quarter. The objective of these assignments is to help you develop a more in-depth understanding of the material covered in the lectures. The assignments are due *at the beginning* of the lectures specified in the course outline below. Your homework must be stapled, legible and contain your name.

Note that some of the problems have answers in the back of the textbook, so you should use those to check your work as you go. However you must show your work - full credit will not be given to answers that do not show work.

Homework assignments and lab will be posted on my website at <http://www.stat.ucla.edu/~mine>.
Lowest homework grade will be dropped.

Quizzes:

There are a total of four quizzes throughout the quarter. Quizzes will be held at the end of the lectures specified in the course outline below. Note that there is a quiz the second week of class.

Materials covered on each quiz will be announced during the lecture in the previous week. All quiz grading issues must be discussed with me no later than one week after the quizzes are returned. No regrades for the quizzes will be offered after the final exam. **No make up quizzes will be given. Lowest quiz grade will be dropped.**

Exams:

The midterm is on October 27, 2010 and will be a 1 hour and 20 minute exam. After the midterm we will give a 20-minute break and continue with the second half of the class. The final is on December 8, 2010 and will be a 3-hour cumulative exam but will focus on material from the second half of the class. Both exams will consist of a number of open-ended and multiple-choice problems.

Note that exam dates cannot be changed and **no make up exams will be given**. If you cannot take the final exam on that date you should drop this class.

You must bring a calculator to the exams (no cell phones) and you are also allowed to bring one sheet of notes (“cheat sheet”) to the final. This sheet must be no larger than $8\frac{1}{2}'' \times 11''$, should not contain any worked examples and must be prepared by you (no photocopies). You may use both sides of the sheet.

Office Hours & Email:

Office hours are scheduled on Tuesdays from 5:30pm to 7:30pm, **except during Week 6 office hours will be held on Monday (10/25) from 4:30pm to 7:30pm**. If these times do not work for you, please do not hesitate to email to make an appointment. During office hours I can help clear up any concepts from lectures, help with homework problems and lab as well as with exam prep.

You are also encouraged to email me with any questions you may have. If emailing about a homework question, make sure to outline what you have attempted so far and indicate where exactly you are having difficulty. This will allow me to ensure that you have at least attempted the problem before emailing me, and also I’ll be able to help more effectively if I know where you are stuck.

Grading:

Course grades will be based on the following:

Homework and lab	20% (4% for each assignment)
Quizzes	20% (5% for each quiz)
Midterm	25%
Final Exam	35%

Grades in this class will be roughly curved under the following criteria.

30% A's
30% B's
30% C's
10% D's-F's

That means that your raw course score will be calculated and then grades will be assigned using a cumulative distribution function. If the class as a whole performs above expectations, a larger portion of A's and B's can be appropriated. ***All grades are final when filed by the instructor on the Final Grade Report.***

Policies:

1. Late homework/lab will not be accepted – late means 5 minutes after class started. If you cannot make it to class the day an assignment is due, please email me to make arrangements to drop it off earlier. There will be **no make up assignments**.
2. There will be no make up quizzes, midterm or final.
3. Any instances of academic dishonesty will be taken very seriously. At a minimum you will lose all points for that particular assignment. Additionally, there may be penalties to your final class grade along with being reported to the Dean's Office. Please review the Student Guide to Academic Integrity at <http://www.deanofstudents.ucla.edu/StudentGuide.pdf>.

Course Outline

Week	Date	Lecture Topic	Readings	Quizzes and Assignment Due Dates
1	9/22	Data and graphs, categorical and numerical variables	Chapters 2 - 5	
2	9/29	The Normal model	Chapter 6	Quiz 1 at the end of class
3	10/6	Producing data and experimental design	Chapters 12, 13	HW 1 due at the beginning of class
4	10/13	Randomness, simulations, probability	Chapters 14 - 16	Quiz 2 at the end of class
5	10/20	Review		HW 2 at the start of class
6	10/27	Midterm (6:30pm – 7:50pm)		
		Sampling distributions and the Central Limit Theorem	Chapter 18	
7	11/3	Central Limit Theorem, One Sample Confidence Intervals	Chapter 18, 19, 23	
8	11/10	One sample inference (cont.)	Chapters 19, 23, 20	Quiz 3 at the end of class Lab assigned
9	11/17	Two sample inference	Chapters 22, 24	HW 3 at the beginning of class Quiz 4 at the end of class
10	11/24	Exploring relationships and linear models	Chapters 7, 8	
11	12/1	Review		HW4 and lab due at the beginning of class
12	12/8	Final Exam (6:30pm – 9:30pm)		

It is estimated students will spend approximately 3-5 hours outside class each week completing class assignments, readings and studying for exams.

UCLA Extension Contact for this Course: Johanna Navarette (jnavarrete@unex.ucla.edu)

Student Records:

Students can access and update student records online by visiting: www.uclaextension.edu and clicking on *My.Extension* on the left navigation bar, selecting *Student's Course Essentials*, and following the directions to log in.

Student's Course Essentials lets you view your grades, request an official transcript, change credit status on a current course, obtain enrollment verification, update your personal information, and much more.

Accommodations:

If you need any accommodations for a disability, please contact the UCLA Extension Disabled Student Services at: (310) 825-7851 or via e-mail access@uclaextension.edu

Course Syllabus Subject to Update by the Instructor.