

Department of Statistics
The Wharton School
University of Pennsylvania

Statistics 431: Statistical Inference

MW 1:30-3:00 @ G50 JMHH
FALL 2009

Instructor

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Teaching assistant

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431-2 JMHH

Office hours: Tue 10:30am-12:30pm.

Lab: Tue 5:00pm in JMHH F96.

Course Website

This course is using *WebCafé*. You can access the course website using the direct link

<https://webcafe.wharton.upenn.edu/eRoom/stat/431-fa09-1>,

or follow the link for the Statistics Department on webcafe.wharton.upenn.edu.

Materials and announcements for this course will be distributed through the website, and you will be able to monitor your grade entries (except the final) throughout the semester.

Non-Wharton students: You will need to create a Wharton Class account using a valid PennKey to access *WebCafé*. This account will also allow computer access in the Wharton labs. To create an account, go to

<http://accounts.wharton.upenn.edu>.

Course Description

The purpose of this course is to develop ideas to help decision-making under uncertainty using statistical methods. The topics include confidence intervals, hypothesis testing, regression analysis, the analysis of variance and logistic regression. If time permits, we will cover categorical data analysis and other advanced topics.

Students taking this course are expected to have some familiarity with data display (including boxplots, histograms and scatterplots), summary statistics (including mean, standard deviation and quantiles), basic probability theory (including probability axioms, expectation and independence) and probability distributions (including binomial and normal), but these topics will be reviewed as we encounter them. Elementary mathematical manipulations are necessary for homework assignments and examinations.

This course will emphasize statistical reasoning with two major components: analysis of assumptions and critical interpretation. Statistical computing package *JPM* will be extensively used to carry out the computation, but we will not focus on the details of computation.

Course Materials

Required:

Lecture notes and homework assignments.

Jay L. Devore (D), *Probability and Statistics for Engineering and the Sciences*, 7th ed., Brooks/Cole, 2008.

Dean P. Foster, Robert A. Stine and Richard P. Waterman (FSW), *Business Analysis Using Regression: A Casebook*, Springer-Verlag.

Computing

We will use the statistical computing package *JMP* 8, available for purchase at <http://upenn.onthefhub.com>. I highly recommend you to purchase the license and have it on your own computer. We will use it extensively throughout the course and it can also be used for other Statistics courses in Wharton.

JMP is also available for use in the Wharton Computer Labs. If you have an older version (5, 6 or 7), it will suffice.

Grading

Homework	20%
Quizzes	20%
Midterm Exam	30%
Final Exam	30%

Notes on calculating your final grade:

- Your lowest homework score will be dropped. A missing homework counts as zero. No late homeworks will be accepted.
- Your lowest quiz score will be dropped. A missing quiz counts as zero. No make-up quizzes will be given.
- Your midterm score is the greater of your two individual midterms. A missing midterm counts as zero. No make-up midterms will be given.

Examinations

TWO mid-term exams are scheduled:

- Midterm I: Wednesday, October 14, 2009, 6-8pm
- Midterm II: Wednesday, November 18, 2009, 6-8pm

No make-up midterms will be given.

The final exam date follows the university schedule, and is on **Monday, December 21, 2009, 12:00-2:00 pm.**

Quizzes will be held in class approximately every two weeks, and each quiz date will be announced in class in advance. Each quiz will begin at the start of class and last about ten minutes. There will be no make-up quizzes given.

All exams and quizzes are open book and open notes. During the exams and quizzes, laptop and cellphone usage are not permitted, and they should be off at all times. I *strongly recommend* that you compile some quick reference notes before the exams and quizzes.

Homework

Regular reading and homework are required. Homework will be assigned approximately every two weeks. Each homework will be assigned at a lecture and will be due at the start (1:30pm) of the next Wednesday class unless otherwise noted. It is essential to do the problems to follow the lectures and succeed on the exams. You may work together in groups of up to 3 people, but *you must submit your own writeup with your own solutions* unless otherwise instructed. *No late homeworks will be accepted.*

Schedule of Lectures (tentative)

No	Week	Topic	Text
1)	9/6	Introduction/review (First class: 9/9)	D 1.4, 3.4, 4.3
2)	9/13	Introduction/review Confidence Intervals	D 4.6, 5.4, 6.1 D Ch 7
3)	9/20	Confidence Intervals, hypothesis testing	D Ch 7, 8
4)	9/27	Hypothesis testing	D Ch 8
5)	10/4	Hypothesis testing	D Ch 9
<hr/> <i>Midterm Exam I: 10/14</i> <hr/>			
6)	10/11	Simple linear regression	D Ch 12; FSW Class 1, 2
7)	10/18	Simple linear regression (Fall break: 10/19. Meet on 10/21.)	D Ch 12; FSW Class 2, 3
8)	10/25	Multiple regression	D Ch 13; FSW Class 4
9)	11/1	Multiple regression	D Ch 13; FSW Class 5, 6
10)	11/8	Multiple regression	D Ch 13; FSW Class 6, 7
<hr/> <i>Midterm Exam II: 11/18</i> <hr/>			
11)	11/15	Multiple regression	D Ch 13; FSW Class 7, 8
12)	11/22	Analysis of variance	D Ch 10; FSW Class 9, 10
13)	11/29	Analysis of variance	D Ch 11; FSW Class 10
14)	12/6	Logistic regression	D 13.5; FSW Class 11

Final Exam: 12/21 12:00-2:00pm