Quantitative Methods for Lawyers -- Law 394
Spring Semester, 2006
Prof. Rick Sander
Syllabus and Course Requirements

Texts: Freedman et al., Statistics, 3rd ed. (1998); Trochim, Research Methods: The Concise Knowledge Base (2005). Various supplemental readings posted during the semester.

Welcome to Quantitative Methods for Lawyers. The purpose of this course is to make you comfortable and literate enough with numbers so that you are prepared to handle the range of quantitative issues that come up in modern legal practice. My goal is not to make you an expert in statistics, but to equip you to deal effectively with experts, whether as consultants or as adverse witnesses, and to enable you to identify a quantitative issue when no one has told you it's there. I also want to help you become "multi-dimensional" in your quantitative literacy. By the end of the course, I'd like you to be comfortable reading statistical arguments, performing basic analyses, writing about statistics, expressing quantitative ideas in graphs, and questioning an expert. We will have exercises aimed at developing each of these skills.

Until last year, QM was a three-unit course. I added a fourth unit last year because students were interested in adding more topics to the class, and so many topics merited treatment in somewhat greater depth. I will also be integrating new materials into the syllabus as we progress through the semester, so I will give you outlines of readings only a couple of weeks in advance. However, this introduction should give you a good idea of generally what we will cover.

I will be evaluating you in four different ways:

1) I'll give you roughly ten problem sets over the course of the semester. These are aimed at seeing how well you can build on ideas and methods we cover in class to find solutions to unfamiliar problems. (For ordinary drilling, you should use the book on your own.) I will review these but not grade them. If it is clear to me that you are having trouble in a particular area, I may ask you to meet with me or do supplemental problems.

2) I will give you three paper assignments over the semester. In each paper, you are cast in a legal role (e.g., judicial clerk), and you have a legal problem that has important quantitative aspects. The assignment will be to address the quantitative issues in a thoughtful, methodologically appropriate, and clear manner, using tables and charts where appropriate (but not to excess). The assignments are relatively short (5-7 pages of text) and you'll have one to two weeks to complete each of them. Each paper will be graded.

3) Each of you will do a clinical exercise sometime during the semester (mostly in April). In these exercises, you will be cast in the role of deposing, examining, or cross-examining an expert witness on quantitative issues. I will be grading you on this work as well.

4) Finally, there's an optional, two-hour final at the end of the term, covering basic techniques from the course. The grade on the final can raise your grade on the papers and exercises, not lower it, but if you don't see why that's a somewhat misleading statement, then you need to take this course.

Reaching me: You can find me in Room 3447; my phone number is x67300 and my email is sander@law.ucla.edu. I will not have fixed office hours during the semester, but I will be easy to find and you can always set up an appointment by email or in person.

I'd like your input on what topics we cover in the course. Below is a list of topics; the ones with asterisks next to them are not definite, yet, and we can do some choosing among them, or consider others you suggest.

Basic statistics
Basic probability
Statistical inference
Sampling methods
Correlation
One-variable Regression
Multiple regression
Writing about statistics
Graphing and illustrating quantitative Arguments
Quan. Apps in Discrimination law
Research Design
The Four "Validities" in Research: Internal, External, Construct, and Conclusion
Experimental and Quasi-experimental designs

*Basic quantitative issues in financial analysis
*Game theory
*Bayesian probability & criminal law
*Decision analysis
*Heuristics of comprehending data
*Logistical regression
*Contracting theory
*Quan. Analysis of environmental Issues
*Quan. Issues in legal education

Initial assignments:

Tuesday, January 10th:	Introduction to the course; the modes of analysis and basic descriptive statistics.
Reading:	Freedman, Chapters 1-3
Wednesday, January 11th:	The Average, the Standard Deviation, and the Normal Curve Calculating Percentiles; Linear Graphs
Reading:	Freedman, Chapters 4-5, 7
Thursday, January 12th:	Introduction to Probability Problem Set #1 distributed
Reading:	Freedman, Chapters 13-14

Wednesday, January 18th	The Binomial Distribution; More on Probability
Reading:	Freedman, Chapter 15
Thursday, January 19th	The Law of Large Numbers; Expected Value, Standard Errors, etc.
Reading:	Freedman, Chapters 16-18 Problem Set 2 Distributed; Problem Set 1 due
Tuesday, January 24th	The Philosophical and Scientific Emergence of Statistics In the 19th Century; Poisson Distribution
Reading:	Excerpts from *The Metaphysical Club*, by Louis Menand Handout on Poisson distribution
Wednesday, January 25th	Some real statistics: types of standard errors; confidence intervals; estimating averages vs. percentages
Reading:	Freedman, Chapters 20-21, 23
Thursday, January 26th	Applying standard errors; confidence intervals
Reading:	Freedman, Chapters 24-25 Problem Set 2 due; PS 3 distributed Friday
Tuesday, January 31st	Formulating hypotheses; more on z-tests
	Freedman, first half of Chapter 26
Wednesday, February 1st	Small samples and t-tests
Reading:	Freedman, rest of Chapter 26
Thursday, Febraury 2nd	The Chi-Square test; Mendel's "perfection"
Reading:	Freedman, Chapter 28 Problem Set 3 due, PS 4 distributed Friday
Tuesday, February 7th	Comparing two samples
Reading:	Freedman, Chapter 27
Wednesday, February 8th	Summing up significance testing; choosing the right test; writing about significance
Reading:	Freedman, Chapter 29 First Paper Assignment Distributed (due Feb. 25)
Thursday, February 9th	The Supreme Court meets inferential statistics

Reading:	(ERES) *Castaneda v. United States; Hazelwood School District v. United States* Problem Set 4 due; PS 5 distributed Friday
Tuesday, February 14th	The right and wrong way to make inferential claims
Reading:	Meier et al, "What Happened in Hazelwood: Statistics, Employment Discrimination, and the 80% Rule."
Wednesday, February 15th	Review of problems sets and inferential methods
Thursday, Febraury 16th	Making an empirical argument about law
Reading:	King & Epstein, "The Rules of Inference."
Tuesday, February 21st	Sampling; writing about statistical significance PS 5 due
Reading:	Trochim, Chapter 2; Freedman, Chaps. 19, 22
Wednesday, February 22nd	Measurement
Reading:	Trochim, Chatper 3; Freedman, Chapter 24
Thursday, February 23rd	First Paper Assignment Due Introduction to Correlation
Reading:	Freedman, Chapter 8
Tuesday, February 28th	Designing survey instruments (w/Joe Doherty)
Reading:	Trochim, Chapter 4; four survey handouts
Wednesday, March 1st	More on correlation; ecological fallacies; The idea of regression
Reading:	Freedman, Chapters 9-10
Thursday, March 2nd	Elements of regression analysis (Problem Set 6 posted March 4th, due March 9th)

Reading:	Freedman, Chapters 11-12 Tufte, Chapters 1-2
Tuesday, March 7th	Two-variable linear regression
Reading:	Tufte, Chapter 3
Wednesday, March 8th	Multivariate regression
Reading:	Tufte, Chapter 4
Thursday, March 9th	Regression in the courtroom Second Writing Assignment distributed
Reading:	Tufte, continued
Tuesday, March 14th	More on regression in the courtroom
	Fisher, "Multiple Regression in Legal Proceedings," 80 Columbia Law Review 702 (1980).
Wednesday, March 15th	Using regression in Excel
	No reading assignment
Thursday, March 16th	Regression in employment discrimination cases Problem Set 8 distributed
Reading:	Campbell, "Regression Analysis in Title VII Cases: Minimum Standards, Comparable Worth, and Other Issues Where Law and Statistics Meet," 36 Stanford Law Review 129 (1984). Finkelstein, "The Judicial Reception of Multiple Regression Studies in Race and Sex Discrmination Cases," 80 Columbia Law Review 738 (1980).
Tuesday, March 21st	Exercises in multiple regression -- predicting law school performance.
Reading:	Worksheet assignment
Wednesday, March 22nd	Survey and regression methodologies in "gender" research
Reading:	Guinier et al, "Becoming Gentlemen"

Thursday, March 23rd	Final topics in regression: squared terms, logistic regression, and assorted applications Problem Set 8 due.
Tuesday, April 4th	Writing and creating tables; misleading tables
Reading:	Handout; no reading before class
Wednesday, April 5th	Financial analysis
Reading:	Sander, “Calculating present value”
Thursday, April 6th	Qualitative measurement 2nd paper assignment due; Problem Set 8 distributed (PS 8 is due on April 11th)
Reading:	Trochim, chapters 5-6
Tuesday, April 11th	Heuristics; data estimation; discussion of 2nd papers
Reading:	Bazerman, Judgment in Managerial Decision Making, pp. 11-34 (1998). Heidenrich, “The Gulf War: How Many Iraqis Died?” *Foreign Policy* (Spring 1993); Haub, "How Many People Have Ever Lived on Earth?"
Wednesday, April 12th	Scientific Evidence
Reading:	Reference Manual on Scientific Evidence (exceprts): Breyer, "Introduction," and Berger, "The Supreme Court's Trilogy on the Admissibility of Expert Testimony." (2001).
Thursday, April 13th	Research design; Distribution of Paper Assignment 3
Reading:	Trochim, chapters 7-9

Tuesday, April 18th	Research design (cont.); Bayesian probability, reasoning, and the trial process
Reading:	Finkelstein & Fairley, "A Bayesian Approach to Identification Evidence," 83 *Harvard L. Rev*. 1329 (1970); Lawrence Tribe, "Trial by Mathematics," 84 *Harvard L. Rev*. 1329 (1971); Finkelstein & Fairley, "A Comment on 'Trial By Mathematics,'" 84 *Harvard L. Rev*. 1801 (1971); Tribe, "A Further Critique of Mathematical Proof," 84 *Harvard L. Rev*. 1810 (1971).
Wednesday, April 19th	More on Bayesian probability; Type I and Type II errors
Reading:	Continued from April 18th.
Thursday, April 20th	Using and Critiquing Statistical Evidence at Trial Problem Set 9 distributed
Reading:	"Chapter Nine: Presenting and Attacking Scientific Evidence."
Tuesday, April 24th	Cross-Examination workshop Problem Set 9 due
Wednesday, April 25th	Cross-Examination workshop
Thursday, April 26th	Review session and class wrap-up
Thursday, May 4th	Final Exam