

**Quantitative Methods**  
**Spring 2010**  
**Version 0.99**  
**(Modified Feb. 23, 2010)**

**Paul Ohm**

**Syllabus**

**Course Description**

The purpose of this course (formerly Law and Social Sciences) 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, questioning an expert, and understanding the power of computer programming. We will have exercises aimed at developing each of these skills.

**Class Times and Office Hours**

The class will meet every Monday and Wednesday from 2:30 – 3:50 PM in Room 304. I will generally be available for office hours on Monday and Wednesday mornings Monday and Wednesday mornings from 10:30 – 11:30 AM in Room 433 or at any other time by appointment. I can also be reached via e-mail at paul.ohm@colorado.edu.

**Course Expectations**

I will be evaluating you in three different ways:

- 1) I'll give you roughly six 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.) You will be penalized if you do not attempt to do the problems, but aside from that 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 longer paper assignments over the semester. In each paper, you will be cast in a legal role (e.g., judicial clerk), and you will 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 approximately two weeks to complete each of them. Each paper will be graded.

- 3) Finally, I will offer a two-hour, non-comprehensive final at the end of the term, covering some of the 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.

Because I value class participation so much, I may increase or decrease your grade up to five points to reflect the quality (not necessarily quantity) of your participation.

### **Course Materials**

We will use one primary text: Freedman et al., Statistics, 4th ed. (2007). Some of the assignments are drawn from a free, online textbook, William M.K. Trochim, Research Methods Knowledge Base, available at <http://www.socialresearchmethods.net/kb/>. I will also post various supplemental readings throughout the semester.

Nearly every chapter contains exercises and some chapters end with review exercises. Although you aren't required to work through these exercises, you should read them and try to think about the answer, at least in outline form. You will find answers at the back of the book for the exercises but not for the review exercises.

Our course website is at [paulohm.com/classes/qm10](http://paulohm.com/classes/qm10). Here, you will find important announcements, supplemental readings (most of which are mentioned in the day-by-day syllabus, below), changes to the reading, and links to other resources. I will make supplemental readings available at least two classes prior to the assigned date. The top part of the website will list "Latest Changes to the Site" which you can scan to see what is important and new. Students must consult the website before every class. There is no TWEN site for this course.

You should have a calculator in class every day (the calculator program on your laptop is fine), and it will not hurt to have a spreadsheet as well.

## Assigned Topics and Reading

Version 0.99  
(Modified February 24, 2010)

This syllabus will change, and maybe dramatically, through the course of the semester. Please do not plan your life around the work described in this version, and please consult the course website frequently to check for updates. The first page lists a version number you can use to check quickly if you have the latest version.

<b>Class Number/Date</b>	<b>Topic</b>	<b>Assignment</b>
1: Mon, Jan. 11	Introduction to the course; the modes of analysis	Chapters 1-2
2: Wed, Jan. 13	Basic descriptive statistics: Average, Standard Deviation	Chapters 3-4
<b><i>Mon, Jan. 18</i></b>	<b><i>No Class: MLK Jr. Day</i></b>	
3: Wed, Jan. 20	The Normal Distribution; Calculating Percentiles; Linear Graphs; Introduction to Probability	Chapters 5, 7  <i>Problem Set 1 Distributed</i>
4: Mon, Jan. 25	Introduction to Probability	Chapters 13-14
5: Wed, Jan. 27	The Binomial Distribution; More Probability	Chapter 15
6: Mon, Feb. 1	The Law of Large Numbers; Expected Value, Standard Errors, etc.	Chapters 16-18; Handout on website  <i>Problem Set 2 Distributed; Problem Set 1 Due</i>
7: Wed, Feb. 3	Applications to Election Law	Handout
8: Mon, Feb. 8	Some real statistics: types of standard errors; confidence intervals; estimating averages vs. percentages	Chapters 20-21 and 23
9: Wed, Feb. 10	Digesting and applying standard errors; confidence intervals	Chapter 24 and Handout  <i>Problem Set 3 Distributed; Problem Set 2 Due</i>
10: Mon, Feb. 15	Formulating hypotheses; more on z-tests	Chapter 25-26
11: Wed, Feb. 17	Comparing two samples; Chi-Square test; Mendel's "perfection"	Chapter 27-28

<b>Class Number/Date</b>	<b>Topic</b>	<b>Assignment</b>
12: Mon, Feb. 22	The Supreme Court meets inferential statistics	Supplemental reading on website: <i>Castaneda v. United States and Hazelwood School District v. United States</i>  <i>Problem Set 4 Distributed; Problem Set 3 Due</i>
13: Wed, Feb. 24	The right and wrong way to make inferential claims	Chapter 29 and Handout  <i>First Paper Assignment Distributed (due March 15)</i>
14: Mon, March 1	Review of inferential statistics and techniques	TBA
15: Wed, March 3	More review of inferential statistics and techniques; computer spreadsheets	TBA  <i>Problem Set 4 Due</i>
16: Mon, March 8	Correlation and two-variable regression; writing about data analysis	Chapters 8, 9, and 10; Handout
17: Wed, March 10	Review of inferential statistics and techniques. More on two-variable regression.	TBA  <i>Problem Set 5 Distributed</i>
18: Mon, March 15	Ecological fallacies; correlation significance; regression to the mean; the meaning of $R^2$ , and the idea of multiple regression.	Chapters 11-12; Handout  <i>First Paper Assignment Due</i>
19: Wed, March 17	Multiple regression output and the meaning of significance in the regression context; introducing multiple regression in legal proceedings	Handout  <i>Second Paper Assignment Distributed (Due Wed., March 31)</i>
<b><i>Mon/Wed, March 22/24</i></b>	<b><i>No Class: Spring Break</i></b>	
20: Mon, March 29	Regression analysis in regulatory context	Handout  <i>Problem Set 5 Due</i>

<b>Class Number/Date</b>	<b>Topic</b>	<b>Assignment</b>
21: Wed, March 31	Where Data Comes From: Sampling and other Devices	Chapter 22; Handout <i><u>Second Paper Assignment</u></i> <i><u>Due</u></i>
22: Mon, April 5	Bayesian probability and reasoning; Type I and Type II errors	Handout <i><u>Problem Set 6 Distributed;</u></i> <i><u>Third Paper Assignment</u></i> <i><u>Distributed (Due Mon.,</u></i> <i><u>April 19)</u></i>
<i><b>Wed, April 7</b></i>	<i><b>No Class</b></i>	
23: Mon, April 12	Admissibility of Scientific Evidence	Handout
24: Wed, April 14	Heuristics and estimates; Financial Analysis (Calculating Present Value)	Handout <i><u>Problem Set 6 Due</u></i>
25: Mon, April 19	Tables, Graphs, and Visual Evidence	Handout <i><u>Third Paper Assignment</u></i> <i><u>Due</u></i>
26: Wed, April 21	Cross-Examination Exercise	Handout
27: To Be Scheduled	<i>Review Session</i>	<i>During Final Exam Period</i>