Criminal Justice 44.580
Quantitative Research
Fall 2009

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Course Objectives

This course provides an introduction to quantitative analysis for graduate students in the social sciences. It is designed to be a review of fundamental statistical analyses as well as to lay the foundation for future statistics classes. However, I have two additional objectives for students who successfully complete this course. First, they should be able to follow much of the statistical work described in scholarly journals. Second, they should be able to execute basic statistical analyses in their own research. Our underlying assumption as we proceed will be that statistical techniques are important tools that allow us to better describe and interpret the social world.

We will begin with techniques for describing the distribution of a single variable, move on to assessing the relationship between two variables, and invoke the power of "statistical inference" to allow us to draw conclusions about the larger populations from which our data are drawn. Finally, we will consider multivariate techniques for the more common situation where our substantive interests demand that we consider more than two variables at a time (which is nearly always the case). This course does not require a strong mathematical background for students to do well. In fact, a basic familiarity with simple algebra (and advanced arithmetic) is sufficient.

Most statistical analysis is done with the help of computers and statistical software packages. Therefore, it is important to blend our coverage of basic statistics with an accompanying foray into the world of computers. For this purpose, the class exercises will require the use of Excel and/or SPSS. The use of these programs will be discussed in class. You will learn to use these software packages to perform tasks in seconds that, if done by hand, literally could take weeks.

The primary format for this course will be lecture, though it is essential that you feel comfortable asking questions, expressing confusion, or probing beyond the information presented in the lectures. We will follow the textbook closely since it clears a pretty logical and coherent path through the material I want to cover.

Required Text

Fox, James A. and Jack Levin. 2006. *Elementary Statistics in Social Research.* Boston: Allyn and Bacon.

Grading

Your final grade will be based on your performance the following:
1.Examinations. There will be two examinations during the semester, a midterm and a final. I tentatively plan to hold the midterm exam after the section on univariate statistical inference. The final exam will be held at the time scheduled by the University. The exams will include a combination of short answer questions and problem solving.
2.Computer Exercises. Throughout the semester, a series of computer exercises will be assigned. These exercises will require you to download and to analyze data using Excel (or SPSS, or another software package you may prefer). I will provide you with a handout describing each assignment and I will provide the necessary data. A typical exercise will ask you to conduct a statistical analysis based on the subjects we cover in class, then to write a short description of your findings.
3.Chapter Exercises. Selected problems from those appearing at the end of chapters in the textbook will be assigned. The purpose of these assignments is primarily to allow you to determine your level of understanding of the material in each chapter.

Each of these components will figure into the final course grade as follows:

Midterm Exam	35%
Final Exam	40%
Computer Exercises	15%
Chapter Exercises	10%

Course Organization

Univariate Statistics

I. Introduction to Statistical Analysis — **Chapters 1 & 2**
- description vs. inference
- conceptual models
- variables (dependent and independent)
- levels of measurement

II. Describing Univariate Distributions — **Chapters 3 & 4**
- measures of central tendency
- measures of dispersion
- graphs and tables

III. Probability Distributions and Their Properties — **Chapter 5**
- the normal distribution
- other distributions
- sampling distributions

IV. Statistical Inference with Single Variables — **Chapter 6**
- confidence intervals for means and proportions
- testing hypotheses about means and proportions

- type I and type II errors

First Exam will cover subject areas 1-4 (date tba)

Bivariate Statistics

V. Statistical Inference with Two Variables **Chapter 7**

- testing the difference between two means
- testing the difference between two proportions

VI. Dealing with Categorical Variables **Chapter 9**

- selected issues

VII. Bivariate Correlation and Regression **Chapter 10**

- the "least squares" criterion
- the components of the regression equation
- "goodness of fit"
- hypothesis testing with bivariate regression

Multivariate Statistics

VIII. An Introduction to the Logic of Multivariate Analysis **Chapter 11**

- establishing "causality"
- the logic of controlling procedures

IX. An Introduction to Multiple Regression Analysis (Time Permitting) **TBA**

- partial coefficients and their meaning
- hypothesis testing with multiple regression

Final Exam will cover subject areas 5-9 (date tba)

Grade Changes

Every semester a student visits my office and begins the discussion by letting me know that they "need a B+ to get into law school" or "is there any way I could *give* them a better grade?" My philosophy regarding grade changes is simple: the final grade you receive is the one you *earn.* That is, the grade you receive is based solely on your performance on the course assignments/exams. I will, however, gladly submit a grade change form to the university if I make an error in the calculation of your final grade. Finally, documentation regarding extenuating circumstances is required before I will issue an incomplete ("I") grade for the course.

Academic Dishonesty

Students are expected to do their own work in this class. Students found cheating (or plagiarizing) on any exam or assignment will receive a "0" for that assignment or exam. I will also report such cases to the appropriate University office for investigation. The following link outlines the University's policy regarding academic dishonesty:
http://www.uml.edu/stage/catalog/undergraduate/policies/academic_dishonesty.htm#Academic%20Dishonesty

**Please note that I will try to follow this syllabus as closely as possible. However, the subjects covered and course policies are subject to change at the discretion of the instructor. Changes to the syllabus will be announced in class, and necessary changes will be made to the course website.*