Sharon H. Mastracci, PhD
E-mail: mastracc@uic.edu

PA/PhD 541: Advanced Data Analysis I

Spring Semester 2010 (CRN 23322)
Tuesdays, 12:00-3:00 p.m., Art & Design Hall (ADH) 2234

Course Description & Goals

This course introduces PhD students to the elements of matrix theory, theories of estimation, hypothesis testing, logit and probit models, factor analysis, and principal components analysis, and applies these techniques to public administration research. Prerequisite: PA 540.

The primary objectives for this course are to:

1. Understand how to select and apply multivariate statistics, given different types of data and research questions.
2. Develop an intuitive understanding of the statistical techniques and their limitations and problems in particular settings. This will require students to become comfortable and familiar with the logic and mathematics of the techniques.
3. Interpret statistical findings quantitatively and in the context of theory and explanation.
4. Develop skills in using a statistical computer package.
5. Develop the skills necessary to conduct independent, quantitative research.

Course Policies

Assignments: Normally, I do not allow students to redo assignments that have been graded, but when you're running numbers in "the real world", you'll run and re-run things all the time, so you can redo computer assignments, but not the article reviews or the final paper. Late assignments, however, are not allowed, and will be penalized unless you have a legitimate excuse or crisis causing the delay in completing work (e.g.: illness, family death) and I must be contacted immediately about any such crisis. An "Incomplete" is *only* earned by students who make requests *prior to* the end of the course.

Deadlines: All assignments are to be submitted *at the beginning of class* on the day they are due. You will lose up to 10 percent of an assignment's score for each day—each 24-hour period—that it is late. Assigned readings must be completed *before* they are discussed in class. Extension petitions should be made *before* the assignment's deadline as best as possible. If you have a question about an extension, please *talk to me*. Plagiarism and cheating are penalized severely, in accordance with university sanctions. Guidelines for academic integrity at UIC are online www.uic.edu/depts/sja/integrit.htm and sanctions for academic dishonesty are also found at www.uic.edu/depts/sja/chpt3.htm#3.

Attendance: Class attendance and active involvement in class discussions are expected. Your final grade is comprised of points earned from various types of assignments: computer assignments, article reviews, and the final project. Details of all assignments will be discussed in class throughout the semester.

Assignments and Final Grade Breakdown

Computer Assignments	7 assignments at 10 points each	70
Article Reviews	4 reviews at 15 points each	60
Final Project	1 paper at 70 points each	70
TOTAL		200 pts.

Final grades: 100-90%=A; 89-80 %=B; 79-70%=C; 69-60%=D; and 59% or lower=F

Crunching Numbers: Computer Assignments

You will complete *seven* computer assignments during the course of the semester. Their purpose is to provide you with experience using software to answer statistical and research questions. You will be provided with the data sets to conduct these analyses. Completed assignments should include a restatement of the research question being investigated, a description of the procedures used, a copy of your final computer output (both programming syntax and frequency distributions for all variables examined in your analysis), and an interpretation of your findings. Each computer assignment also should be accompanied by a clear written description of what you did and why.

Interpreting Output: Article Reviews

You will read and prepare brief (3-4 double-spaced pages) critical reviews of *four* empirical journal articles. The purpose of these assignments is to develop the skills necessary to critically assess the methodology and to see firsthand practical applications of the statistical techniques you will be learning. For each assignment, you will choose one article from a list of several to review. Your paper should provide a full citation for the article (e.g., author, year, title, journal, issue, volume, and page numbers).

The reviews should also:

- Identify the research question in the article.
- Describe the hypotheses or theory being tested.
- Identify the independent and dependent variables and describe how they are measured. Are they measured appropriately? Are they measured in a valid and reliable manner?
- Identify the source of the data and the type of data collection used.
- Identify the unit of analysis.
- Identify the statistical methods used in the research. What do they tell you? Where the appropriate methods used? What would you have done differently?
- Summarize the findings. Was the hypothesis supported?
- Evaluate the research. Was it important? Did it make sense? Are there consequences of the findings for our actions, or the government's actions?

Crunching Numbers *and* Interpreting Output: Final Paper

You will be required to submit a research paper (10-12 pages) that replicates research already in print. The paper should be in the format of a brief research report that would appear in a professional journal and should apply one or more of the statistical techniques we cover.

Focus on statistical techniques that are more sophisticated than simple bivariate or multivariate regression. Indeed, much of the research with statistical analysis that is published in good journals is sophisticated relative to the topics covered in this course, and it often requires constructing complicated scales or indices. Thus, you may need to supplement your readings on the statistical techniques used by the study and other topics.

The paper should, at a minimum, include a brief statement of the research problem and questions being investigated, a description of the data being examined, a description of the analysis procedures used, interpretation of findings and conclusions. The paper should also include a realistic discussion of limitations and recommendations for future research. Finally, please submit a copy of the relevant computer printouts along with your paper.

Required Text

Trieman, Donald J. 2009. *Quantitative Data Analysis: Doing Social Research to Test Ideas*. San Francisco, CA: Jossey-Bass.

Assigned readings from other sources will be posted on the course Blackboard site. PDFs of will be posted on our Blackboard site: http://blackboard.uic.edu/

Class Meetings and Reading Assignments

January 19 Chapter 1: Cross Tabulations and Intro to STATA

Friday, January 22, 2010: Last day to complete late registration; last day to add a course or make section changes; last day to drop individual courses without receiving W (Withdrawn) grade on academic record, via UIC Web for Student.

January 26 Chapters 2 & 3: Tables and More Tables

February 2 Chapter 4: Data Manipulation in STATA

February 9 Chapter 5: Introduction to OLS; Computer Assignment #1 Due

February 16 Chapter 6: Multiple Regression; Computer Assignment #2 Due

February 23 Chapters 7 & 8: Tricks and Missing Data; Computer Assignment #3 Due

March 2 Chapter 9: Survey Samples; Computer Assignment #4 Due

March 9 Chapter 10: Regression Output; Computer Assignment #5 Due

March 16 Chapter 11: Measurement; Computer Assignment #6 Due

March 23 No Class: Spring Break

March 30 Chapter 12: Log-Linear Analysis; Computer Assignment #7 Due

April 6 Chapter 13: Binomial Logistic and Probit Regression; Article Review #1 Due

April 13 Chapter 14: Multinomial and Ordinal Logistic Regression; Article Review #2 Due

April 20 Chapter 15: Fixed Effects and Random Effects Modeling; Article Review #3 Due

April 27 Chapter 16: Research Design and Interpretation; Article Review #4 Due

May 4 Final Project DUE