

**Arizona State University, Department of Political Science  
Political Science 603: Polimetrics, Spring 2005**

*Professor:* Rodolfo Espino

Phone: 480-965-5884

email: espino@asu.edu

*Time/Location:* Monday, 6:40-9:30PM, LSE204

Office: 6686 Lattie Coor Hall

Office Hours: Wednesday 11-1 or by appointment

## Course Description

This course is an introduction to methods of statistical data analysis for social scientists. A major objective of this course is to teach you how to *read*, *speak*, and *write* effectively in the use of empirical methods employed by many in political science. We will only cover *some* of the basic and recent methods used in political science. You should not believe that what we cover in the course are the only ways available to you in which particular research questions can be addressed.

In this course, we will begin with a discussion of data analysis and ways that we ought to begin explorations of data we gather. We will then transition to a discussion of basic probability and inference, which is critical to our ability to make generalizable claims. This will set us up for coverage on the use of linear regression. We will also spend a considerable amount of time on interpreting regression results and its assumptions. We will conclude with a brief introduction to methods to use when the traditional regression model is not appropriate for the data we have. Throughout each component we will spend a considerable amount of time learning how to implement methods we discuss through statistical computing.

While I do not expect all of you to become passionate consumers of the material we cover, it is my hope that you at least come away from this course with an understanding of some research methods used by political scientists, particularly an understanding of when such methods are appropriate and when not appropriate. At a minimum, I hope this course brings you to an ability to continue to pursue advanced material in future courses or to a point where you can thoughtfully analyze methods used by some political scientists rather than outright dismissal of such methods merely because you do not understand them or it is fashionable among colleagues to do so.

## Texts and Readings

The only book I ordered for this class is

Abelson, Robert P. 1995. *Statistics as Principled Argument*. Hillsdale, NJ: Lawrence Erlbaum Associates.

While the examples in this book are drawn largely from psychology studies, I think this is a handy, inexpensive book for all students to own that will serve as a helpful guide in how to read, talk, and write statistics. We will frequently use Abelson's book as a focal point for our discussions.

Although I am not requiring the purchase of a traditional statistics textbook, I recommend any of the following textbooks for your consumption - something that is highly recommended for those of you who plan to continue to use the topics in this course in your future work.

Takeshi Amemiya. 1995. *Introduction to Statistics and Econometrics*.

Peter Kennedy. 1998. *A Guide to Econometrics*. (available online through ASU library)

Damodar Gujarati. 2003. Basic Econometrics.  
Kmenta. Elements of Econometrics.  
Eric Hanushek and John Jackson. 1977. Statistical Methods for Social Scientists.  
Jeffrey Woolridge. 2003. Introductory Econometrics.  
Arthur Goldberger. 1991. A Course in Econometrics.  
William Greene. 1997. Econometric Analysis.  
G.S. Maddala. 1992 Introduction to Econometrics.

I am not requiring purchase of any of the above texts because I am fully aware that for some of you, the books might run the future risk of serving as expensive bookends. Yet others might find them to analogous to the manual sitting in your political science glove compartment - you may not frequently read it but when things go wrong (i.e., angry journal reviewers), you might find them as a handy reference to have in your possession; so the investment is seriously worth considering.

Nevertheless, we will still need to make basic treatments of the methods we will cover in this course. Therefore, we will take advantage of a number of concise writings of some of the methods in this course through a series of small texts put together by Sage publications. Sage is more than happy to take your \$16 for any of these texts but free access is provided to these texts through the ASU library. If you need to access these papers remotely (i.e., from an off-campus site, such as your house) you will need to first create and register a netLibrary account from a machine located on campus to provide you off-campus access. Visit "<http://www.asu.edu/lib/resources/db/netlibr.htm>" for instructions on how to do this.

In addition to readings from Abelson and the Sage books, I will occasionally assign supplemental readings of substantive articles that we may come across in developing your research papers. The purpose of any such supplemental readings would be to give us some fodder for substantive discussions about the proper or improper application of methods covered in this course.

For the course, we will be using a freeware statistical package known as R. As typical with freeware, there are no easy to interpret manuals that come with it. Further, R has a steeper learning curve than most stats packages. However, with a significant effort on your part you should be able to make sense of the online documentation provided as well as the R-help archives. The key to learning R is simply trial and error - you will make mistakes and you should not be afraid of making mistakes. I am here to help you learn this package as well. However, I ask that before you seek out my help (or the help of others online), you put forth a serious effort to solve the problem yourself and are able to provide documentation that you have done so. Investment of time early on will save you much time in the future.

## Course Evaluation

You will have six **problem sets** each worth 10% of your grade. One **course paper** will constitute the remaining 40% of your grade.

Completion of the course paper will proceed in three parts. You will first submit a proposal to me. In the proposal you will formulate an original research question and summarize how it contributes to the relevant literature, describe detailed hypotheses you will test, describe the data you will use to test your hypotheses (particularly, the location of the data and how you plan to collect it), and describe your expected findings and their implications. The second component of the course paper will consist of a research memo. In the memo you will expand upon the research proposal by describing the methods you will use to test your hypotheses and provide exploratory findings describing and explaining the data you have collected. The final component of the course paper will be a complete

research paper. This final paper should provide a detailed description of the methods you use, a detailed explanation of the findings, and a detailed explanation of the implications of your findings to the relevant literature. At each stage, you should be dutiful about citing the readings we cover. Since this is a course on statistical methods in the social sciences, your final research paper will be heavier in describing the methods you use than research papers in your other courses.

I will also add that while you are not graded on participation, per se, active participation is essential to getting the most out of this course. Although the class is a lecture format, it is strongly encouraged that students ask any questions during class when things are unclear. The entire class benefits from an active “question and answer” format because teachers are not always the best mind readers. However, please understand that some questions may be deferred to a later point or will be addressed outside of class if the issue is too far from the lecture’s focus. This allows the instructor to stick to the subject but also allows students to feel free to ask whatever is on their mind. Please meet me early and be sure to communicate to me anything that you do not understand. If you do not, I guarantee you will soon get lost.

## Course Schedule

*The pace and ordering of the material covered is subject to change, depending on progress in class.*

### Introduction to Statistics and Statistical Computing

Problem Set 1

*Statistics as Principled Argument*, Abelson. Chapter 1.

*Exploratory Data Analysis*, Hartwig and Dearing. Chapters 1-2.

*Data Analysis: An Introduction*, Lewis-Beck. Chapters 1-3.

### Looking at Data: Distributions and Relationships

Problem Set 2; Research Proposal Due February 18.

*Statistics as Principled Argument*, Abelson. Chapters 2-3.

*Exploratory Data Analysis*, Hartwig and Dearing. Chapter 3.

*Central Tendency & Variability*, Weisberg, Chapters 1-5.

### Probability

Problem Set 3

*Statistics as Principled Argument*, Abelson. Chapters 4-6.

*Data Analysis: An Introduction*, Lewis-Beck. Chapters 4-5.

### Inference

Problem Set 4

*Statistics as Principled Argument*, Abelson. Chapters 7-9.

### Topics in Inferential Statistics (especially regression)

Problem Set 5; Research Memo Due April 1.

*Data Analysis: An Introduction*, Lewis-Beck. Chapters 6-7. *Applied Regression*, Lewis-Beck. Chapters

1-3. *Interpreting and Using Regression*, Achen. Chapters 1-7.  
*Understanding Regression Assumptions*, Berry. Chapters 1-6.

## **Beyond Ordinary Least Squares Regression**

Problem Set 6; Final Research Paper Due May 6.