Graduate Seminar in Research Methods

Advanced Research Methods introduces students to the statistical methods of the social sciences with an emphasis on their applications in political science. A significant part of the course focuses on hypothesis testing, regression analysis, and why these techniques work. The study will be carried to the level of multiple regression with the goal of providing students with the ability to test their own theories and to interpret basic statistical results in the political science literature.

The course presumes a basic knowledge of research design and an acquaintance with means, standard deviations, and frequencies -- as covered in POS 5706 or a similar introductory course. If you haven't been exposed to this, don't worry. We will quickly review these matters in the first week (or two) of the course, but we will go fast. Students who are not familiar with quantitative methods, or don't like it, may find the material rather challenging. The course requires some mathematics (algebra) and an understanding of the statistical reasoning behind the results. We will approach this material gradually to make sure that everyone keeps up, but please keep in mind that this course requires strong commitments on your part in order to be successfully completed.

In addition to a theoretical knowledge of statistics, it is also important to gain hands-on experience with statistical software. This will help you apply the theories you learn. As a result, we will have a couple of computer days to train you on the statistical software SPSS for Windows. SPSS is widely used in political science and very user friendly. I will assume that the class has no prior knowledge of SPSS and frequently allow you to work with others when operating the software. SPSS is available in the FIU computer labs so you don't have to purchase it for yourself.

Grading

Your grade consists of four homework assignments, a midterm exam and a final exam. Each home work assignment requires you to practice the analytical techniques introduced in class and will help prepare you for one of the exams. Each is worth 10% of your overall grade and will be assigned roughly every other week. This should help you keep on top of the material and discourage you from falling behind. All assignments will be put on-line. Please look at my web page if you miss the day I give out an assignment.

The remaining 60% of your grade will be reserved for a midterm exam and a final exam. The midterm exam covers materials from the first part of the course while the final exam focuses on material from the second part of the course. Both contain multiple choice, problem solving, and short answer type questions that evaluate your understanding of the material rather than your aptitude for a particular type of test question.

	Date	Percent of Grade
HOMEWORK ASSIGNMENT 1	Feb 5	10%
HOMEWORK ASSIGNMENT 2	Feb 19	10%
MIDTERM EXAM	Feb 26	30%
HOMEWORK ASSIGNMENT 3	Mar 26	10%
HOMEWORK ASSIGNMENT 4	Apr 9	10%
FINAL EXAM	Apr 16	30%

Make-ups

Homework assignments require a fair amount of analysis time. Please plan ahead to avoid turning them in late. **Late homework assignments will be lowered one letter grade for every *working* day they are late**. If an assignment is late, it would be a good idea to stick it under my office door (DM 482B) as soon as possible to avoid any unnecessary late penalties. Grades are lowered for every *working day* they are late, not every class day they are late. No homework will be accepted after the final exam. Please plan ahead.

If you miss the midterm exam for a good reason, you will be allowed to complete a make-up midterm on Monday, March 10 at 8:00-9:15 p.m., meeting in DM 482B. **THERE WILL BE NO OTHER TIME TO MAKE UP THE MID-TERM EXAM AND <u>NO</u> MAKE-UP EXAM FOR THE FINAL. NO EXCUSES!** It also should be noted that the make-up exam will be considerably more difficult than the regular mid-term exam and should be avoided. Please plan ahead.

Required Texts

Our readings will cover both the theory of statistics and its application. Unlike most social science courses, you may have to read your statistics book two or three times to fully comprehend the material. Use a pencil and paper to work out the logic behind the material as you read. It should help. I have also listed additional readings, at the end of the syllabus, which will allow you to see the material from a different angle. If you don't fully understand the readings or want more detail, try one of them. The strength of each book is highlighted and outside readings are encouraged.

I will assume that all students have read the material prior to class and that you are professional enough to know the consequences of not attending class. If you miss a class, please obtain the notes from another student. Remember, if you work hard and complete all the readings, this should be a very rewarding course.

The following books can be purchased from the campus book store...

1. Wonnacott, Thomas H. and Ronald Wonnacott. 1990. *Introductory Statistics*. New York: John Wiley and Sons -- required.

2. Norusis, Marija J. 2000. *Guide to Data Analysis*, *SPSS 10.0*. Upper Saddle River, NJ: Prentice Hall -- required.

3. Short Course Packet -- pick-up at the University Copy Center. The University Copy Center is two doors down from the campus bookstore in the student union, University Park campus. Readings from the course packet are marked with a "**CP**" below.

4. Berry, William D. 1993. *Understanding Regression Assumptions*. London: Sage University Paper -- recommended, NOT REQUIRED.

Finally, you will also need a calculator that adds, subtracts, multiplies, divides, squares, and takes square roots for this course. You need it for assignments and for the exams. If you can borrow a calculator rather than purchase one, that's great. If not, they are fairly cheap at the bookstore.

Schedule of Topics and Readings

Jan 8   **Introduction**

         Wonnacott and Wonnacott, Ch 1 (skim)

Jan 15 - 22   **Basic Probability Theory**

         Wonnacott and Wonnacott, Ch 3 (skim) and 4 (focus on normal distributions).

Jan 29   **Sampling Distributions, Point Estimation, and The Central Limit Theorem**

         Wonnacott and Wonnacott, Ch 6 and 7.

Feb 5   **Univariate Hypothesis Tests**

         Wonnacott and Wonnacott, Ch 9.
         Norusis, Ch. 9 (the binomial test) & Ch.10

Feb 12   **Difference of Means & Difference of Proportions Tests**

         Norusis, Ch 11 & 13

Feb 19   **Computer Day**   (*meet in political science computer lab*)

         Norusis, Ch . 2
         Theilmann, John and Allen Wilhite. 1998. Campaign tactics and the decision to attack. *Journal of Politics* 60:1050-1062, **CP.**

Feb 26   **MIDTERM EXAM**

Mar 5   **Simple Regression**

Wonnacott and Wonnacott, Ch 11 & 12.

Mar 12   **Simple Regression (cont.)**

Carefully review Wonnacott and Wonnacott, Ch 11 & 12.

Mar 19   **No Class! Spring Break**

Mar 26   **Multiple Regression**

Wonnacott and Wonnacott, Ch 13.

Apr 2   **Assumption Diagnostics**

Wonnacott and Wonnacott, Ch 14 (449-467), Ch 15.
Norusis, Ch. 21-23.
recommended: Berry, *Understanding Regression Assumptions*

Apr 9   **Computer Day**   (*meet in political science computer lab*)

Norusis, Ch. 19 & 20
Dougherty. 1999. "Public Goods and Private Interests: An explanation for state
compliance with federal requisitions, 1775-1789," **CP**.

Apr 16   **In Class Final**

Web Support

http://www.math.uah.edu/stat/

If you are looking for practice problems or additional explanations for statistical topics,
try web sites like this.

Recommended Readings

Agresti, Alan and Barbara Finlay. 1997. *Statistical Methods for the Social Sciences*, 3rd edition. Upper Saddle River, NJ: Prentice Hall.

This is a good, general text for the social sciences with many political science examples. If you don't understand how something relates to political science, pick up this book.

Neter, John, William Wasserman, and G. A. Whitmore. 1978. *Applied Statistics*. Allyn and Bacon: Boston.

Neter, Wasserman, and Whitmore have put together one of the most careful coverages of probability theory, sampling distributions and hypothesis testing that I've ever read. These basic topics are covered with such precision that the book is far from simple, but it is technically correct and totally in depth. Anyone who really wants to learn these topics should engage it.

Freedman, David, Robert Pisani, and Roger Purves. 1998. *Statistics*. W. W. Norton & Co.

This is a very careful but user friendly book. It is particularly useful for the study of simple regrssion. I would assign it for this course, but it does not have anything on multiple regression, regression diagnostics, or other advanced topics. It's easy and on reserve.

Berry, William D. 1993. *Understanding regression assumptions*. Sage Publications.

Berry's book is a short and in depth discussion of regression assumptions and regression diagnostics. I cannot stress how important this topic is, but Berry's book is occasionally confusing and at times "too quick." Start here for additional information on regression assumptions and diagnostics, then seek out other books, Like Kelejian and Oats, if Berry doesn't work -- on reserve.

Kelejian, Harry and Wallace Oats. 1989. *Introduction to Econometrics*. Harper and Row.

This book offers a very careful and in depth discussion of regression assumptions and regression diagnostics, particularly on simultaneity which we will not cover. The book may appear difficult at times but it is technically correct. The only problem is that the book appears "lost" from the University Park library and is out of print.

Ramanathan, Ramu. 1998. *Introductory Econometrics*. NY: Harcourt, Brace, and Co.

If you can't find Kelejian and Oats try Ramanathan. He covers many of the same topics and should be easier to purchase.