

Political Science 599
Statistical Methods in Political Research

Fall 2005

<http://www.umich.edu/~franzese>

Class: 3451 Mason, 10-12 TuTh; Section: G333 Mason, 1-2 Th

Instructor:	Office Hours:
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GSI:	Office Hours:
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This course aims to help you begin developing the skills necessary to understand and to use statistical tools in the empirical evaluation of theoretical propositions in social science. No previous experience in statistics is assumed.

The course has few rules, but they're all important. First, read the assigned readings before you come to class. Second, complete and submit everything on time. Third, ask questions when you don't understand things; chances are you're not alone. Do not let misunderstandings or incomplete understandings lie; they will not go away, they will accumulate. Fourth, don't miss class or section.

We'll calculate your course grade thus: 60%, problem sets; 30%, final exam; 10%, course involvement.

Books

The required books are available for purchase at Shaman Drum bookstore. (Some might also be available in electronic format via the NetLibrary.)

1. Wonnacott, Thomas H. and Ronald J. Wonnacott. 1990. *Introductory Statistics for Business and Economics, 4th Edition*.
2. Abelson, Robert. 1995. *Statistics as Principled Argument*.
3. Achen, Chris. 1982. *Interpreting and Using Regression*.
4. Kleppner, Daniel and Norman Ramsey. 1985. *Quick Calculus: A Self-Teaching Guide, 2nd Edition*.

I also ordered some copies of the four recommended books through Shaman Drum:

1. John Fox. 1997. *Applied Regression Analysis, Linear Models, and Related Methods* will be a good resource for the second half of the course.
2. John Fox. 2002. *An R and S-PLUS Companion to Applied Regression* will be useful to the extent that you use the R statistical language.
3. Lawrence C. Hamilton. 2004. *Statistics with Stata. (Updated for Version 8)* will be useful to the extent that you use the Stata statistical language.
4. Chiang, Alpha. 1984. *Fundamental Methods of Mathematical Economics* is a good resource for basic calculus and matrix algebra.

These and all of the rest of the required readings are available from the library's reserves, electronic reserves (<http://www.lib.umich.edu/reserves/ures/lists/1/fa2005/fa2005POLSCI599franzese.php>) and/or physical reserves (http://mirlyn.lib.umich.edu/F?func=find-b-0&local_base=miu30_pub, search for 'polsci 599'). Please let me know immediately if you discover that library reserves do not, in fact, have any of these readings.

No book is perfect for all students. I suggest you ask around, look at other syllabi online, and just browse the shelves at the library and used bookstores to find books that make things clear to you. Some other recommendations:

Carl Simon and Lawrence Blum's *Mathematics for Economists* is a nice math book to supplement Chiang and Kleppner. For a slightly higher level coverage of probability and mathematical statistics than Wonnacott and Wonnacott, consider John Rice's *Mathematical Statistics and Data Analysis, 2nd Edition*. For a slightly lower level coverage of probability and mathematical statistics than Wonnacott and Wonnacott, try *Statistics, 3rd Edition* by David Freedman, Robert Pisani and Roger Purves.

Computing Computing is essential in modern statistical data analysis — both for producing persuasive information from data and for conveying that information to the scholarly community. So we will pay some attention to computing, with special emphasis on understanding what is happening behind the scenes. You will be writing your own routines for a few simple and common procedures. You will submit all homework with an appendix that we could run (not cut and paste, but run) to replicate your analyses. Most applied researchers use two or three computing packages at any one time because no single language or environment for statistical computing can do it all. So, we will begin the process of exposing you to multiple packages in this course with the **Stata** and the **R** statistical languages. And, you will also learn to write about data analysis in a way that sounds and looks professional by using either a WYSIWYG system like Word, OpenOffice, or Wordperfect, or a typesetting system like \LaTeX , to produce documents that are suitable for correspondence, collaboration, and publication.

Schedule

9/6, Tuesday—Intro & Descriptive Statistics, Part 1

Wonnacott and Wonnacott, 3-24, Chapter 1

V.O. Key, *A Primer of Statistics for Political Scientists*, vii-ix.

Abelson, xi-2.

Harold F. Gosnell, "Statisticians and Political Scientists," *APSR* 27(3, June, 1933):392-403.

Wonnacott and Wonnacott, 25-68

Homework: Problem Set 0 Posted

9/8, Thursday—**CLASS CANCELED; FIRST SECTION MEETS**

9/13, Tuesday—Descriptive Statistics, Part 2

V.O. Key, 1-27

Abelson, 2-8

Homework: Problem Set 0 Due. Problem Set 1 Posted.

9/15, Thursday—Probability, Part 1

Wonnacott and Wonnacott, 69-109

Section: Kleppner and Ramsey, *Quick Calculus*, 50-76.

9/20, Tuesday—Probability, Part 2

9/22, Thursday—Probability Distributions, Part 1

Wonnacott and Wonnacott, 110-152

Section: Kleppner and Ramsey, 76-81; Wonnacott and Wonnacott, 741-742, appendix to section 4-4

Homework: Problem Set 1 Due. Problem Set 2 Posted.

9/27, Tuesday—Probability Distributions, Part 2

Abelson, 17-26

9/29, *Thursday—Two Random Variables*

Wonnacott and Wonnacott, 153-186

Kleppner and Ramsey, 91-108.

10/4, *Tuesday—Sampling, Part 1*

Wonnacott and Wonnacott, 189-230

Homework: Problem Set 2 Due. Post Problem Set 3.

10/6, *Thursday—Sampling, Part 2*

Abelson, 26-42

Section: Bradley and Meek, *Matrices and Society: Matrix Algebra and Its Applications in the Social Sciences*, 7-29.

10/11, *Tuesday—Point Estimation, Part 1*

Wonnacott and Wonnacott, 231-253

Abelson, 42-52

10/13, *Thursday—Point Estimation, Part 2—Maximum Likelihood*

Wonnacott and Wonnacott, 564-581

Section: Bradley and Meek, 30-41.

Homework: Problem Set 3 Due. Post Problem Set 4.

10/18, Tuesday—FALL STUDY BREAK

10/20, *Thursday—Confidence Intervals, Part 1*

Wonnacott and Wonnacott, 253-286

Abelson, 52-53

10/25, *Tuesday—Confidence Intervals, Part 2*

10/27, *Thursday—Hypothesis Testing, Part 1*

Wonnacott and Wonnacott, 287-323

Abelson, 8-16

Section: Hanushek and Jackson, *Statistical Methods for Social Scientists*. 349-359.

Homework: Problem Set 4 Due. Post Problem Set 5.

11/1, *Tuesday—Hypothesis Testing, Part 2*

Wonnacott and Wonnacott, 517-563

Abelson, 54-77

11/3, *Thursday—Analysis of Variance*

Wonnacott and Wonnacott, 324-354

11/8, *Tuesday—Regression, Part 1*

Wonnacott and Wonnacott, 357-370

11/10, *Thursday—Regression, Part 2*

Wonnacott and Wonnacott, 371-395

11/15, *Tuesday—Regression, Part 3*

Achen, *Interpreting and Using Regression*, entire.

11/17, *Thursday—Regression, Part 4*

Wonnacott and Wonnacott, 396-433

Homework: Problem Set 5 Due. Post Problem Set 6.

11/22, *Tuesday—Regression, Part 5*

Abelson, 78-103

V.O. Key, 105-129.

11/24, Thursday—HAPPY THANKSGIVING

11/29, *Tuesday Regression, Part 6*

Wonnacott and Wonnacott, 434-473

12/1, *Thursday —Regression, Part 7*

Abelson, 104-131

Section: Tufte. *Visual Explanations*. Ch. 2, “Visual and Statistical Thinking,” pp. 27-53.

12/6, *Tuesday—Regression, Part 8*

V.O. Key, 154-184

Wonnacott and Wonnacott, 474-514

Homework: Problem Set 6 Due.

12/8, *Thursday —Regression, Part 9*

Abelson, 132-155

Section: Review

12/13, *Tuesday—Regression, Part 10 & Conclusion*

Abelson, 156-198

Friday 12/16 8:00am – Post Final on the Web, Final due Monday 12/19 5:00pm