

**Political Science 599**  
**Statistical Methods in Political Research**

Fall 2004

<http://www.umich.edu/~jwbowers/ps599.html>

Class in 3451 MH 10-12 TTh, Section in 7603HH 1-2 Th

<b>Instructor:</b>	<b>Office Hours:</b>
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This course aims to help you develop the reasoning necessary to use statistical tools to answer social science questions. No previous experience in statistics is assumed.

There aren't many rules for the course, but they're all important. First, read the assigned readings before you come to class. Second, turn everything in on time. Third, ask questions when you don't understand things; chances are you're not alone. Fourth, don't miss class or section.

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

**Books**

There are four required books for the class at the Shaman Drum bookstore (some of these might also be available in electronic format via the NetLibrary):

Wonnacott, Thomas H. and Ronald J. Wonnacott. 1990. *Introductory Statistics for Business and Economics, 4th Edition*.

Abelson, Robert. 1995. *Statistics as Principled Argument*.

Achen, Chris. 1982. *Interpreting and Using Regression*.

Kleppner, Daniel and Norman Ramsey. 1985. *Quick Calculus: A Self-Teaching Guide, 2nd Edition*.

And three or four recommended books:

John Fox. 1997. *Applied Regression Analysis, Linear Models, and Related Methods* will be a good resource for the second half of the course.

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.

Lawrence C. Hamilton. 2004. *Statistics with Stata. (Updated for Version 8)* will be useful to the extent that you use the Stata statistical language.

Chiang, Alpha. 1984. *Fundamental Methods of Mathematical Economics* is a good resource for basic calculus and matrix algebra.

There's a small course pack filled with required readings. I've marked those readings with an asterisk below. Any required readings not marked with an asterisk are available online through Mirlyn.

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, I like 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, I like *Statistics, 3rd Edition* by David Freedman, Robert Pisani and Roger Purves.

**Computing** Computing is an essential part of modern statistical data analysis — both for producing persuasive information from data and for conveying that information to the scholarly community. So we will pay attention to computing, with special emphasis on understanding what is going on behind the scenes.

You will be writing your own routines for a few simple and common procedures. All homeworks will be turned in 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 **L<sup>A</sup>T<sub>E</sub>X**, to produce documents that are suitable for correspondence, collaboration, and publication.

## Schedule

9/7, *Tuesday—Introduction to the class*

Wonnacott and Wonnacott, 3-24, Chapter 1

**Homework:** Hand out Problem Set 0

9/9, *Thursday—Descriptive statistics, Part 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

9/14, *Tuesday—Descriptive statistics, Part 2*

\*V.O. Key, 1-27

Abelson, 2-8

**Homework:** Problem Set 0 Due. Hand out Problem Set 1.

9/16, *Thursday—Probability, Part 1*

Wonnacott and Wonnacott, 69-109

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

9/21, *Tuesday—Probability, Part 2*

**Homework:** Problem Set 1 Due. Hand out Problem Set 2.

9/23, *Thursday—Probability distributions, Part 1*

Wonnacott and Wonnacott, 110-152

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

9/28, *Tuesday—Probability distributions, Part 2*

Abelson, 17-26

**Homework:** Problem Set 2 Due.

9/30, *Thursday—Two random variables*

Wonnacott and Wonnacott, 153-186

Kleppner and Ramsey, 91-108.

10/5, *Tuesday—Sampling, Part 1*

Wonnacott and Wonnacott, 189-230

**Homework:** Hand out Problem Set 3.

10/7, *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.

10/12, *Tuesday—Point estimation, Part 1*

Wonnacott and Wonnacott, 231-253

Abelson, 42-52

**Homework:** Problem Set 3 Due. Hand out Problem Set 4.

10/14, *Thursday—Point estimation, Part 2—Maximum Likelihood*

Wonnacott and Wonnacott, 564-581

**Section:** \*Bradley and Meek, 30-41.

10/19, *Tuesday—Break, No Class*

10/21, *Thursday—Confidence intervals, Part 1*

Wonnacott and Wonnacott, 253-286

Abelson, 52-53

10/26, *Tuesday—Confidence intervals, Part 2*

**Homework:** Problem Set 4 Due.

10/28, *Thursday—Hypothesis testing, Part 1*

Wonnacott and Wonnacott, 287-323

Abelson, 8-16

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

11/2, *Tuesday—Hypothesis testing, Part 2*

Wonnacott and Wonnacott, 517-563

Abelson, 54-77

**Homework:** Hand out Problem Set 5.

11/4, *Thursday—Analysis of Variance*

Wonnacott and Wonnacott, 324-354

11/9, *Tuesday—Regression, Part 1*

Wonnacott and Wonnacott, 357-370

11/11, *Thursday—Regression, Part 2*

Wonnacott and Wonnacott, 371-395

11/16, *Tuesday—Regression, Part 3*

Achen, *Interpreting and Using Regression*, beginning to end

**Homework:** Problem Set 5 Due.

11/18, *Thursday—Regression, Part 4*

Wonnacott and Wonnacott, 396-433

11/23, *Tuesday—Regression, Part 5*

Abelson, 78-103

\*V.O. Key, 105-129.

11/25, *Thursday—No Class, No Section—Thanksgiving*

11/30, *Tuesday Regression, Part 6*

Wonnacott and Wonnacott, 434-473

**Homework:** Hand out Problem Set 6.

12/2, *Thursday —Regression, Part 7*

Abelson, 104-131

**Section:** \*Tuft. *The Visual Display of Data*. 27-53.

12/7, *Tuesday—Regression, Part 8*

\*V.O. Key, 154-184

Wonnacott and Wonnacott, 474-514

**Homework:** Problem Set 6 Due.

12/9, *Thursday —Regression, Part 9*

Abelson, 132-155

**Section:** Review

12/14, *Tuesday—Regression, Part 10 and Conclusion*

Abelson, 156-169, 170-198

12/15, *Wednesday—Post Final on the Web, Final due 5pm, Dec 22nd*