

# POLI 700: Maths for Budding Political Scientists

Fall 2005

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## Description

This mini-course covers introduces the basic mathematical techniques necessary to learn and conduct quantitative political analysis. No knowledge of math or statistics beyond basic high school algebra is assumed. Topics include mathematical notation, probability theory, estimation and properties of estimators, rudimentary calculus, and linear algebra.

## Texts

### Required:

Hagle, Timothy M. 1995. *Basic Math for Social Scientists: Concepts*. Thousand Oaks, CA: Sage Publications.

Additional readings as necessary.

### Recommended:

Chiang, Alpha. 2004. *Fundamental Methods of Mathematical Economics*, 4th Ed. New York: McGraw Hill.

*Getting Started with Stata for Windows, Release 9*. 2005. College Station, TX: Stata Press.  
This will get you familiar with using the **Stata** statistical software.

Nagler, Jonathan. 1996. "Coding Style and Good Computing Practices." *The Political Methodologist* 6(2):2-8. Contains words to live by.

Namboodiri, Krishnan. 1984. *Matrix Algebra: An Introduction*. Beverly Hills, CA: Sage Publications.

Simon, Carl P. and Lawrence Blume. 1994. *Mathematics for Economists*. New York: Norton.

Venables, W. N., D. M. Smith, et al. 2005. *An Introduction to R*. Available at  
<http://cran.r-project.org/doc/manuals/R-intro.pdf>.

# Grading

Grading will be based on a total of 100 points, divided among various homework exercises. I will also make a subjective (but not arbitrary) assessment of each student's level of participation, which will enter the evaluation process in an unspecified way. Homeworks might occasionally involve using a statistical software package; *Stata*<sup>TM</sup> is a good choice, though you're welcome to adopt whatever other software you care to use (*S-Plus*<sup>TM</sup> and *R* are also very good). Details for the homeworks will be announced in class. Grading will be on an S/U basis.

## Course Schedule

**August 22:** *Class Introduction.*

No readings assigned.

**August 29:** *Algebra/notation review(?).*

Readings:

- Hagle, pp. 1–17.

**September 5:** **No Class – Labor Day.**

**September 12:** *Limits.*

Readings:

- Hagle, pp. 22–31.

**September 19:** *Differential Calculus I.*

Readings:

- Hagle, pp. 31–47.

**September 26:** *Differential Calculus II.*

Readings:

- Hagle pp. 47–58.

**October 3:** *Integral Calculus I.*

Readings:

- Hagle pp. 58–65.

**October 10:** *Integral Calculus II.*

Readings:

- Hagle, pp. 65–71.

**October 17:** *Probability Theory and Distributions.*

Readings:

- Fox, John. 1997. *Applied Regression Analysis, Linear Models and Related Methods.* Thousand Oaks, CA: Sage Publications, pp. 540–559 (available on Blackboard).

**October 24:** *Estimation and Properties of Estimators.*

Readings:

- Fox, pp. 563–574 (available on Blackboard).

**October 31: No Class – Halloween**

**November 7:** *Linear Algebra I.*

Readings:

- Hagle, pp. 71–83.

**November 14:** *Linear Algebra II.*

Readings:

- Hagle, pp. 83–89.

**November 21:** *Linear Algebra III.*

Readings:

- Hagle, pp. 89–95.

**November 28:** *Wrap-Up.*