

# Political Science 7962: Seminar in Research Design and Quantitative Techniques

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Office Hours: M,F 9:00-11:40; T TH 9-10:15  
or by appointment.

Semester: Fall 2015  
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## Course Objectives

Political Science 7962 is the introductory course in quantitative methodology for graduate students in political science. The goal of the course is to enable students to evaluate, conduct, and report research using basic quantitative methods. The course introduces students to a set of introductory statistical concepts and techniques, and their practical application to research in political science. Topics covered include measurement, descriptive statistics, statistical inference, and tests of bivariate relationships. The course concludes with an overview of multivariate analysis.

This course is intended to train students to conduct their own research projects. Lectures and readings will

So for example  $\sum (x_i - \bar{x})(y_i - \bar{y})$  is the formula for the covariation between two variables and provides the logic which drives correlation and OLS regression analysis. This is a straightforward matter of logic and mathematics.

In some types of graphical presentations of data (pie charts, histograms) surface area is equivalent to relative frequency. Understanding this concept will make the discussions of probability distributions easier to grasp. And that in turn is the cornerstone of interpreting tests for statistical significance.

countless introductions to statistics in print and online, but this is one of the best. And sharing a common text keeps the class on the same page literally and figuratively (common notation etc.).

All students must buy one of the **Companion to Political Analysis** workbooks. The editions listed differ mainly by the statistical software package used to do the lab exercises. The use of one of the current editions listed is important so that everyone has the same problems and exercises for their lab and homework assignments. Poli Sci students are required to purchase the STATA edition, and a Poli Sci TA will hold lab sessions to help students using STATA to conduct their lab exercises. STATA is an increasingly popular solution for Political Scientists because it is often quicker to implement new statistical techniques than is SPSS. STATA is also used in later courses in the statistics sequence. Unfortunately, STATA is not available in all of the computer labs at LSU, though it is available in the first floor lab in Stubbs Hall or can be purchased through tigerware. (Theory students who will not take 7963 can safely opt for the SPSS workbook.)

SPSS is being rebranded by IBM as a solution for business applications with a decreased emphasis on the social sciences. R is freeware and popular in some circles in geography, mathematics, and the physical sciences. Mathematically, there should be no difference in the statistical output generated by each program. So it does not matter to me which program you use. Students from other disciplines are welcome to use the STATA workbook as well, and can take advantage of the lab sessions. However, disciplines and faculty differ in their choice of a statistical package, and if your discipli



## Part II Foundations of Inferential Statistics

Sept 16: Introduction to probability/ Comparisons

Gravetter Ch 6 (6.1,6.2)

Gorini chapters 1,2,3

Miller Ch 3 (33-40)

Kahneman Thinking Fast and Slow La of small numbers moodle

Sept 23: Binomial Distribution/ conditional probability

Gorini chapters 4,5,6,7

Gravetter Ch 6 (6.6)

And crosstab reading from Pollock (moodle)

Sept 30: The Normal Distribution and the Central Limit Theorem

Gorini chapters 8,9

Gravetter chs 5 , 6 (6.3,6.4), 7

Oct 7 Hypothesis Testing and Confidence Intervals

Ronald Fisher, The Design of Experiments London: Oliver and Boyd. Chr 2. (moodle)

Miller Ch 3

Gravetter Ch 6 (6.7) and 8

## Part III Bivariate techniques

Oct 14 : Bivariate statistics, nominal data

Gravetter Ch 15

Oct 21 : Sample means and the t distribution

Gravetter Ch 9 and 10

Oct 28 Analyzing Variance (ANOVA)

Gravetter Ch 12

Part IV. multivariate techniques

Nov 11 Multiple Regression, Dummies and Interactions

Lewis Beck Applied Regression: An Introduction Sage Publications (Section 3 on Multiple Regression)  
(moodle)

Brambor, Clark, and Golder Understanding Interaction Models Improving Empirical Analyses  
Political Analysis 14: 63-82 (moodle)

Suits Use of Dummy Variables in Regression Equations Journal of the American Statistical  
Association 52: 280-548-551 (moodle)

Nov 18 Categorical Dependent Variables : Logit

Pollock 2012 The Essentials of Political Analysis 4th ed CQ Press Ch. 9 (on moodle)

Nov 25 Nonlinear OLS, measurement error, and proportions

Gill Essential Mathematics sections 1.5 to 1.7 (on moodle)

Firebaugh and Gibbs Users Guide to Ratio Variables ASR -722 (moodle)

Dec 2 Wrap up and cautionary notes

Abelson Ch 10 Styles of Rhetoric moodle

Abelson Ch 11 On Suspecting Fishiness moodle