Professor Nicole Simonelli  
nicole.simonelli@nyu.edu  
Phone: (212) 992-8084  
Office: 19 West 4th Street, Room 215  
Office hours: Wednesdays 2:00-4:00 PM, and by appointment

Course Assistant: Ali Ahmed  
kta230@nyu.edu  
Office: 19 West 4th Street, Room 319  
Office hours: Fridays 10:00 AM- 12:00 PM

Course Description:  
This is a course in quantitative methods for political science. The purpose of this course is to enable students to apply regression analysis to the study of political phenomena. Following a brief review of statistics, we begin with basic hypothesis testing using Ordinary Least Squares regression. We will examine how to build more sophisticated models allowing us to test more complex hypotheses, and we will learn more sophisticated statistical tests enabling us to proceed with analysis even when the Gauss-Markov assumptions are violated. We will finish off with an introduction to logit and probit analysis. The primary focus will be on identifying statistical techniques appropriate to the question being examined and correctly applying those techniques.

Required Text:  

There are additional required readings that are available on JSTOR, E-Journals, etc.

Course Requirements:

Problem sets (35% of final grade): There will be approximately 7 to 10 problem sets, which will consist of a mix of analytical problems and computer-based problems based on the techniques covered in class. You may work in small groups on these problem sets if you wish, but you must write up and turn in your own problem set and run any code yourself.

Mid-term exam (30% of final grade) and Final exam (35% of final grade)
Class attendance is mandatory. In addition to the lecture, there is a weekly recitation in the 3rd floor data lab to introduce Stata, familiarize you with working data and review material from lecture.

**Schedule:**
The following schedule is tentative. If it takes more or less than the allotted time for a particular topic, we will adjust accordingly.

**Week 1 (January 22)**
**Introduction**
- econometrics, data

**Week 2 (January 29)**
**Random Variables, Sampling and Estimation**
- expected values of random variables
- variance, covariance, correlation
- sampling and estimation, unbiasedness, efficiency, consistency

- Dougherty, Review Chapter

**Week 3 (February 5)**
**The Basic Linear Model: 2 Variable Ordinary Least Squares Regression**
- parameters vs. estimates, deriving OLS estimates
- properties of least-squares estimators

- Dougherty, Chapter 1

**Week 4 (February 12)**
- assumptions underlying least squares, Gauss-Markov Theorem
- statistical properties of OLS estimators, variance of OLS estimators
- interpreting OLS estimators

- Dougherty, Chapter 2 (sections 2.1-2.5)

*** No Class (February 19) – Presidents’ Day ***
Week 5 (February 26)
- hypothesis testing, confidence intervals, one-sided and two-sided t-tests
- R-squared, F test goodness of fit

- Dougherty, sections 1.6, 2.6-2.7

Week 6 (March 5)
The General Linear Model: K Variable OLS Regression
- deriving OLS estimates, interpreting OLS estimates in multiple regression
- variance of OLS estimates
- R-squared, goodness of fit

- Dougherty, Chapter 3 (skip section 3.4 pp. 171-180)

*** No Class (March 12) – Spring Break***

Week 7 (March 19)
Multiple regression analysis continued

Review

Week 8 (March 26)
Midterm Exam

Week 9 (April 2)
More on Multiple Regression
- multicollinearity
- testing a linear restriction (F tests)

- Dougherty, sections 3.4 and 6.5

Week 10 (April 9)
Model Specification
- overspecification, omitted variable bias
- functional form, logarithmic model, log-linear model
- Dougherty, Chapters 4 and 6

Week 11 (April 16)

**Dummy Variables & Interaction Terms**
- categorical variables, dummy right-hand-side variables
- multiplicative interaction terms

- Dougherty, Chapter 5

Week 12 (April 23)

**Heteroscedasticity**
- consequences of heteroscedasticity
- detection of heteroscedasticity
- weighted least squares

- Dougherty, Chapter 7

Week 13 (April 30)

**Measurement Error & Instrumental Variables**
- consequences of measurement error
- instrumental variables
- instrumental variable estimation, two-stage least squares

- Dougherty, Chapter 8

Week 14 (May 7)

**Beyond OLS Regression: Limited Dependent Variables**
- logit analysis, probit analysis
- overview of other limited dependent variable applications

- Dougherty, Chapter 10


*** Final Exam – Monday, May 14 ***