

Data Analysis I – (Political Science 401)

Fall 2015

(This syllabus is current as of August 26, 2015, but is subject to change at any time.)

Instructor: Dr. Noah Kaplan

Class: Thursday, 3:30 – 6 pm in BSB 1115

Computer Lab: Tuesday, 2-3:15 pm in BSB 4133

Office: BSB 1122B, ext. 6-5156

E-mail: njkaplan@uic.edu

Office Hours: Tuesday, 9:30 – 11:30 am AND by appointment.

Course Webpage: Blackboard

TA: Semih Patan

Office: BSB 1145

Office Hours: Wednesdays, 2-4 pm

E-mail: spatan3@uic.edu

The purpose of this course is to introduce graduate students to the fundamentals of statistical analysis. We will examine the principles and basic methods of quantitative research in political science and public policy. The course assumes no mathematical background beyond high school algebra. We will use survey data from the 2012 American National Election Study (ANES) for course assignments and the final paper (information regarding ANES can be found at <http://www.electionstudies.org/>).

This course covers basic methods of descriptive statistics (counting, measuring, and displaying data to "tell their story") and inferential statistics (generalizations from samples to populations), through the use of multivariate linear regression and path analysis to investigate complicated causal relationships. Computer skills are emphasized, and we provide support in the use of Stata, a popular and powerful statistical software package. The course provides the foundation for Data Analysis for Political Science II (POLS501). In both courses, the overriding objective is to identify patterns in sample data that can be generalized to populations and that provide insight into the way that social phenomena work.

Class and Lab Sessions: The class meets once a week on Thursdays from 3:30-6 pm. Training in a statistical program (Stata) is provided once a week on Tuesdays from 2-3:15 pm in a computer lab (BSB 4133)

Readings and Assignments: Readings for each class are specified in the attached syllabus. The readings for a specified week must be completed **before** class meets that specific week. The textbook (Wonnacott and Wonnacott) and the other required books are at the University Bookstore, which is located in the Student Center. The books for this course are:

- Wonnacott and Wonnacott (WW), *Introductory Statistics* (5 ed.) (required)
- Tamas Rudas, *Probability Theory: A Primer* (required)
- Michael Lewis-Beck, *Applied Regression* (required)
- Christopher Achen, *Interpreting and Using Regression* (required)
- James Davis, *The Logic of Causal Order* (recommended)
- Sam Kachigan, *Multivariate Statistical Analysis: A Conceptual Introduction* (recommended)

The course uses computers for many of the weekly assignments. We will be using a statistical program called Stata.

Hardware and software: Stores will be happy to sell you "statistical calculators," but you do not need one. You do need a basic scientific calculator. Look for one with logarithms (a "log" and/or "ln" key) – any machine with this capability is bound to have everything else we need. Such calculators are available for under \$15.

We use Stata for Windows extensively in this class; this program is loaded on the computers in the department's graduate student computer lab (BSB 1129), as well as many other computers around the university. You may wish to buy Stata (you can purchase Stata/IC for \$198 or Stata/SE for \$395 perpetual license; for further information, see <http://www.stata.com/order/new/edu/gradplans/gp-direct.html>). You do **not** need to own the software; it just gives you the convenience of working at home and/or on a laptop rather than in the computer lab.

Stata Resources: rather than assign a textbook to learn Stata, we will hold weekly lab sessions. However, many "learning/using" Stata books are available. Furthermore, extensive resources are available online. Almost all of Stata's documentation is available online at: <http://www.stata.com/features/documentation/>. Furthermore, the following are a few of my favorite online sites which provide extensive resources for learning Stata:

- <http://www.ats.ucla.edu/stat/stata/webbooks/reg/default.htm> (a Stata "webook")
- <http://statcomp.ats.ucla.edu/stat/stata/>
- http://dss.princeton.edu/online_help/stats_packages/stata/
- <http://www.stata.com/links/resources-for-learning-stata/> provides links to additional resources. Many more can be found via any search engine.
- <http://www.lse.ac.uk/methodology/tutorials/Stata/home.aspx> (with videos!)

Teaching Assistant: One Teaching Assistant is associated with this course. The TA will hold weekly office hours and will be available by appointment on an as need basis. The TA also runs many of the computer lab training sessions.

Grading:

- Weekly Assignments (20%)
- Midterm (25%)
- Final Exam (25%)
- Paper (20%)
- Quiz (10%)

I prefer not to give makeup exams. Students who take make-ups have more time to prepare. Consequently, make-ups are inevitably unfair to students who take the exam on time. Please arrange your affairs so that you can be in class at the time of the examination. If you are prevented from taking an exam on time and I agree to give you a makeup, it will be different from the exam given at the scheduled time. Regularly scheduled exams are designed to be completed in about an hour-and-a-half. Makeup exams will be longer and will require a more thorough understanding of course material to compensate for the additional time the student has to prepare.

Attendance is taken at the beginning of each class period. If you miss more than two classes, your course grade will be reduced by one letter grade for each additional class you miss.

Cheating and Plagiarism: All students are expected to observe the University of Illinois' rules against cheating and plagiarism. See the section on "Academic Integrity/Academic Dishonesty" in the University of Illinois at Chicago's Student Academic Policy Guide (<http://www.uic.edu/depts/oa/SMAAPP/guide.pdf>) for a full statement regarding UIC's rules against cheating and plagiarism. The relevant regulations can be found at <http://www.uic.edu/depts/dos/docs/Student%20Disciplinary%20Policy.pdf>. Any violation may result in expulsion from the University. Cheating and plagiarism in this class will be punished to the maximum extent possible.

ADA Statement: The American with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please see <http://disabilityresources.uic.edu/> and contact the UIC's Disability Resource Center (for contact information and more, see <http://drc.uic.edu>). Then follow-up with me as appropriate.

Course Outline for Data Analysis I – Political Science 401

PART I: OVERVIEW OF PROBABILITY AND STATISTICS

Week 1 (August 27): Overview/Introduction

Week 2 (Sept. 3): Descriptive Statistics

Readings: WW – Chapter 2, Sections 1, 2, 3, 6 & 7;

Assignment # 1 due

Week 3 (Sept. 10): Probability Theory

Readings: WW – Chapter 3, Sections 1-6

Rudas – Pages 1-32

Assignment # 2 due

Week 4 (Sept. 17): Probability Distributions, Univariate and Bivariate

Readings: WW – Chapter 4, Sections 1-6; Chapter 5, Sections 1-3;

Rudas – Remainder

Assignment # 3 due

PART II: STATISTICAL INFERENCE

Week 5 (Sept. 24): Random Sampling and Populations

Readings: WW – Chapter 6, Sections 1-4; Chapter 7, Sections 1-3

Assignment # 4 due

NOTE: quiz on the 24th!

Week 6 (Oct. 1): Confidence Intervals

Readings: WW – Chapter 8, Sections 1-5

Assignment # 5 due

Week 7 (Oct. 8): Hypothesis Testing

Readings: WW – Chapter 9, Sections 1-4 & 6

Assignment # 6 due

Week 8 (Oct. 15): Measures of Association (e.g. correlation)

Readings: WW – Chapter 15, Sections 1, 2 & 4

I will discuss the paper proposal due week 10.

Assignment # 7 due

Week 9 (Oct. 22): MIDTERM - BRING CALCULATORS!

NOTE: The midterm is on the 22nd.

PART III: REGRESSION ANALYSIS**Week 10 (Oct. 29): Regression Analysis**

Readings: WW – Chapter 11, Sections 1-3

Additional readings: *Applied Regression*

Assignment # 8 due (Assignment 8 is paper proposal)

Week 11 (Nov. 5): Simple Regression Model

Readings: WW – Chapter 12, Sections 1-4

Additional readings: *Interpreting and Using Regression*

Assignment # 9 due

Week 12 (Nov. 12): Multiple Regression I

Readings: WW – Chapter 13, Sections 1-3

Recommended Readings: *The Logic of Causal Order*

Assignment # 10 due

Week 13 (Nov. 19): Multiple Regression II

Readings: WW – Chapter 13, Sections 4-6

Assignment # 11 due

Week 14 (Nov. 26): Thanksgiving

NOTE: Thanksgiving is on the 26th – No class!

Week 15 (Dec. 3): Regression Extensions & Review

Readings: WW – Chapter 14

Assignment # 12 due

NOTE: The final exam is on Friday the 11th and starts at 1 pm in BSB 115.

(https://registrar.uic.edu/current_students/calendars/final_exam_schedule.html#fall-schedule).

THE FINAL PAPER IS DUE BY 1 pm, Friday, Dec. 11th (i.e., the paper is due when you walk in for the final exam).