**PUBLIC POLICY ANALYSIS 460**

**Quantitative Methods for Public Policy**

**Spring 2012**

**Instructors**

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**TA**

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**Lectures**

**M, W** 12:00-12:50, New West 219

**Recitations [NOTE: you must be enrolled in and must attend a recitation section.]**

Section 601: F 11-11:50 Alumni Building 205

Section 602: F 2-2:50 Peabody 222

**Course objectives**

The objective of this course is to provide students with the knowledge and skills necessary to categorize, describe, analyze, and interpret data that can inform public policy decision-making and contribute to our understanding of the impact of public policies. This course will emphasize the application of statistical concepts and methodologies to the analysis of social issues in public policy, including the limitations of quantitative methods in generating answers to social policy questions. The course covers data definition and measurement, description of univariate and bivariate distributions, statistical testing, correlation, simple linear regression, and multiple linear regression.

**Course overview**

*Unit 1* covers data definitions, measurement and descriptive data analyses. Most of this material will be a review of what you have learned in pre-requisite courses, but we will also discuss critical thinking about the choices we make in identifying relevant data or variables for analysis, and how the types data affect the statistical tools we choose for analyses.

*Unit 2* goes beyond the description of relationships between variables to making inferences about observed relationships that might apply to a larger group for which we want to make generalizations. This is known as inferential statistics: the application of methods of probability to the analysis and interpretation of empirical data. The main statistical techniques for making judgments about the generalizability of relationships are tests of statistical significance. We will apply these concepts using statistical techniques such as *t* test of means and *z* test of proportions and the chi-square test for contingency tables.

*Units 3 and 4* introduces the more complex methods of statistical inference and data analysis— correlation and regression analysis. The use of these methods is motivated by the fact that the complexities of both human and institutional activities in the real world demand a more sophisticated strategy for understanding and producing useful information about public policy decision-making and the impact of public policies. Correlation and regression analysis and the application of these methods to public policy programs will build on the concepts learned in Sections 1 and 2, and will be applied to public policy issues. The course emphasizes ordinary linear regression for continuous outcomes, but also introduces logistic regression for binary outcomes.

**Applied data analysis**

The course emphasizes hands-on application of the techniques discussed in class using statistical software and real data. Problem sets and memo assignments will involve data used by scholars and policy analysts to inform for public policy decision-making. We will use the software package STATA and a variety of datasets to examine the determinants of child well-being and young adult outcomes and the role of public policy in improving such outcomes.

You may purchase a six-month license of STATA IC 12 ($65) and load it on your laptop. See <http://www.stata.com/order/new/edu/gradplans/gp-campus.html> for more details about this particular version of STATA (note: that we will be using datasets that are too large for “Small STATA.”) Those who do not wish to purchase a one-year license of Stata may use a web-based cloud-computing resource, the Virtual Computing Lab (<https://vcl.unc.edu/index.php?mode=selectauth>) to access STATA. More information on this option will be provided during the second week of class. You may also use Stata on any library computer or in any campus computer lab including the in the basement of Manning Hall.

**Norms of academic behavior**

The purpose of lectures and recitations is to enhance your understanding of material covered in the textbooks. To state the obvious, to get the most out of these experiences you must come to class prepared and on time, get enough sleep the night before, and avoid any distractions that might hinder your learning. Failing to read outside of class, coming to class late, falling asleep and/or text messaging during class wastes your time, my time, and insults your fellow students. The use of laptop computers will be required in all Friday recitations. The use of a basic calculator will be required during exams. **During lectures, however, please refrain from using electronic devices (phones, MP3 players, and laptops).** Anyone caught using an electronic device for an inappropriate use during lecture will have the device confiscated for the class period or asked to leave. Anyone caught twice for such an infraction will face further disciplinary action including low marks for class participation.

**Sakai**

All course materials, including data sets, assignments and examples will be placed on the course’s sakai site. Important notices about schedule changes and other operational details will also be posted on sakai. You are responsible for all information on sakai, so please check it consistently throughout the semester.

**Required Texts** (available at Student Stores, except as noted)

* Agresti & Finlay (denoted AF, below), *Statistical Methods for the Social Sciences*, 4rd edition, 2009.
* Paul D. Allison, *Multiple Regression: A Primer*, 1999.
* Lauen, *Stata Handbook* (available on sakai)

**Optional Text** (available at Student Stores)

* Acock, Alan C., *A Gentle Introduction to Stata*, 2006.

For details on how to appropriately reference your sources, please consult the most recent edition of one of the following texts: Turabian’s *A Manual for Writers*, *The Chicago Manual of Style,* Strunk & White’s *The Elements of Style*, or the *Publication Manual of the American Psychological Association* (for APA style).

**Student evaluation**

Your grade will be based on your performance on the following tasks, with point values as noted:

Five textbook exercise homework assignments (10, worth 2 points each)

Four problem sets (20, worth 5 each)

Unit one test (10)

Unit two test (10)

Bivariate hypothesis testing memo (10)

Regression analysis memo (20)

Unit three & four test (Final Exam) (20)

**Grading**

The following definitions of grades were adopted by the University Faculty and are the official basis for assigning and interpreting undergraduate grades. Note that they are based on performance, not on effort or on individual improvement:

**A** - Mastery of course content at the highest level of attainment that can reasonably be expected of students at a given stage of development. The A grade states clearly that the student has shown such outstanding promise in the aspect of the discipline under study that he/she may be strongly encouraged to continue.

**B** - Strong performance demonstrating a high level of attainment for a student at a given stage of development. The B grade states that the student has shown solid promise in the aspect of the discipline under study.

**C** - A totally acceptable performance demonstrating an adequate level of attainment for a student at a given stage of development. The C grade states that, while not yet showing any unusual promise, the student may continue to study in the discipline with reasonable hope of intellectual development.

**D** - A marginal performance in the required exercises demonstrating a minimal passing level of attainment for a student at a given stage of development. The D grade states that the student has given no evidence of prospective growth in the discipline; an accumulation of D grades should be taken to mean that the student would be well advised not to continue in the academic field.

**F** - For whatever reasons, an unacceptable performance. The F grade indicates that the student's performance in the required exercises has revealed almost no understanding of the course content. A grade of F should warrant an adviser's questioning whether the student may suitably register for further study in the discipline before remedial work is undertaken.

**Exams**

Exams for this course are designed to test the knowledge of students throughout the skill distribution, including those with prior experience with statistics. Therefore, the exams will be difficult. They will be curved to adjust for the relative differences in difficulty across tests within the same semester, across semesters, and across sections. Consistent with the standards noted above, they will be graded on the following scale: A – exemplary, B – proficient, C – basic, D – below basic, F – no test turned in or incomplete in most respects.

The tests will be in-class and students will be allowed to use both sides of ONE 3” x 5” index card for recording formulas and related notes about using them. The instructor will collect this card after the first test and hand them back along with the test. The same procedure will be used for the second and third tests. Students will be allowed to use one and only one card for the entire semester. Therefore, students should budget space on the card wisely (1/3 for unit 1, 1/3 for unit 2, 1/3 for units 3 and 4, for example).

**Textbook exercises**

Exercises will not be graded for correctness, only whether they have been turned in and appear to be complete. You will be responsible to checking your own work against a homework key. Exercises will be awarded points on a 0-2 scale, with 0 being not turned in, 1 being turned in and incomplete, and 2 being turned in and complete. Late assignments will not be accepted as the key will be posted immediately after the due date to permit self-grading.

**Problem sets**

Problem sets will be graded on a 0 to 5 scale. Late assignments will be penalized at the rate of ½ a point per 24-hour delay.

**Memos**

The memos will allow you to formulate and test a policy-relevant research hypothesis of your choosing using one of the datasets used in the course. These will require data manipulations with a statistical analysis software package (Stata), using your critical thinking skills and knowledge about the uses and limits of public policy to formulate an appropriate research hypothesis, and the ability to properly formulate and interpret statistical data analysis. The first memo will require a bivariate hypothesis test. The second memo will require both a bivariate hypothesis test and a multiple regression analysis. Consistent with the standards above, memos will be graded on the following scale: A – exemplary, B – proficient, C – basic, D – below basic, F – no memo turned in or assignment incomplete in most respects. Late memos will be penalized at a rate of half a letter grade per 24-hour period. For example, an “A” memo will be marked down to an A- if it is turned in after the due date and time, but before 24 hours after the due date and time.

**Note: to perform well on the memos, you must attend lab and do the lab exercises.** Good memos require you do demonstrate a number rare skills – all in the same assignment: 1) statistical proficiency, 2) computer programming skill, 3) creativity, and 4) clear thinking, 5) clear writing. Lab time will help you develop many of these skills. We have very little patience for students who skip lab and then ask questions on topics we have addressed during lab time.

**Assignment Submission Guidelines and Extensions**All assignments will submitted to sakai for a “date and time stamp.” Hard copies of problem sets and memos (only) will also be submitted at the beginning of the class immediately following the e-submission deadline. Failure to submit a hardcopy will limit the amount of feedback we can provide on the assignment.

The late assignment policy will apply to the date and time on which an assignment was received by sakai. If technical problems prevent you from submitting your first assignment (Exercise 1) to sakai, you will receive an automatic grace period of 24-hours provided you also submit documentation that your technical problem was genuine (e.g., a tech support “help ticket.”). No such grace periods will apply to assignments subsequent to the first. You are expected to verify that your assignments have been properly submitted. Remember, points will be subtracted from late memos and problem sets (only) at a rate of five percentage points per day. Late textbook exercises will not be accepted.

If personal or extenuating circumstances prevent you from turning in an assignment on time, please contact the instructors as soon as possible *in advance* of the deadline. Extensions will be handled on a case-by-case basis, but job interviews, work commitments, extracurricular activities, weddings, travel plans, and academic workload issues will not be considered valid reasons for extensions. Medical emergencies and other unexpected events, with documented proof, may be grounds for an extension.

**Exam Policy**

**There will be no make up exams and no one will be allowed to take an exam before the appointed date and time**. Students with valid excuses (typically medical emergency or similar unexpected event) will have their exam grades reweighted, with other exams taking on more weight. Valid excuses will be handled on a case-by-case basis, but job interviews, work commitments, extracurricular activities, weddings, travel plans, and academic workload issues (except for the case of three final exams during a 24 hour period) will not be considered valid excuses.

**Class Participation**

5 percent of your grade will be based on class participation and instructor’s discretion. This includes your attendance in class and labs, willingness to ask and answer questions, and constructive participation in discussion, and adherence to the norms of academic behavior, noted above. Discussion of class material with the instructors and TAs during office hours will also contribute positively to this aspect of your mark.

#### **Grade Appeal Policy**

We take the evaluation and grading of your work very seriously because we know that most of you take your work very seriously. If you think you deserve a higher grade on a paper or exam, you may write a letter and explain why you would like to appeal the grade. After we receive your letter, we will re-read your paper/exam. Depending on our re-reading, your grade may stay the same, be raised, or be lowered. This system is designed to minimize frivolous grade appeals and to ensure that you have carefully examined and reflected on the quality of your work before deciding to initiate a grade appeal.

**Honor Code**

The honor code is on effect in this class and all others at the University. We treat Honor Code violations seriously and urge all students to become familiar with its terms set out at http://instrument.unc.edu. If you have questions, it is your responsibility to ask us about the Code’s application. It is assumed that all exams, written work and assignments submitted by you are in compliance with the requirements of the Honor Code.

**Academic Integrity/Plagiarism**

In order to ensure effective functioning of the Honor System at Carolina, all students are expected to:

a. Conduct all academic work within the letter and spirit of the Honor Code, which prohibits the giving or receiving of unauthorized aid in all academic processes. If unsure about the limits of group work versus individual work on papers and projects, ask the instructor. Do not guess.

b. Consult with faculty and other sources to clarify the meaning of plagiarism; to learn the recognized techniques of proper attribution of sources used in written work; and to identify allowable resource materials or aids to be used during completion of any graded work.

c. Sign a pledge on all graded academic work certifying that no unauthorized assistance has been received or given in the completion of the work.

d. Treat all members of the University community with respect and fairness.

e. Report any instance in which reasonable grounds exist to believe that a student has given or received unauthorized aid in graded work or in other respects violated the Honor Code. Reports should be made to the office of the Student Attorney General.

At UNC, plagiarism is defined as "the deliberate or reckless representation of another's words, thoughts, or ideas as one's own without attribution in connection with submission of academic work, whether graded or otherwise." ([*Instrument of Student Judicial Governance*](http://instrument.unc.edu/)*,* Section II.B.1.). Because it is considered a form of cheating, the Office of the Dean of Students can punish students who plagiarize with course failure and suspension. Full information can be found on the [UNC Honor System](http://honor.unc.edu/) page UNC Writing Center Handout: <http://writingcenter.unc.edu/resources/handouts-demos/citation/plagiarism>)

**Course Schedule and Due Dates**

Note: “AF” refers to Agresti & Finlay’s textbook, “Ex” refers to textbook exercise assignment, and “PS” refers to problem set.

**January**

*Unit One – Review*

M 9 – Course introduction, descriptive and inferential statistics, AF 1

W 11 – Social science reasoning, theory, hypotheses, dependent and independent variables, AF 1

F 13 – Measurement, AF 2

M 16 – Holiday – no class

W 18 – Sampling, validity, reliability, AF 2

F 20 – **LAB** – Stata on the VCL, measurement scales of variables **Ex 1 due 9:00AM**

M 23 – Descriptive statistics, AF 3

W 25 – Descriptive statistics, AF 3

F 27 – **LAB** – Recoding variables in Stata

M 30 – **UNIT ONE TEST**

*Unit Two – Inferential Statistics*

**February**

W 1 – Probability, AF 4

F 3 – **LAB** – Tables and graphs of different types of variables

M 6 – Statistical inference, point and interval estimation, AF 5 **PS 1 due 9:00AM**

W 8 – One sample significance tests, AF 6

F 10 – **LAB** - One sample significance tests, AF 6 **Ex 2 due 9:00AM**

M 13 – Comparison of two groups, AF 7

W 15 – Comparison of two groups, AF 7

F 17 – **LAB** - Bivariate tests in Stata **Ex 3 due 9:00AM**

M 20 – Contingency tables, AF 8

W 22 – Contingency tables, AF 8

F 24 – **LAB** – Contingency tables in Stata

M 27 – Midterm review **PS 2 due 9:00AM**

W 29 – **UNIT TWO TEST**

**March**

F 2 – **LAB** – Memo help

Spring Break

*Unit Three – Bivariate Linear and Logistic Regression*

M 12 – Linear regression and correlation, AF 9

W 14 – Linear regression, parameter estimation, AF 9, Allison 5

F 16 – **LAB** – Linear regression in Stata **Bivariate Memo Due 9:00AM**

M 19 – Linear regression, model fit, AF 9

W 21 – Linear regression, model assumptions and violations, AF 9, Allison 6

F 23 – **LAB** – Linear regression in Stata **Ex 4 due 9:00AM**

M 26 – Linear probability model, AF 15.1

*Unit Four – Multiple Regression*

W 28 – Correlation, causation, and confounding, AF 10

F 30 – **LAB** – Controlling for a variable in Stata **PS 3 due 9:00AM**

**April**

M 2 – Statistical control and types of multivariate relationships, AF 10

W 4 – Multiple linear regression, AF 11 (skip 11.7), Allison 1

F 6 – holiday – no class

M 9 – Multiple linear regression, AF 11 (skip 11.7), Allison 2

W 11 – Regression with categorical predictors, interactions, and non-linearities, AF 13.1-13.4, AF 14.5, Allison 8 **Ex 5 due 9:00AM**

F 13 – **LAB** – Example of regressions for memo

M 16 – Applied regression, direction of bias, Allison 3

W 18 – Examples of bias in linear and logistic regression **PS 4 due 9:00AM**

F 20 – **LAB** – Memo help session

M 23 – TBA **Multiple regression memo due 11:59PM**

W 25 – Review

**Final exam – NOON Saturday April 28**

**Covers Material from Units Three and Four, but builds on material from entire course**