George Mason University  
Schar School of Policy and Government  
POGO 511: Statistical Methods for Policy Analysis

Instructor: Anh Pham.  
Office hours: TBD

Class website: Blackboard

Course Description:

Many times, public policy work requires statistical analysis. POGO 511 introduces a range of quantitative tools that are used to inform public policy issues. The course is divided into four broad units: Descriptive Statistics, Probability, Statistical Inference, and Regression Analysis. The course emphasizes on the ways in which they are applied to practical policy questions. The course also introduces you to STATA, commonly used software in social sciences, as a tool to analyze quantitative data.

Learning Outcomes
- Conduct basic statistical analysis (hypothesis testing, regression, etc.) to analyze various policy issues.
- Interpret the STATA outputs of various basic statistical analysis
- Acquire programming skills necessary to conduct basic statistical analysis in STATA. In this class, I will only introduce basic skills of STATA to facilitate the understanding of statistical analysis. The purpose of this class is not to be proficient at STATA
- Critically consume policy studies/papers/reports in which statistical analysis is used.

Required Course Texts and Resources
   - It is fine with me if you use an earlier edition. However, you should make sure that you can find the appropriate reading.

2. Getting Started with Stata for Windows (or Mac) - Release 14  
   Publisher: Stata Press  
   You can download this book for free from the following link:  
   http://www.stata.com/bookstore/getting-started-windows/

3. UCLA statistics website: http://www.ats.ucla.edu/stat/stata/

Course software: STATA 13 or newer IC (or SE). You will need access to this software in and outside of class.

Ways to get access to STATA:
1. You are recommended to purchase a 6-month (or longer) license of Stata13 or newer version, either IC or SE. If you are planning to deal with a large dataset, you may want to invest in SE rather than IC. For the product (IC vs. SE) comparison, visit: http://www.stata.com/products/which-stata-is-right-for-me/
   For the detailed pricing information, visit: http://www.stata.com/order/new/edu/gradplans/course-pricing/
   Please put in your student ID in the “GradPlan ID” field.
2. STATA are installed in all machines in the computer labs on the Arlington campus.
3. You can get free access to STATA using the Virtual Computing Lab at https://itservices.gmu.edu/services/view-service.cfm?customel_dataPageID_4609=5385

Grades
10% - Pre-class Exercises
10% - Problem Sets
30% - Midterm
30% - Final Exam
20% - Data Exercise

Pre-class Exercises:
- Pre-class exercises have questions about the new reading material.
- They help you realize what you understand or do not understand from the reading.
- They also help me see what the difficult concepts are.
- You may work in small groups. However, you must turn in your own individual answers.
- Pre-class exercises are graded based on effort.
- No late assignments will be accepted. I will drop one lowest score.

Problem Sets
- The weekly problem sets are to ensure that you have understood the important concepts from the lecture.
- You may work in small groups. However, you must write up your answers individually, in your own words. Put the names of your study group member(s) on your problem sets. Duplicate answers will receive no credit.
- Problem sets are graded based on effort.
- No late assignments will be accepted. I will drop one lowest score.

Exams
- In class, closed notes, closed book.
- One question on each exam (midterm and final) will be taken directly from the problem sets or the pre-class exercises.
- There will be no STATA coding questions on the exam.
- All students are expected to be present. Please check the exam dates and arrange your schedule accordingly.

Data Exercise:
The Data Exercise helps you get familiar with STATA and gain some understanding of how to do a quantitative data analysis.

It also enhances your critical thinking as a consumer of policy analyses.

I will suggest a topic and a dataset. You can either work on the topic and the dataset I suggest or pick your own topic and dataset.

Class participation and engagement: I strongly believe that student participation can substantially enrich the learning experience for both the students and the instructor. In this spirit, class participation is encouraged. Effective class participation requires that you read any assigned readings before coming to class. You are encouraged to ask questions, to share relevant insights you have from previous experiences, and to treat your classmates’ participation with courtesy. If you are on the margin between receiving two final grades, I will use the quality of your class participation to help determine which of the two grades you receive.

How can you succeed in this course?

- For nearly all students, the answer is simple: “By really trying and putting in effort.” A weekly average of at least 6-9 hours of preparation outside class are required for most students. For some students, 12-15 hours per week may be necessary. This time includes reading and re-reading the textbook and lecture slides and repeatedly solving problems to test understanding.
- I highly recommend you to form a study group that meets regularly (ideally weekly) from the beginning of the semester.

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<thead>
<tr>
<th>Date</th>
<th>Topic, Reading, and Assignments</th>
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<tbody>
<tr>
<td>Week 1:</td>
<td><strong>Overview, Graph and Number, Probability and the Normal Curve</strong></td>
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<tr>
<td>Jan 21</td>
<td>Required Reading: Healey: Basic mathematical review, ch. 1.1, 1.4, 1.5, 1.6 2.1,2.2 ,2.3, 2.4a, 2.6b, 2.6c, ch. 5</td>
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<td>Week 2:</td>
<td><strong>Introduction to STATA, Sampling Distribution and Confidence Interval</strong></td>
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| Jan 28     | Required Reading: -Healey ch 6 introduction, ch. 6.1, 6.3, 6.4, 6.5  
|            | -“Open STATA& Descriptive Statistics” instruction on Blackboard under  
<p>|            | “Course Content STATA Instruction”                                    |
|            | Assignments Due: Problem Set 1, Pre-class 2                         |
| Week 3:    | <strong>Confidence Interval</strong>                                             |
| Feb 4      | Required Reading: Healey Estimation: ch.7                           |</p>
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<tr>
<th>Week 4: Feb 11</th>
<th><strong>Hypothesis Testing of one sample</strong></th>
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<tr>
<td><strong>Assignments Due:</strong></td>
<td>Data 1, Data 2, Problem Set 2, Pre-class 3</td>
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<tr>
<td><strong>Required Reading:</strong></td>
<td>Healey from ch8.1 to ch8.9</td>
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<td><strong>Assignments Due:</strong></td>
<td>Problem Set 3, Pre-class 4</td>
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<th>Week 5: Feb 18</th>
<th><strong>Midterm Review</strong></th>
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<td><strong>Assignments Due:</strong></td>
<td>Data 3, Optional Data 2 Redo</td>
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<th>Week 6: Feb 25</th>
<th><strong>Midterm</strong></th>
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<td><strong>Location:</strong></td>
<td>TBA</td>
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<th>Week 7: March 3</th>
<th><strong>Simple Regression</strong></th>
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<tr>
<td><strong>Required Reading:</strong></td>
<td>Healey ch. 13.1, 13.2, 13-3b, 13.4, 13.6, 13.8, 13.10</td>
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<tr>
<td>- UCLA statistics: Interpretation of simple regression coefficients in STATA. This reading is available on Blackboard → Course Content → Lecture → Week 9 → STATA_SimpleRegressionOutput_UCLA.</td>
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<tr>
<td>- STATA code for simple regression: “Blackboard → Course Content → STATA Instruction → STATA Lab_Simple Regression”</td>
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<td><strong>Assignments Due:</strong></td>
<td>Pre-class 7</td>
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| Week 8: March 10 | **Spring break, no class** |

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<th>Week 9: March 17</th>
<th><strong>Multiple Regression</strong></th>
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<tr>
<td><strong>Required Reading:</strong></td>
<td>Healey ch.15.1, 15.2, 15.4, 15.5, 15.6. Note:</td>
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<tr>
<td>+ In section 15.1b: you only need to understand the interpretation, don’t need to know the computation</td>
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<tr>
<td>+ In section 15.2a: you only need to understand the interpretation, don’t need to know the computation</td>
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<tr>
<td>+ In section 15.4a: you only need to understand the interpretation, don’t need to know the computation</td>
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<tr>
<td>- UCLA statistics: Interpretation of multiple regression coefficients in STATA.</td>
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| Week 10: March 24 | **Simple and Multiple Regression Assumptions**  
Required Reading:  
- Healey’s: The interpretation of R-squared in 15.4.  
- A handout on Blackboard → Course Content → Lecture → Week 11  
→ Reading_OLS Assumptions”  
Assignments Due:  
Problem Set 9, Pre-class 10 |
|-------------------|---------------------------------------------------------------|
| Week 11: March 31 | **Multiple Regression Assumptions**  
Required Reading:  
- Review AS3 through 6 the handout reading on Blackboard: “Course Content → Lecture → Week 11 → Reading_OLS Assumptions”  
Assignments:  
Problem Set 9, Pre-class 10 |
| Week 12: April 7  | **Comparing two means, Linking Sample t-test with Regression.**  
Required Reading: For this lecture, please do the reading in the order listed below:  
- Healey ch.9.1 intro, 9.1, 9.2, 9.5, and 9.6. Note:  
  + In section 9.2 and step 4 of the hypothesis testing, you don’t need to know how to calculate the test statistics by hand. You can use STATA to calculate the test statistics. The STATA syntax is introduced in the UCLA statistics for “Standardized Coefficient&Two-sample t-test” reading below.  
  - UCLA statistics for “Two sample t-test”. This reading is available on Blackboard → Course Content → Lecture → Week 13 → Standardized Coefficient&Two-sample t-test.”  
Optional Reading: Healey Chapter 15.3. This section introduces standardized regression coefficients to compare how well each of the independent variable predicts the dependent variable.  
Assignments Due:  
Problem Set 11, Pre-class 12 |
| Week 13: April 14 | **ANOVA (F-test) and Chi square (chi2)**  
Assignments Due:  
Problem Set 11, Pre-class 12 |
Required Reading:
- Healey’s 10.1, 10.4
+ In section 10.4:
  Step 3 of hypothesis testing: only need to know the significance level alpha
  Step 4: you don’t need to calculate the test statistics in step 4, I will provide
  STATA results.
  Step 5: compare the p-value with significance level alpha.

- STATA syntax for ANOVA and Chi2. This reading is available on Blackboard
  Course Content ➔ Lecture ➔ Week 14 ➔ anova_chi2.”

Optional Reading: Healey’s ch. 11 for Chi square

Assignments:
Data 6, Problem Set 12, Pre-class13, Optional Data 5 Redo

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<tr>
<th>Week 14: April 21</th>
<th>Make-up class for a snow day if any. If no snow days, Final Exam Review</th>
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<tr>
<td>Week 15: April 28</td>
<td>Final Exam Review if week 14 is a make-up class for a snow day. If no snow days, extra practice day.</td>
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<tr>
<td>Week 16: May 5</td>
<td>Reading day, no class</td>
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<tr>
<td>Week 17: May 12</td>
<td>Final Exam, Location: TBA</td>
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Assignments:
Optional Data 6 Redo, Data Exercise Peer Evaluation.

**George Mason Academic Integrity**: It is expected that students adhere to the George Mason University Honor Code as it relates to integrity regarding coursework and grades. The Honor Code reads as follows: “
To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the University Community have set forth this: Student members of the George Mason University community pledge not to cheat, plagiarize, steal and/or lie in matters related to academic work.” More information about the Honor Code, including definitions of cheating, lying, and plagiarism, can be found at the Office of Academic Integrity website at http://oai.gmu.edu

**Violation of Academic Integrity**:

*First offense*: Report to the Honor Board and recommend a 0 on the assignment

*Second offense*: Report to the Honor Board, recommend a F in the course, and suspension from the institution
Third offense: Usually result in expulsion.
More information about typical sanctions can be found at the Office of Academic Integrity website http://oai.gmu.edu

Schar Policy on Plagiarism
The profession of scholarship and the intellectual life of a university, as well as the field of public policy inquiry, depend fundamentally on a foundation of trust. Thus, any act of plagiarism strikes at the heart of the meaning of the University and the purpose of the School of Policy, Government, and International Affairs. It constitutes a serious breach of professional ethics and it is unacceptable. Plagiarism is the use of another’s words or ideas presented as one’s own. It includes, among other things, the use of specific words, ideas, or frameworks that are the product of another’s work. Honesty and thoroughness in citing sources is essential to professional accountability and personal responsibility. Appropriate citation is necessary so that arguments, evidence, and claims can be critically examined. Plagiarism is wrong because of the injustice it does to the person whose ideas are stolen. But it is also wrong because it constitutes lying to one’s professional colleagues. From a prudential perspective, it is shortsighted and self-defeating, and it can ruin a professional career. The faculty of the School of Policy, Government, and International Affairs takes plagiarism seriously and has adopted a zero-tolerance policy. Cases of suspected plagiarism are referred to the Office of Academic Integrity and may lead to termination from the program. This termination will be noted on the student’s transcript. For foreign students who are on a university-sponsored visa (e.g., F-1, J-1 or J-2), termination also results in the revocation of visa.

To help enforce the SPGIA policy on plagiarism, all written work submitted in partial fulfillment of course or degree requirements must be available in electronic form so that it can be compared with electronic databases, as well as submitted to commercial services to which the School subscribes. Faculty may at any time submit a student’s work without prior permission from the student. Individual instructors may require that written work be submitted in electronic as well as printed form. The SPGIA policy on plagiarism is supplementary to the George Mason University Honor Code; it is not intended to replace it or substitute for it. (http://oai.gmu.edu/the-mason-honor-code-2/)

Academic Accommodation for a Disability
If you are a student with a disability and you need academic accommodations, please see me and contact the Disability Resource Center (DRC) at 703-993-2474. All academic accommodations must be arranged through the DRC.