Statistical Analysis for Public Policy
PBPL10 • Spring 2013
2A: Tuesday and Thursday 2:00 - 3:50 p.m.
X: Wednesday 4:15 - 5:05 p.m.
Rockefeller Center Room 209

Professor Matt Cravens
Office Hours: Tuesday 4-5 p.m.,
Friday 12-2 p.m., and by appt.
Office: Rockefeller Center 202
Email: Matthew.Cravens@dartmouth.edu
Phone: (603) 646-1291

Course Overview
This course introduces students to the concepts and methods necessary to conduct and interpret statistical public policy research. It emphasizes applications to “real world” policy issues and the development of practical analysis skills, from data exploration to presentation of results. Although the course covers a wide range of statistical methods in social science research, it will not focus on mathematical derivations of estimators or obscure statistical theory. It is intended to help students develop the toolkit necessary to conduct and interpret practical research. Students will use the statistical software program Stata and analyze data on contemporary policy issues throughout the term. The research project will be an original paper that may be developed into a scholarly conference presentation or journal submission.

The first section of the course considers how to measure and describe social science concepts, the logic of causal inference, and research design. We will cover experimental, quasi-experimental, and observational designs. The second section of the course introduces students to inferential statistics, including significance tests and multivariate regression.

No prior statistical or advanced mathematical training is assumed, but solid arithmetic skills are helpful. Because of the large overlap in material covered, no student may receive credit for more than one of the courses Public Policy 10, Economics 10, Government 10, Mathematics 10, Psychology 10, Mathematics and Social Sciences 15, or Sociology 10 except by special petition. The course fulfills the quantitative or deductive science (QDS) course requirement.

Required Texts
Two books are required for the course and available at the bookstore:


Journal articles and book chapters are available through the Blackboard course website, the library’s webpage, or JSTOR.
Software

This course will rely on the statistical software Stata for the final research project and most of the homework assignments. You will have some time in the lab sessions to complete your assignments, but most work must be completed outside of class time. Stata 12 is the current version and available for free to Dartmouth students at http://www.dartmouth.edu/comp/soft-comp/software/statistics/stataintro.html. Computers with Stata are also available in the Baker, Berry, and Kresge libraries.

Course Grades

Final course grades will be based on:
1. Homework Assignments – 25%
2. Final Research Project – 25%
3. Midterm Exam – 20%
4. Final Exam – 20%
5. Class Participation – 10%

1. Homework Assignments

Since much of the course material builds on itself, there will be regular assignments to help ensure that you are up to speed on the material. The assignments will include some textbook problems that you complete by hand and many questions that require you to use Stata. Many of the assignments will aid you in the completion of your final project.

Assignments are due at the beginning of the class period on the assigned due date. If you turn your assignment in after the beginning of the class it will be considered one day late. I must receive a hard copy of your homework at the beginning of class (unless you submit it late). Late submissions can be emailed. Otherwise, no email submissions will be accepted. I take no responsibility for formatting problems in electronic submissions. PDF documents are preferred for email submissions.

2. Final Research Project

Each student will select a research topic and conduct an analysis using social science data. The final paper will be 10 to 12 pages long. You will develop a brief theoretical explanation for a political or public policy phenomena of interest to you. Based on this theory, you will formulate hypotheses about the relationship between a dependent variable and some independent variables. Testing these hypotheses will require the collection of data and applying the appropriate statistical methods learned in this course. In the final paper you should explain the research design, present the findings from the statistical analysis, and discuss your conclusions regarding your hypotheses. I will provide further details in a separate handout.

Portions of the project can be done in the homework assignments. A prospectus that describes the proposed theory, hypotheses, variables, and data is due April 30. The research project is due on the final day of class (May 29). You might consider developing it later into a scholarly conference presentation or journal submission.
3. **Midterm Exam**

We will have an in-class midterm exam May 2. The midterm will be on paper (i.e., you will not be asked to use Stata).

4. **Final Exam**

We will have a final exam June 3 at 11:30 a.m. (the scheduled time for our course). Like the midterm exam, the final will be on paper. The final will cover material from the midterm to the end of the course.

5. **Participation**

Your participation grade will be based on involvement in class discussion, attendance, and in-class group work. I encourage you to ask questions regularly and engage the material during class. However, your participation grade is not simply a tally of how many times you speak in class. I am more interested in students providing their peers with thoughtful feedback about the readings and material, questions that provoke thought or clarify, and helpful feedback during the occasional in-class group activity.

Attendance is also an important part of being participatory. Since the material builds on itself, it will be easy to fall behind if you miss class. And, please, always feel free to ask questions if you have them. Others probably have the same question. Finally, when we have in-class exercises I will sometimes ask you to turn in a brief written assignment as evidence of your work, which I will count towards your participation grade.

**Note about Readings**

I expect that you will have done the reading prior to the class they are being discussed. Given the condensed nature of the course, and the sequential nature of the material, is essential to keep up with the reading. It will be difficult to keep up if you are not vigilant about the reading and attending class.

**Course Policies**

**Late Assignments**

Assignments are due at the beginning of class. An assignment will lose 10 percentage points for each day that it is late (an assignment turned in after the beginning of class is considered one day late). Turn in late assignments (1) by email to me, (2) as a paper copy to Jane DaSilva in Rockefeller Center Room 203, or (3) as a paper copy to me in Rockefeller Center Room 202. If you turn it into Jane DaSilva, ask for it to be time-stamped.

**Make-Up Exams**

Make-up exams will be permitted only if the student presents written documentation of legitimate circumstances that prevent the student from taking the exam on time. This documentation must be presented in a timely manner (i.e., within a week). Legitimate circumstances include religious holidays, illness (verified by a physician), serious family emergencies, and participation in activities sponsored by the University. If you must miss an exam for a University-sponsored function or religious holiday, you must contact me before the scheduled test time.
**Accommodations**

Students with disabilities enrolled in this course and who may need disability-related classroom accommodations are encouraged to see me privately as early as possible in the term. Students requiring disability-related accommodations must register with the Student Accessibility Service office. Once SAS has authorized accommodations, students must show the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to their professor. As a first step, if students have questions about whether they qualify to receive accommodations, they should contact the SAS office. All inquiries and discussions about accommodations will remain confidential.

**Academic Honesty**

This course adheres to the Dartmouth College Academic Honor Principle. I take plagiarism very seriously and will follow the College’s procedures if academic honor violations arise. Using information from a book, article, web page, or source without crediting the source is plagiarism. Quotations, paraphrased information, and use of others’ ideas should be properly cited in written assignments. In summary, all of the work presented in this course is expected to be your own. All work is also expected to be original, not previously or simultaneously handed in for credit in another course (unless prior approval of all instructors involved is obtained). If you have questions about citations please contact me or see http://www.dartmouth.edu/~deal/resources/honor.html.

**Extra Credit**

I do not allow students to submit extra work in an attempt to raise a grade, unless I specify at the outset that such opportunities will be afforded to all students.

**Contacting Me**

Do not hesitate to contact me if you have any questions, comments, or concerns about any aspect of the course. The best way to reach me is by email (Matthew.Cravens@dartmouth.edu) and during office hours or before or after class. I will respond to your questions as soon as I can.

**Course Schedule**

**Week 1**

March 26 (Tues): Course Overview; Introduction to Policy Analysis

March 28 (Thurs): Causation; Generating Research Questions and Hypotheses


**Week 2**

April 2 (Tues): Defining and Measuring Concepts

- Pollock, *Essentials*, Chapter 1
- Gates, Bill. *2013 Annual Letter*
- Assignment 1 distributed, due April 10

April 3 (Wedn, X): Stata lab session
April 4 (Thurs): Measurement Validity and Reliability
  - Pollock, *Essentials*, Chapter 2

**Week 3**

April 9 (Tues): Describing and Displaying Variables; Research Design
  - Pollock, *Essentials*, Chapter 4
  - Pollock, *Stata Companion*, Chapter 2
  - Assignment 2 distributed, due April 18

April 10 (Wedn, X): Stata lab session
  - Assignment 1 due

April 11 (Thurs): Experiments and Quasi-Experiments

**Week 4**

April 16 (Tues): Making Controlled Comparisons
  - Pollock, *Essentials*, Chapter 5
  - Pollock, *Stata Companion*, Chapters 4 and 5

April 18 (Thurs): Introduction to Inferential Statistics
  - Pollock, *Essentials*, Chapter 6
  - Assignment 2 due
  - Assignment 3 distributed, due April 30

**Week 5**

April 23 (Tues): Survey Research

April 24 (Wedn, X): Stata lab session

April 25 (Thurs): Significance Tests
  - Pollock, *Essentials*, p. 155-169
  - Pollock, *Stata Companion*, Chapter 6
  - “What is a confidence interval?”

**Week 6**

April 30 (Tues): Measures of Association
  - Pollock, *Essentials*, p. 169-177
  - Assignment 3 due
  - Research paper prospectus due
May 1 (Wedn, X): Midterm Exam Review (Rocky 209)
May 2 (Thurs): Midterm Exam

**Week 7**
May 7 (Tues): Bivariate Regression
  - Pollock, *Essentials*, p. 183-196
  - Pollock, *Stata Companion*, Chapter 7
  - Assignment 4 distributed, due May 15
May 8 (Wedn, X): Stata lab session
May 9 (Thurs): Multivariate Regression
  - Pollock, *Essentials*, p. 196-206
  - Pollock, *Stata Companion*, Chapter 8

**Week 8**
May 14 (Tues): Dummy Variables and Interaction Terms
  - Pollock, *Stata Companion*, Chapter 9
  - Assignment 5 distributed, due May 23
May 15 (Wedn, X): Stata lab session
  - Assignment 4 due
May 16 (Thurs): Specification Error; Mediation Analysis

**Week 9**
May 21 (Tues): Heteroscedasticity, Outliers, Measurement Error
  - Handout
May 22 (Wedn, X): Stata lab session
May 23 (Thurs): Statistical Graphics and Visualization
  - Handout
  - Assignment 5 due

**Week 10**
May 28 (Tues): Introduction to Logistic Regression; Catch-Up
May 29 (Wedn, X): Final Exam Review
  - Research Paper Due
June 3 (Monday, 11:30 a.m.): Final Exam
### Summary of Assignments and Exams

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1</td>
<td>April 10</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>April 18</td>
</tr>
<tr>
<td>Assignment 3</td>
<td>April 30</td>
</tr>
<tr>
<td>Research Prospectus</td>
<td>April 30</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>May 2</td>
</tr>
<tr>
<td>Assignment 4</td>
<td>May 15</td>
</tr>
<tr>
<td>Assignment 5</td>
<td>May 23</td>
</tr>
<tr>
<td>Research Paper</td>
<td>May 29</td>
</tr>
<tr>
<td>Final Exam</td>
<td>June 3</td>
</tr>
</tbody>
</table>