Public Policy 529: Statistics
Fall 2015 Syllabus

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The central objective of this course is to provide a foundation in statistics and their application to questions in public policy and social science research. Key topics include research design, data collection and management, descriptive statistics, probability theory, and basic statistical inference for different types of data.

By nature of the material, this course is difficult. There will be times when you feel that you are just not getting it, and this is normal. Know this ahead of time, and keep working hard. There are no short cuts. Know also that I am on your side. My only goal is to help you learn, and I will push you because that is what I need to do in order for you to learn. The rewards will come if you persist!

Class Meeting Schedule

Unless otherwise noted, lectures are Tuesdays and Thursdays from 2:30–4:00 pm in 1110 Weill Hall. Weekly section meetings are held on Fridays from 2:30–4:00 pm in 1120 Weill Hall.

Textbooks

Statistics textbooks have different strengths and weaknesses, and no single book will work well for everyone. It is useful, however, to have one text be a focal point for presentation of the material. The following book, which is available for purchase, will serve in that role for this course:

- Alan Agresti and Barbara Finlay, *Statistical Methods for the Social Sciences*, 4th edition, (Pearson: 2008).

If you would like to rent electronic access to this textbook, rather than buy a physical copy, see the following link: http://tinyurl.com/qykfl8m. The cost of electronic access for 180 days is $82.99.

For problem set exercises and practice with the software package Stata, we will use the folowing text:

- Phillip Pollock, *A Stata Companion to Political Analysis*, 3rd edition, (CQ Press: 2015).

Other reading selections will be made available on the Canvas site for the course. You can log into Canvas at http://canvas.umich.edu.

Although I strongly recommend you purchase or rent the Agresti and Finlay text, alternatives issued under Creative Commons licenses have become increasingly viable in recent years, and I encourage you to utilize these resources as well. Two such books follow:

- David M. Diez, Christopher D. Barr, and Mine Çetinkaya-Rundel, *OpenIntro Statistics*, 3rd edition, 2015. Available for download at https://www.openintro.org/stat/textbook.php.
- Barbara Illowsky and Susan Dean, *Collaborative Statistics*, 2012. Available for download at http://tinyurl.com/nmvpevf.

I expect that the *OpenIntro Statistics* book will be the more helpful of the two for this course, but both have good features. The relevant sections from these texts are listed on the syllabus along with those of the Agresti and Finlay text so that you can refer to these books whenever you find it helpful.

Assignments and Grading

Your grade for this course will be determined by the following:

Problem sets	30%
Quizzes	20%
Midterm exam	25%
Final exam	25%

By nature, this material is cumulative and you will become stronger with practice. Problem sets will thus be assigned on a regular basis. You are encouraged to collaborate with other students to figure out how to answer questions on the problem sets. It is essential, however, that you write up all of your answers independently and in your own words. The ability to produce the answer yourself is a marker for your learning. Credit will not be given if it is determined that answers were not written independently.

The second portion of the course grade will come from two in-class quizzes worth 10% each. These quizzes, which will be given on October 6 and November 19, are designed to ensure that you are keeping up with the material between the two major exams for the course.

The midterm exam will be given on Monday, October 27, and the final exam will take place on Friday, December 18. Each of these exams is worth 25%.

Software

Students will use the Stata statistical package for many homework assignments. This application is available on computers in the Ford School computer lab and many of the larger computer labs

on campus. Discussion section will include help with the statistical computing skills required to complete these assignments. Students who want additional training in using software for statistical work are encouraged to take *PubPol 647-648: Data Analysis with Excel* or *PubPol 567: Stata Practicum* in future semesters.

Academic Integrity

It is expected that students are familiar with the Ford School's polces for academic integrity as described in the Program Handbook for the MPP/MPA programs, which adhere to the academic integrity policies for Rackham Graduate School. Violations of these policies will be taken seriously.

Students with special needs

If you believe you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of this course may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Office of Services for Students with Disabilities to help us determine appropriate accommodations. I will treat any information you provide as private and confidential.

September 8: Introduction

- Agresti and Finlay, chapter 1.

September 10: Sampling and Measurement

- Agresti and Finlay, chapter 2.

- Additional resources: *OpenIntro Statistics*, sections 1.1–1.5; *Collaborative Statistics*, chapter 1.

September 15 & 17: Descriptive Statistics

- Agresti and Finlay, chapter 3.

- Additional resources: *OpenIntro Statistics*, sections 1.6–1.8; *Collaborative Statistics*, chapter 2.

▷ Problem Set 1 due Friday, September 18.

September 22 & 24: Probability

- Agresti and Finlay, section 4.1. Reading from the additional resources is strongly recommended this week.

- Additional resources: *OpenIntro Statistics*, sections 2.1–2.4; *Collaborative Statistics*, chapter 3.

▷ Problem Set 2 due Friday, September 25.

September 29 & October 1: Probability Distributions

- Agresti and Finlay, sections 4.2–4.7.

- Additional resources: *OpenIntro Statistics*, section 2.5 and chapter 3; *Collaborative Statistics*, chapters 4–5.

▷ Problem Set 3 due Friday, October 2.

October 6 & 8: Statistical Inference (Estimation)

⇒ In-class quiz on Tuesday, October 6. ⇐

- Agresti and Finlay, chapter 5.

- Additional resources: *OpenIntro Statistics*, sections 4.1–4.2, 5.1; *Collaborative Statistics*, chapter 8.

▷ Problem Set 4 due Friday, October 9.

October 13 & 15: Significance Tests

- Agresti and Finlay, sections 6.1–6.5.

- Additional resources: *OpenIntro Statistics*, sections 4.3, 6.1–6.2; *Collaborative Statistics*, chapter 9.

▷ Problem Set 5 due Friday, October 16.

October 20: Fall Study Break

October 22: Significance Tests continued

- Agresti and Finlay, sections 6.6–6.8.

▷ Problem Set 6 due Friday, October 23.

October 27: Midterm Exam

October 29: Statistical Inference (Comparison of Two Groups)

- Agresti and Finlay, section 7.1–7.4.

- Additional resources: *OpenIntro Statistics*, sections 5.2–5.4, or *Collaborative Statistics*, chapter 10.

November 3 & 5: Statistical Inference (Comparison of Two Groups) cont.

- Agresti and Finlay, section 7.5–7.8.

▷ Problem Set 7 due Friday, November 6.

November 10 & 12: Association Between Categorical Variables

- Agresti and Finlay, sections 8.1–8.4.

- Additional resources: *OpenIntro Statistics*, sections 6.3–6.6, or *Collaborative Statistics*, chapter 11.

November 17: Association Between Categorical Variables cont.

- Agresti and Finlay, sections 8.5–8.7.

November 19: Linear Regression and Correlation

⇒ In-class quiz on Thursday, November 19. ⇐

- Agresti and Finlay, sections 9.1–9.3.

- Additional resources: *OpenIntro Statistics*, sections 7.1–7.3, or *Collaborative Statistics*, sections 12.1–12.5.

▷ Problem Set 8 due Friday, November 20.

November 24: Linear Regression and Correlation cont.

- Agresti and Finlay, sections 9.4–9.7.

- Additional resources: *OpenIntro Statistics*, sections 7.4–7.5, or *Collaborative Statistics*, sections 12.6–12.11.

November 26: Thanksgiving Break

December 1 & 3: Linear Regression and Correlation cont.

▷ Problem Set 9 due Friday, December 4.

December 8 & 10: Introduction to Multivariate Relationships

- Agresti and Finlay, chapter 10, sections 11.1–11.6.

- *OpenIntro Statistics*, sections 8.1–8.3.

▷ Problem Set 10 due Friday, December 11.

Friday, December 18, 4:00–6:00 pm: Final Exam