CRIM 535
Introduction to Quantitative Methods for Policy Analysis
University of Pennsylvania
Fall 2017

Lecture
Monday & Wednesday, 10:00 am-11:30 am
410 McNeil Building

Lab
Friday, 10:00 am-12:00 pm
108 McNeil Building

Instructor
Aaron Chalfin
Office: 565 McNeil Building
Office Hours: Monday 5:00-6:00, Wednesday, 1:30-2:45 and by appointment
achalfin@sas.upenn.edu
https://crim.sas.upenn.edu/people/faculty/aaron-j-chalfin

Teaching Assistant
Yuhao Wu
Office: 216 McNeil Building (off 2nd floor atrium)
Office Hours: Tuesday 1:30-3:00
yuhaowu@sas.upenn.edu
http://crim.sas.upenn.edu/people/yuhao-wu

Course Description
This course provides an introduction to applied statistical techniques in the social sciences and is tailored, in particular, to students pursuing the master of science degree in the Department of Criminology. It is taught as a basic course in statistics and presumes minimal mathematical or statistical background.

We'll begin with a brief introduction to the research process. We'll then cover the computation, interpretation and understanding of basic descriptive statistics, distributions, hypothesis testing, measures of association and finally regression analysis. Depending on how much time we have, I will cover several more advanced topics in regression analysis at the end of the semester.

More than anything, I would like for this course to be both useful and fun! I truly believe that judicious use of data is critical to getting criminal justice policy right and I expect that each of you will have a distinguished career in criminal justice policy (or a related field), a career in which you will have the opportunity to use data to improve public policy. It is my privilege to play a part in your statistics training.

Lecture Notes
There is no textbook for the course. In lieu of a textbook, I will hand out lecture notes during the

semester that will closely mirror the material we will cover in lecture. I have written the lecture notes myself specifically for this class. The notes aren't long – each chapter is approximately 15 pages in length – but the material is dense. I encourage to read the notes really carefully and to follow along with numerical examples. If there is something that doesn't make sense, please feel free to shoot me an e-mail. I am always happy to answer your questions.

Lab Sessions
In addition to lecture, on most weeks, you will have the opportunity to attend a computer lab session that will be led by the teaching assistant for the course, Yuhao Wu. These sessions will allow you to apply concepts you learn in class to analyze real-world data. I strongly encourage you to attend these sessions as the most enduring learning you will do in this class will be in front of the computer. In addition, the exercises you will work on in these sessions will include questions on your weekly problem sets so there is a major advantage to working on these on Friday mornings with Yuhao and your classmates.

Statistical Software
This will be a "hands on" class. During weekly lectures, you will have the opportunity to apply concepts in the classroom using MS Excel. The goal is to make sure that you understand how to actually compute and interpret the statistics we are learning about. So I will ask that you please bring a laptop computer to class if at all possible.

You will also receive training in how to use statistical software to analyze data. During weekly lab meetings, you will receive formal instruction in the statistical software package, *R*, which you will use to complete your problem sets and part of your final exam. *R* can be downloaded for free here: https://www.r-project.org

While you will receive formal training in *R*, I will also allow you to use Stata if you prefer to do so. Stata will be available to you in campus computer labs but, if you want a personal copy, you will need to pay for it. You can find several reasonably priced options here: http://www.stata.com/order/new/edu/gradplans/student-pricing/

Evaluation
Your course grade will be determined on the basis of three exams and nine problem sets that you can start working on in weekly lab sessions.

Exams (120 points — 40 points each): Each exam will consist of a mix of short answer questions and computer exercises. As of now, these are the dates of the three exams:

- Exam #1: Wednesday, October 4th
- Exam #2: Wednesday, November 1st
- Exam #3: Monday, December 11th

Problem Sets (72 points — 9 points each): During the semester, I will hand out nine problem sets which you will begin working on during the weekly lab session. I will count your top eight problem sets – you are free to skip one. Each of the problem sets is designed to allow you to apply the material you have learned to work with real-world data using both MS Excel and *R*. You are welcome and even encouraged to collaborate with one another as you complete the

problem sets. All I ask that each of you hand in your own copy of the problem set to be graded and that you write up answers in your own words.

Personal Statement (8 points): I'd love to get to know each of you a little better. I will ask you to send me a brief personal statement describing your academic background, career ambitions and anything else you would like for me to know about you. This is not intended to be onerous – please write as little (or as much) as you would like to share.

Your course grade will be determined on the basis of 200 possible points. Your letter grade will be assigned according to the following rubric where the points listed correspond to the minimum number of points needed to earn a particular grade.

- 196-200 points = A+
- 187-195 points = A
- 180-186 points = A-
- 174-179 points = B+
- 166-173 points = B
- 160-165 points = B-
- 154-159 points = C+
- 146-153 points = C
- 140-145 points = C-
- 134-139 points = D+
- 126-133 points = D
- 120-125 points = D-
- 0-119 points = F

Note: I reserve the right to lower these cutoffs as needed (e.g., Depending on the class' performance, I might decide that 170 points will earn an "A" and 150 points will earn a B).

Academic Integrity

Students are expected to abide by the University of Pennsylvania Code of Academic Integrity, which is contained below. Additional information about expected standards of intellectual honesty can be found here: http://www.upenn.edu/academicintegrity/index.html

Since the University is an academic community, its fundamental purpose is the pursuit of knowledge. Essential to the success of this educational mission is a commitment to the principles of academic integrity. Every member of the University community is responsible for upholding the highest standards of honesty at all times. Students, as members of the community, are also responsible for adhering to the principles and spirit of the following Code of Academic Integrity.

Academic Dishonesty Definitions

Activities that have the effect or intention of interfering with education, pursuit of knowledge, or fair evaluation of a student's performance are prohibited. Examples of such activities include but are not limited to the following definitions:

A. Cheating: Using or attempting to use unauthorized assistance, material, or study aids in examinations or other academic work or preventing, or attempting to prevent, another from using authorized assistance, material, or study aids. Example: using a cheat sheet in a quiz or exam,

altering a graded exam and resubmitting it for a better grade, etc.
B. Plagiarism: Using the ideas, data, or language of another without specific or proper acknowledgment. Example: copying another person's paper, article, or computer work and submitting it for an assignment, cloning someone else's ideas without attribution, failing to use quotation marks where appropriate, etc.
C. Fabrication: Submitting contrived or altered information in any academic exercise. Example: making up data for an experiment, fudging data, citing nonexistent articles, contriving sources, etc.
D. Multiple submissions: submitting, without prior permission, any work submitted to fulfill another academic requirement.
E. Misrepresentation of academic records: Misrepresentation of academic records: misrepresenting or tampering with or attempting to tamper with any portion of a student's transcripts or academic record, either before or after coming to the University of Pennsylvania. Example: forging a change of grade slip, tampering with computer records, falsifying academic information on one's resume, etc.
F. Facilitating Academic Dishonesty: Knowingly helping or attempting to help another violate any provision of the Code. Example: working together on a take-home exam, etc.
G. Unfair Advantage: Attempting to gain unauthorized advantage over fellow students in an academic exercise. Example: gaining or providing unauthorized access to examination materials, obstructing or interfering with another student's efforts in an academic exercise, lying about a need for an extension for an exam or paper, continuing to write even when time is up during an exam, destroying or keeping library materials for one's own use., etc.

*** If a student is unsure whether his action(s) constitute a violation of the Code of Academic Integrity, then it is that student's responsibility to consult with the instructor to clarify any ambiguities.**

Preliminary List of Topics (Subject to Change)

Date	Topic(s)	Lecture Notes	Lab (Friday)
Wednesday, August 30	Course introduction	Chapter 1	--
Monday, September 4 Wednesday, September 6	**NO CLASS [LABOR DAY]** Types of data and variables	Chapter 2	Lab #1: *R* primer
Monday, September 11 Wednesday, September 13	Measures of central tendency and dispersion *Z*-scores	Chapter 3	Lab #2: Measures of central tendency and dispersion
Monday, September 18 Wenesday, September 20	Cumulative distribution functions, probability density functions The binomial and normal distributions	Chapter 4	Lab #3: Distributions
Monday, September 25 Wednesday, September 27	Sampling distributions and the central limit theorem Confidence intervals	Chapter 5	Lab #4: Confidence intervals
Monday, October 2 Wednesday, October 4	*Review for Exam #1* **EXAM #1**		--
Monday, October 9 Wednesday, October 11	Introduction to hypothesis testing One sample z-tests	Chapter 6	Lab #5: Hypothesis testing
Monday, October 16 Wednesday, October 18	One sample t-tests Two sample t-tests	Chapter 7	Lab #6: T-tests
Monday, October 23 Wednesday, October 25	Analysis of Variance F-Tests	Chapter 8	Lab #7: F-tests
Monday, October 30 Wednesday, November 1	*Review for Exam #2* **EXAM #2**		--
Monday, November 6 Wednesday, November 8	Measures of association: covariance and correlation Introduction to linear regression	Chapter 9	Lab #8: Correlation
Monday, November 13 Wenesday, November 15	Linear regression with a single predictor: estimation **NO CLASS [AMERICAN SOCIETY OF CRIMINOLOGY CONFERENCE]**	Chapter 10	--
Monday, November 20 Wednesday, November 22	Linear regression with a single predictor: inference **NO CLASS [THURSDAY-FRIDAY SCHEDULE]**	Chapter 10	--
Monday, November 27 Wednesday, November 29	Linear regression with multiple predictors: estimation Linear regression with multiple predictors: inference	Chapter 11	Lab #9: Linear regression I.
Monday, December 4 Wednesday, December 6	Regression with panel data Differences-in-differences estimation	Chapter 12	Lab #10: Linear regression II.
Monday, December 11	**EXAM #3**		