Seminar in Criminology Research and Analysis – Crim 7301
Fall 2016 Syllabus

Course Information
Time: Thursdays, 1:00 to 3:45
Class Location: GR 3.206

Professor Contact Information
Dr. Andrew P. Wheeler – but call me Andy!
Email: Andrew.Wheeler@utdallas.edu
Office Hours: Tuesday and Friday, 9:00 to 11:00, Office is GR 3.530

The quickest way to reach me is via email. I am frequently in my office, so feel free to stop by whenever (knock if the door is closed). Otherwise you can email to set up an appointment time.

Course Pre-requisites, Co-requisites, and/or Other Restrictions
This is a PhD course. You will have been expected to have completed EPPS 6310 (Research Design I), EPPS 6313 (Intro to Quant. Methods), and EPPS 6316 (Applied Regression).

Course Description

The course is an advanced course on quantitative research designs often used in criminology and criminal justice research. This course includes both lecture and time in the computer lab. The format of the course will often be I give a lecture (that includes student discussion of particular topics), and then save time for a computer lab (conducting statistical analysis) in the latter half of class.

Student Learning Objectives/Outcomes

By the end of the course you will be able to:

- Learn how regression equations can answer causal questions
- Understand when to use common quasi-experimental research designs -- such as propensity score matching and difference-in-differences.
- Have run practical examples of conducting those research designs in statistical software
- Know the basics of making a reproducible statistical analysis
- Gained introductory exposure to group based trajectory modelling, social network analysis, and machine learning applications in criminology

Required Textbooks and Materials

There will be two required texts for the course. These are:

- Joshua Angrist and Jörn-Steffen Pischke. 2009. *Mostly Harmless Econometrics*. Princeton University Press.
- William Shadish, Thomas Cook, and Donald Campbell. 2002. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Houghton Mifflin.

There will also be additional readings for the course, mostly academic journal articles. These will be distributed as pdf files through email. Expected readings are listed in the class schedule, but I reserve the right to amend the reading list (either require new/different readings or take off some readings) given class progression and other unforeseen circumstances.

Software

For many of the classes I will provide code snippets to illustrate how to apply a particular research design. I will give code snippets in R, Stata, and/or SPSS (and Python for social network analysis). These will be self-contained sets of code that reproduce some analysis.

I may then ask you to conduct a particular homework assignment, and you will have the option to conduct analysis in whatever software you choose. These will be self-directed (following along with me doing code on the projector is excruciating), but I will be available to help troubleshoot.

These are to help translate some of the advanced ideas into more practical data analysis advice. The best way to do this is to actually show how to conduct said data analysis with an example.

Grading Policy

The final grade for the course will be the accumulation of assignments, class participation, and a final project. The requirements for the final project will be further detailed in a separate handout, but the distribution of the proportion for grades will be as follows

- Assignments – 40% of final grade [90 points]
- Class Participation – 10% of the final grade [10 points]
- Final Project – 50% of final grade [100 points]. Requirements for the project will be split into several separate components, each with their own grade. The final project and its requirements will be further described in a separate handout. For the class project you should preferably **use data from your dissertation** (or another current project you are working on). This will entail both a presentation to the class and a final paper.

Assignments will each be graded on a 10 point scale. There will be 10 assignments in the course, so there is a built-in 10 point extra credit. The total number of points for all of

the graded material in the course is 200 points. Letter grades corresponding to the total number of points is as follows:

A	180-200
B	160-179
C	140-159
D	120-139
F	Below 120

Class participation is based on coming to class, participating in discussions, and asking questions when fellow classmates give presentations.

For my homework policy, I will expect homework given in the previous week to be turned in at the beginning of class the following week. Any late homework will be automatically docked 5 points (out of a total possible of 10), but can be turned in any time before 11/17. Homework will always require turning in a physical paper (I do not accept assignments by email), so make sure your name and the assignment is clearly marked on the paper.

Course & Instructor Policies

For my homework policy, I will expect homework given in the previous week to be turned in at the beginning of class the following week. Any late homework will be automatically docked 5 points (out of a total possible of 10), but can be turned in any time before 11/17. Homework will always require turning in a physical paper (I do not accept assignments by email), so make sure your name and the assignment is clearly marked on the paper.

If you are sick and are unable to make it to class, just send me an email. A university approved class absence excuse will be needed if you cannot make it to class on either days exams are given or when other students are doing presentations.

Assignments & Academic Calendar

Below is a listing of the approximate weekly class schedule. For the readings column, they will be expected to be done for the week they are listed (e.g. on 9/1 you are expected to have read *Extracting sunbeams from cucumbers* before you have come to that class). If the schedule is changed anytime during the semester I will forward you a new copy of the class schedule via email. I will state homework assignments due for the next week at the end of class.

THE BASICS OF RESEARCH DESIGN AND REGRESSION

8/26 - Introductions, go over syllabus, course set-up
9/1 – Basics of data visualization and presentation
Topics:
- Guidelines for making good graphs and tables

- Poor practices for graphics in print and PowerPoint presentations
- Reproducible research

Readings:
- Cleveland, William, and Robert McGill. 1984. Graphical perception: Theory, experimentation, and application to the development of graphical methods. *Journal of the American Statistical Association* 79(387): 531-554.
- Feinberg, Richard, and Howard Wainer. 2011. Extracting Sunbeams from cucumbers. *Journal of Computational and Graphical Statistics* 20(4): 793-810.
- Maltz, Michael. 2010. Look before you analyze: Visualizing data in criminal justice. In *The Handbook of Quantitative Criminology*, eds. Alex Piquero and David Weisburd, pgs. 25-52. Springer.
- Tufte, Edward. 2006. *The Cognitive Style of PowerPoint: Pitching Out Corrupts Within.* 2nd Ed. Graphics Press, Cheshire, CT.

9/8 – Types of validity, the experimental ideal, and linear regression
Topics:
- Experimental Ideal
- Types of Validity
- Linear regression
  - How to write regression equations
  - Regression to the mean
  - Other tests than coefficients against zero
  - Checking linearity

Readings:
- *Mostly Harmless,* **Chapters 1, 2 & 3**
- *Experimental & Quasi-Experimental,* **Chapters 1, 2 & 3**

9/15 – Generalized linear models
Topics:
- Logistic and Poisson regression
- Generalized models vs. transforming the dependent variable
- Understanding coefficients
- Graphing effects
- Non-linear effects

Readings:
- Gelman, Andrew and Jennifer Hill. 2007. *Data Analysis Using Regression and Multilevel/Hierarchical Models.* Cambridge University Press: New York, NY. **Chapters 3, 4, 5 & 6.**

QUASI-EXPERIMENTAL RESEARCH DESIGNS

9/22 – Propensity Score Matching
Topics:
- Understanding selection bias
- The logic of matching

- How to incorporate propensity scores; matching vs. weighting
- Assessing balance

Readings:
- *Experimental & Quasi-Experimental, **Chapters 4 & 5***
- Apel, Robert and Gary Sweeten. 2010. Propensity score matching in criminology and criminal justice. In *The Handbook of Quantitative Criminology*, eds. Alex Piquero and David Weisburd, pgs. 543-562. Springer.
- Berk, Richard. 1983. An introduction to sample selection bias in sociological data. *American Sociological Review* 48(3): 386-398.

9/29 – Difference in Difference Regression Designs
Topics:
- The motivation for difference in difference designs
- Ashenfelter's dip
- Counter-factual interpretations, parallel trends assumption
- Predicting change scores vs. levels, regression to the mean

Readings:
- *Mostly Harmless, **Chapter 5***
- Allison, Paul. 1990. Change scores as dependent variables in regression analysis. *Sociological Methodology* 20: 93-114.
- Maltz, Michael, Gordon, Andrew, McDowall, David, and McCleary, Richard. 1980. An artifact in Pretest-Posttest designs: How it can mistakenly make delinquency programs look effective. *Evaluation Review*, 4(2): 225-240.

10/6 – Fixed Effects vs Random Effects
Topics:
- Derivation/motivation for the fixed effects estimator
- When you actually want random effects
- Clustered standard errors and robust standard errors

Readings:
- *Mostly Harmless, **Chapter 8***
- Brame, R., Bushway, S., and Paternoster, R. (1999). On the use of panel research designs and random effects models to investigate static and dynamic theories of criminal offending. *Criminology*, 37(3):599-642.
- Worrall, J. L. (2010). A User-Friendly introduction to panel data modeling. *Journal of Criminal Justice Education*, 21(2):182-196.

10/13 – Experiments in practice and knowledge accumulation
Topics:
- Practical and moral problems with conducting experiments
- Power analysis
- Logic of meta-analysis

Readings:
- *Experimental & Quasi-Experimental, **Chapters 8, 9, 10 & 13***

- Sampson, R. J. (2010). Gold standard myths: Observations on the experimental turn in quantitative criminology. *Journal of Quantitative Criminology*, 26(4):489-500.
- Eck, J. (2006). When is a bologna sandwich better than sex? A defense of small-n case study evaluations. *Journal of Experimental Criminology* 2(3):345-362.

ADDITIONAL TOPICS IN QUANTITATIVE CRIMINOLOGY

10/20 – Group based trajectory models
Topics:
- Latent classes and growth models
- Model selection and absolute fit
- graphics

Readings:
- Skardhamar, T. (2010). Distinguishing facts and artifacts in group-based modeling. *Criminology*, 48(1):295-320.
- Weisburd, D., Bushway, S. D., Lum, C., and Yang, S.-M. (2004). Trajectories of crime at places: A longitudinal study of street segments in the city of Seattle. *Criminology*, 42(2):283-322.
- Erosheva, E. A., Matsueda, R. L., and Telesca, D. (2014). Breaking bad: Two decades of Life-Course data analysis in criminology, developmental psychology, and beyond. *Annual Review of Statistics*, 1(1):301-332.
- Nagin, D. and Odgers, C. (2010). Group-Based trajectory modeling (nearly) two decades later. *Journal of Quantitative Criminology*, 26(4):445-453.

10/27 – Social Network Statistics
Topics:
- Connections between people and diffusion on the network
- Measures of centrality
- Graphing networks

Readings:
- McGloin, J. M. (2005). Policy and intervention considerations of a network analysis of street gangs. *Criminology & Public Policy*, 4(3):607-635.
- McGloin, J. M. and Kirk, D. S. (2010). An overview of social network analysis. *Journal of Criminal Justice Education*, 21(2):169-181.
- Papachristos, A. V. (2011). The coming of a networked criminology. *Measuring Crime & Criminality: Advances in Criminological Theory*, 17:101-140.
- Papachristos, A. V., Hureau, D. M., and Braga, A. A. (2013). The corner and the crew: The influence of geography and social networks on gang violence. *American Sociological Review*, 78(3):417-447.
- Papachristos, A. V. and Kirk, D. S. (2015). Changing the street dynamic: Evaluating Chicago's group violence reduction strategy. *Criminology & Public Policy*, 14(3):525-558.

- Gravel, J. and Tita, G. E. (2015). With great methods come great responsibilities: Social network analysis in the implementation and evaluation of gang programs. *Criminology & Public Policy*, 14(3):559-572.

11/3 – Machine Learning and Forecasting
Topics:
- Different goals of prediction vs inference
- False negatives are worse than false positives
- Potential disparity due to prediction
- Clinical vs. Actuarial prediction
- Overview of different machine learning algorithms

Readings:
- Berk, R. (2008). Forecasting methods in crime and justice. *Annual Review of Law and Social Science*, 4(1):219-238.
- Shmueli, G. (2010). To explain or to predict? *Statistical Science*, 25(3): 289-310.
- Tollenaar, N. and van der Heijden, P. G. M. (2013). Which method predicts recidivism best?: A comparison of statistical, machine learning and data mining predictive models. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 176(2):565-584.
- Bushway, S. D. (2013). Is there any logic to using logit. *Criminology & Public Policy*, 12(3):563-567.
- Dawes, R. M. (1979). The robust beauty of improper linear models in decision making. *American Psychologist*, 34(7):571-582.
- Ridgeway, G. (2013). The pitfalls of prediction. *NIJ Journal*, 271 February, 34-40.

11/10 – Go over class projects, spend time in class on projects
11/17 – No Class, *American Society of Criminology* conference
11/24 – No Class, Thanksgiving Break
12/1 – Final Class, Final Paper Due and Class Presentations

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.

Comet Creed
This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."