The purpose of this seminar is to familiarize the students with the applied topics in data analysis and causal inference. Given that this is an advanced graduate seminar, it will be run somewhat informally with a combination of some lecturing as well as group discussion and presentations.

I will periodically give exercises that you are expected to complete, but the main work for the class is to work towards an empirical analysis. This need not be a completed paper, but I am more interested in seeing the analysis and code for the project.

The main texts for the class are:


Wickham, Hadley and Garett Grolemund. 2016. *R for Data Science*. Available at: http://r4ds.had.co.nz

**Course Schedule**

**October 3: Introduction**

**October 10: Measurement, Construct Validity, and Design**

**Required:**


Imai (2017), Chapter 3
Rosenbaum (2009), Chapter 1.
Trochim (2016), Chapters 3 (Measurement) and 4 (Design).

Recommended:

October 17: Introduction to R and Best Programing Practices

Required:
Imai (2017), Chapter 1.

Recommended:
R Coding Conventions (RCC), available at: http://www.aroma-project.org/developers/RCC

October 24: Counterfactuals, Potential Outcomes, Causal Graphs

Required:
Imai (2017), Chapters 2 and 4.3.
Morgan and Winship (2015), Chapters 1 to 4.
Hernán and Robins (2016), Chapters 1 to 3 and 6 to 10.

Recommended:

October 31: Regression

Required:
Imai (2017), Chapter 4.2.
Morgan and Winship (2015), Chapters 6 and 7.
Recommended:


Imbens and Rubin (2015), Chapters 13 to 19.

**November 7: Matching Estimators**

Required:

Morgan and Winship (2015), Chapters 5.
Rosenbaum (2009), Chapters 2, 3, 7, 8, 9, 13.

**November 14: Panel & Time-Series-Cross-Section Data**

Required:

Morgan and Winship (2015), Chapters 11

**November 21: Dynamics** Required:


**November 28: Analyzing Text** Required:


**December 5: Student Presentations**

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