Course Description:

Course covers contemporary statistical approaches to questions about causality. Introduces the potential outcomes framework in the context of randomized experiments and observational studies. Techniques covered include blocking, instrumental variables, matching (propensity scores), and regression discontinuity designs. Advanced topics may include probabilistic graphical models, attrition/missing data, and principal stratification.

Day 1:
Introduction
Probability and Conditional Probability
(+ exercises)
Introducing Potential Outcomes Framework
Break
Experiments: Simple Randomized and Block-Randomized.

Day 2:
Brief review of previous day; review of exercises
Instrumental Variables estimation
Break
Regression Discontinuity Design

Day 3:
Brief review of previous day; review of exercises
Confounding in Observational Studies
Using Regression, Controlling for Covariates: Best Practices
Break
Problems with Regression
Matching/Propensity Scores

Day 4:
Brief review of previous day; review of exercises
More Matching/Propensity Scores (or Special Topics)
Break
Special Topics