You are responsible for everything we covered in class, including any papers I discussed – both in class and on replications.

Introduction material covered 1-36. Of this, very little is needed.

Potential outcomes: 139-178. Of these I would emphasize

* Understand the notation and how it differs from observables via the switching equation
* Calculating ATE, ATT, ATU and simple difference in outcomes
* Decompose the SDO into three parts. Under what conditions is the SDO equal to ATE?
* I will provide a numerical example for this, so you will be working through actual examples.
* Krueger STAR paper
* SUTVA definition and examples of violations
* Definition of independence

Directed acyclical graphs: 228 – 264. Of these I would emphasize

* Identifying all backdoor paths, closed and open, from treatment to outcome
* Backdoor criterion
* Developing a research design that will satisfy the backdoor criterion
* Definition of a collider and collider bias
* You will be given several DAGs and be asked to determine if the backdoor criterion can be met.

Regression discontinuity: 400 – 482

* Know key terms like running variable, cutoff
* Definition of the parameter. Where is there overlap? Where is there not overlap? Why is that important? Why do we need extrapolation therefore for estimation? Why is the parameter defined only at the limit?
* What are the key identifying assumptions needed for an RDD?
* Estimation using local polynomial regression. Write down an estimation equation.
* How to handle nonlinearities in the data generating process
* Nonparametric boundary problem and its solution – nonparametric regressions local to the cutoff with rectangular and triangular kernels.
* Explain “sorting on the running variable” also called “manipulation” and how to test for it.
* Name a few other tests commonly employed with RDD (placebos, balance on covariates, jumps at non-discontinuous points)
* Lee, Moretti and Butler QJE paper on close election design. Explain the close election design.
* Hansen’s DUI paper

Instrumental variables: 495 – 667

* Understand the intuition of IV using DAGs
* Constant treatment effects
  + Derive 2SLS
  + Derive ratio of covariance(Y,Z) to covariance(D,Z). What additional assumptions are needed for this ratio to be the causal effect of D on Y?
  + What are the identifying assumptions and how – if possible – can you test them?
  + Explain the problems of weak instruments, and their tests, and the values on those tests needed to satisfy a strong enough instrument.
  + Angrist and Krueger compulsory schooling paper
  + Angrist and Evans family size paper
* Heterogenous treatment effects
  + Give an example of a problem where IV solves it. Not visual – real example.
  + What identifying assumptions are needed?
  + How does independence get satisfied, but exclusion get violated? Give an example.
  + Meth and foster care paper by Cunningham and Finlay
  + What is monotonicity?
  + Explain the LATE parameter. Is it internally valid? Is it externally valid? Why/why not? How does it relate to ATE?
  + Explain the judge leniency design or “judge fixed effects”
  + Aizer and Doyle juvenile incarceration paper
  + Lottery design
  + Oregon Medicaid Experiment