

Government 51: Spring 2025 Midterm Topic List

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The contents here do not represent all of the content for the course nor is this meant to be an exhaustive list of things that could be covered on the midterm. Please review all course materials yourself, and use this topic list as a starting point.

1 Notation

- Potential outcome notation
- Summation notation

2 General Assumptions

- Causal ordering
- Consistency and interference (SUTVA)
- Individualistic assignment
- Probabilistic assignment
- Unconfounded assignment

3 Difference in Difference

- Graphical description
- Estimand for DiD
- Estimator for DiD
- Estimate for DiD
- Parallel trends (in words and with notation)

4 Instrumental Variables

- Exclusion restriction
- No defiers
- “Local” Average Treatment Effect
- Observations (4-part table); explain behavior
- Intent to Treat (conceptually and in notation)
- Encouragement (conceptually and in notation)
- Wald estimator (can you calculate LATE using this estimator by hand?)

5 Matching

- Conceptually, what is matching?
- Matching assumption (conceptually and in notation)
- Mahalanobis matching vs. absolute distance matching

6 Regression

- Linear model (what is the theoretical model?)
- Sum of Squared Residuals
- Loss function for regression
- Relationship between TSS, SSR, and R-squared
- DiD as Regression (eqn. and differences)
- Loss function for LASSO regression
- Relationship between lambda and coefficients
- Can you take (simple) data and find the OLS and LASSO equations for it?

7 Coding

- Loading in data
- Filtering and subsetting data
- Mean and medians
- Add, subtract, divide, multiply
- Defining and using functions (ex: PSET 1)
- Plotting data and trends