

POL 722: Probability and Statistics

Instructor: Kosuke Imai

Spring 2008

Course Objective and Requirement:

This course presents basic principles of mathematical probability and statistics that are essential for advanced quantitative analysis in political science research. The first half of the course will cover basic probability theory, which serves as a foundation of statistical theory. The second half will be devoted to topics for statistical inference, which include estimation, hypothesis testing, asymptotic analysis and regression. Students are expected to complete twelve problem sets, one for each topic, each of which consists of four or five exercises.

Course Schedule:

- Week 1 Probability Theory
- Week 2 Transformations and Expectations
- Week 3 Common Families of Distributions
- Week 4 Multiple Random Variables
- Week 5 Properties of a Random Sample
- Week 6 Principles of Data Reduction
- Week 7 Point Estimation
- Week 8 Hypothesis Testing
- Week 9 Interval Estimation
- Week 10 Asymptotic Evaluations
- Week 11 Analysis of Variance and Regression
- Week 12 Regression Models

Textbook: Casella, George and Roger L. Berger (2002), *Statistical Inference*, 2nd ed.