

Econ 307: Statistical Analysis
Fall 2005

Time: MW 11:00AM-12:15PM

Classroom: CL 209

Instructor: Mototsugu Shintani

Office: CL 211

Office hours: W 4:00-5:00PM or by appointment

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Course Objectives: This course introduces the fundamental concepts of probability and statistical theory. The course is mainly designed for the first year graduate students and intends to provide the basic statistical tools that will be used in later econometrics courses.

Prerequisites: One year of calculus is required. The equivalent of Econ 150 or above is preferred.

Required Textbook: Casella, G. and R.L. Berger, *Statistical Inference* (2001, Duxbury)

Recommended Textbook: A. Ronald Gallant, *An Introduction to Econometric Theory* (1997, Princeton University Press)

Method of Grading:

Attendance	10 points
4 Assignments	30 points
Midterm exam (Oct. 17)	30 points
Final exam (Dec. 13)	30 points

Course Outline

(26 lectures excluding first meeting and midterm exam)

1. Probability Theory (4)

Set theory, Sample space
Counting, conditional probability, independence
Probability space (sigma algebra), Random variable
Cdf, pdf, pmf

2. Transformation and Expectations (3)

Transformation
Moments, MGF

3. Common Families of Distributions (4)

Discrete distribution
Continuous distribution
Exponential families
Inequalities, Inequalities II(from chap4)

4. Multiple Random Variables (3)

Joint and marginal distribution
Transformation II
Covariance, correlation

Midterm exam Oct 17, Monday, 11:00AM-12:15PM

5. Properties of a Random Sample (3)

Sampling distribution from normal
Convergence concepts - as convergence, Convergence in probability, Convergence in distribution, LLN, CLT

6. Principles of Data Reduction (3)

Sufficiency principle
Likelihood principle
Equivalence principle

7. Point Estimation (3)

MOM, MLE
MSE, bias, Cramer-Rao inequality
Decision theoretic approach - Optimality, Loss function, Risk function

8. Hypothesis Testing (3)

LR test, Evaluating test, P-values, Power function
Neyman-Pearson Lemma

Final exam Dec13, Tuesday, 12:00PM-3:00PM