Econ 220A: Econometrics (Statistics and Probability Theory)

Class Web-Page:

http://econ.ucsd.edu/~ikomunje/ec220course.htm

Class time: Monday & Wednesday, 10:30 AM – 11:50 AM, Econ 300

TA: Gray Calhoun [gcalhoun@ucsd.edu]

Office Hours:
Gray Calhoun: Monday, 3:00 PM - 5:00 PM in Econ 123
Prof. Ivana Komunjer: Wednesday, 2:00 PM – 3:00 PM in Econ 226

Required Text:

Statistical Inference, G. Casella and R. L. Berger, Doxbury Advanced Series, 2002

This book covers all of the course material and I will follow it very closely. In addition, the required text provides many problems for practice and excellent references for further readings.

Suggested Texts:

Statistical Methods in Econometrics, R. Ramanathan, Academic Press, 1993

This book is similar in level to the required text with more emphasis on multivariate distributions.

An Introduction to Econometric Theory, A.R. Gallant, Princeton University Press, 1997

More rigorous than the required text, this books is an excellent reference in asymptotic theory and related areas.

Overview:

The course is designed to be an introduction to probability and statistical theory. The main goal is to prepare students for the remainder of the econometrics sequence. The emphasis of the course is on the basic principles of statistical theory.

Homework Policy:

You will have weekly homework assignments. All the homeworks are due by 12:00 (noon) on Wednesday and have to be handed out during class. You will be graded on one part of the homework—the questions that are graded each week will be announced at the end of the Wednesday class or once all the homeworks have been collected.

Exam Policy:

The midterm and final must be taken on the scheduled dates. The only exceptions allowed are:
(1) officially sanctioned university events;
(2) unforeseen and officially documented illness, accident or family crisis.
The midterm exam is in-class and is 1h20min long; the final exam is a 3h exam. No textbooks/lecture notes are allowed during midterm/final exam.

Midterm Exam: Monday, October 30, 10:30 AM – 11:50 AM (in class)
Final Exam: Monday, December 04, 9:00 AM – 11:59 AM

Grading Policy:
Your final grade will be determined by your performance on the midterm exam and the final exam, as well as your homeworks. The actual percentages are:

Homeworks	25%
Midterm Exam	25%
Final Exam	50%

Outline:

Part 1: Probability Theory

I. Probability Theory
- a. Introduction
- b. Set Theory
- c. Probability Theory
- d. Conditional Probability and Independence
- e. Random Variables
- f. Distribution Functions

II. Transformations and Expectations
- a. Transformations
- b. Expected Values
- c. Moments, Moment Generating Functions and Characteristic functions.
- d. Common distributions

III. Multivariate Random Variables
- a. Joint and Marginal Distributions
- b. Conditional Distributions and Independence
- c. Bivariate Transformations
- d. Covariance and correlation
- e. Multivariate Distributions
- f. Bivariate Normal

Part 2: Sampling Theory

IV. Properties of Random Samples
- a. Random samples
- b. Sums of Random Samples (Exact distribution theory)
- c. Sums of Random Samples (Asymptotic methods)

Part 3: Statistical Estimation and Inference

V. Estimation
- a. Introduction
- b. Estimation methods - Method of Moments
- c. Estimation methods - Maximum Likelihood
- d. Estimation methods - Bayes Estimators
- e. Evaluating Estimators - Exact criteria
- f. Evaluating Estimators - Asymptotic criteria

VI. Hypothesis Testing
- a. Introduction to Classical testing
- b. Likelihood Ratio tests
- c. Evaluating Tests
- d. Other approaches
- e. LR test approximations