1. Course Description

This is the first half of the first semester Ph.D. econometrics course. This course is primarily intended to provide the student with a solid foundation in mathematical statistics and probability theory. Topics covered include: a review of univariate and multivariate probability theory, methods for determining distributions of functions of random variables, methods for stochastic simulation, criteria for convergence of random variables, and an introduction to asymptotic theory.

Throughout the course, we will apply techniques discussed in the classroom using MATLAB, which is available at the computer labs. I will teach you how to write your own m-files and help you to do the problems on the problem sets using MATLAB. The programming side of the course should not be excessively demanding.

2. Grading and Textbooks

The grade from my portion of the class will be divided (60-40) among an exam score and problem sets, respectively. Two exams will be given during this first half of the semester. To formulate the exam portion of your grade, I will put 60 percent weight on your highest exam score and 40 percent weight on your lowest score. This weighted average of exam scores will then constitute 60 percent of your final grade (for my portion of the course), and problem sets will comprise the remaining 40 percent. Final grades for Economics 671 will then be based on your overall scores from my portion of the course as well as those from the second-half of this semester. Since the problem sets count for 40 percent of your final grade in my portion of the class, they will be graded rigorously.

There is no required textbook for this portion of the course, though *Statistical Inference* (second edition) by Casella and Berger is recommended. This is a good all-around reference book for problems you may encounter in your own work. In later portions of the sequence, the required
text will be *Econometric Analysis* by Greene. This is a standard reference text in econometrics, providing some treatment of most of the important topics encountered in econometrics. This book, however, does not provide sufficiently detailed treatment of the topics we cover during the first-half of the semester. Generally speaking, these (or any other) books should serve to supplement your understanding of the lectures rather than substitute for it.
3. Course Outline

The following is a very rough outline of the topics covered in this course. I have broken them down into topics I expect we will cover, although we may move faster or slower than expected.

(1 Week) Univariate and Multivariate Probability Theory.

(1 Week) Special Distributions and Distributions of Functions of Random Variables

(1 Week) Methods for Stochastic Simulation, Convergence of Random Variables

(1 Week) First Examination, more on convergence of random variables

(1 Week) Introduction to Asymptotic theory: Laws of Large Numbers and Central Limit Theorems

(1 Week) Paradigms in Econometrics: Bayesian and Classical Perspectives, Estimation: Risk, Bayes Risk, Admissability, Inference.