Econ 628
Econometrics I
Professor Tim Halliday
Class Time: MW 12:00-1:30
Office Hours: Thursday 3:00 – 4:30

Course Description:

This is the first part of the graduate econometrics sequence at UHM. The course will be divided into two parts. The first will focus on probability and statistics. The emphasis of this part will be to lay down the mathematical foundations that you will need to understand the theory and practice of modern econometrics. Topics will include probability theory, distributions, expectations, asymptotic theory, Maximum Likelihood and testing. The second part will provide an introduction to the linear regression model. Emphasis will be placed on the finite and large sample properties of the Ordinary Least Squares estimator and on the plausibility of the assumptions that are required for these properties to hold.

Texts:

DeGroot, M and Schervish, M 2002. *Probability and Statistics*, 3rd Edition, Addison Wesley

Hogg, R. and Craig, A. 1995. *Introduction to Mathematical Statistics*, 5th Edition, Prentice Hall

Hayashi, F. 2000. *Econometrics*, Princeton University Press

Hayashi's book is required. Either Hogg and Craig or DeGroot and Schervish is required, but you do not need to buy both. In addition, my own lecture notes and copies of parts of other texts may also be used.

Course Requirements:

The requirements of this course are weekly problem sets, a midterm exam and a final exam. Your grade will be determined by the following formula:

Problem Sets	-	25%
Midterm	-	35%
Final	-	40%

Problem sets will be an important part of the course. You are encouraged to work together, but are required to hand in your own problem set. Towards the end of the course, the problem sets will also include empirical exercises which will require you to use STATA.

Outline (Tentative):

Probability Theory (DS: Ch. 1 and Ch. 2)

set theory; definition and properties of probabilities; conditional probability; independent events; Bayes Theorem

Distributions and Random Variables (DS: Ch 3)

random variables; discrete and continuous distributions; multivariate distributions; marginal distributions; conditional distributions; independent random variables; univariate and multivariate normal distributions

Expectations (DS: Ch. 4)

definition and properties of expectations; moments; moment generating functions; conditional expectation; sample means; Law of Large Numbers

Asymptotic Theory (H: Ch 2)

definitions of convergence; Law of Large Numbers; Central Limit Theorem; delta method; Slutsky Theorem

Estimation and Inference (HC: Ch. 6 and Ch 8)

point estimation; confidence bands; information equality; Maximum Likelihood

Testing (DS: Ch. 8 and supplemental material)

p-values; Neyman-Pearson Theorem; type I and type II errors; power functions

OLS – Small and Large Sample Theory (H: Ch. 1 and Ch. 2)

finite sample properties, testing, Generalized Least Squares, relationship to MLE, asymptotic properties, heteroskedasticity

Generalized Method of Moments (H: Ch 3)

endogeneity, identification, large sample properties, over-identification