Curriculum for Econometrics  
GS63.2707  

First Version: July 9, 2001  
This Version: July 16, 2001

**Basics**

Instructors: Neil Chriss and Bill Krasker will be co-teaching the course.  
Day & Time: Mondays, 7:10pm – 9:00pm  
Room: 401 Main Building (the Main Building is located at 100 Washington Square East between Waverley Place and Washington Place).

**Texts**


**Overview**

**Requirements**

We require a sound understanding of basic probability theory including an understanding of pdf’s, the notion of mean, variance and higher moments. Familiarity with the bernoulli, binomial, normal, chi-square, t and F distributions is encouraged.

**Assignments**

**Course Outline**

**Lecture 1 (September 10, 2001):** *Statistical Inference, Estimation and Hypothesis Testing I (Neil Chriss).* Discussion of estimators, sampling properties, estimator performance. Discussion of hypothesis testing will include basics of statistical tests, testing power and likelihood ratio tests. Asymptotic results will be discussed.

**Lecture 2 (September 17, 2001):** *Statistical Inference, Estimation and Hypothesis Testing II (Neil Chriss).* More on lecture 1, discussion of variance, introduction to the Bayesian point of view, introduction to resampling methods.

**Lecture 3 (September 24, 2001):** *Linear Regression I (Bill Krasker):* Basic linear models. Fitting the model, estimating the parameters and their distributions. *Discussion of asymptotic results.*

**Lecture 4 (October 1, 2001):** *Linear Regression II (Bill Krasker):* The normal model.
Maximum likelihood estimation, hypothesis testing.

**Lecture 5 (October 8, 2001):** *Linear Regression III (Neil Chriss):* Generalized least squares, heteroskedasticity, auto-correlation including Durbin-Watson statistic. Discussion of bootstrap and other resample methods.

**Lecture 6 (October 15, 2001):** *Linear Regression IV (Neil Chriss):* Bayesian point of view and decision theory. Discussion of Bayes’ theorem, the logic of the Bayesian framework and the James-Stein rule.

**Lecture 7 (October 22, 2001):** *Non-linear Regression (Bill Krasker):* Focus on non-linear least squares. Estimating the sampling distribution of the estimator by simulation or from the asymptotic distribution.

**Lecture 8 (October 29, 2001):** *Times Series Analysis (Bill Krasker):* Time series modeling in general, stationary time series, maximum likelihood estimation. Discussion of GARCH models.

**Lecture 9 (November 5, 2001):** *Robust Statistics (Bill Krasker):* Discussion of the sources of anomalous data. Definition of a robust estimator. Discussion of the influence function, sensitivity, and breakdown point of an estimator. Presentation of bounded-influence and high-breakdown regression estimators.

**Lecture 10 (November 12, 2001):** *Model Building and Data Mining Issues (Neil Chriss):* Model selection issues techniques in the face of multiple variables.

**Lecture 11 (November 19, 2001):** *Applications I, Covariance Matrix Estimation (Bill Krasker):* Factor models using time-series and cross-sectional methods. Sensitivities to anomalous data. Methods with uneven time series.

**Lecture 12 (November 26, 2001):** *Applications II, Mortgage Modeling (Gregg Patruno, Goldman Sachs).*

**Lecture 13 (December 3, 2001):** *Applications III, Asset Management Models (Cliff Asness, AQR Capital).*