A. Course Objectives:

This course is a continuation of the standard graduate curriculum in econometrics. The course provides a systematic approach to econometric theory and techniques associated with single and multiple equation models, with special emphasis on qualitative and censored data, panel data, simultaneous equations, and time-series techniques. The emphasis will be to provide an intuitive, yet rigorous, theoretical understanding of the statistical methods used to analyze such models. There will be “hands on” experience using statistical software and actual data analysis. The course will provide students with exposure to selected empirical applications.

The student should be able to apply econometric tools to a wide range of economic problems. There will be regular exercises that allow the student to develop skills in formulating and estimating models. Some exercises will be analytical in nature, while others will involve estimation of models and interpretation of results.

B. Grading:

Homework and classroom participation 20%
Midterm 35%
Final Exam 45%

C. Textbooks:


Davidson, R. and J. MacKennon. *Estimation and Inference in Econometrics*

I. Qualitative and censored dependent variable model
   A. Discrete dependent variable model
      Linear probability model
      Probit model
      Logit model
   B. Limited dependent variable and duration models
      Tobit model
      Non-random sample selection effects
      Heckman’s method
      Other methods
   C. Duration models: Waiting time or Hazard functions

II. Large sample properties of estimators
    Convergence in probability
    Limiting distributions
    Convergence in distributions
    Asymptotic distributions

III. Estimating Systems of Equations by OLS and GLS
     Multivariate Linear Model
     Seemingly unrelated regressions
     Linear unobserved effects in panel data

IV. Stochastic regressors and systems of regression equations
    A. General issues and identification in simultaneous equation models (SEM)
       Rank and order conditions
       Methods to achieve: normalization, identities, restrictions on coefficients and covariances
    B. Estimation
       Single equation: IV, 2SLS
       Systems of equations: 3SLS, FIML
    C. Testing—generally and for endogeneity/exogeneity
    D. Forecasting in SEM

V. Time-Series Models
   A. Definitions and examples of stationary time-series models
      1. General processes
         Autoregressive, AR(r)
         Moving average, MA(s)
         Autoregressive—moving average, ARMA(r,s)
      2. Covariance stationarity
         Meaning
         Fitting models
   B. Nonstationary time-series models
      1. Models
         Definition
         Importance
         Fitting
      2. Testing
         Unit root (Dickey-Fuller and others)
         Methods to induce stationarity (differencing, structural breaks)
         Spurious regressors
         Cointegration
   C. Forecasting with time-series models
I. Qualitative and Censored Dependent Variables
   A. Discrete dependent variable models
   
   B. Limited dependent variable, censored regression and nonrandom selection
      Greene, W. H. *Econometric Analysis*, Ch 22, pp 756-802
      Wooldridge, J. *Econometric Analysis*, Ch 16-17, pp 517-602

   C. Duration Models

II. Large Sample Properties of Estimators
    Ruud, P. A. *Classical Econometrics*, Ch 13, pp 245-280

III. Estimating Systems of Equations by OLS and GLS: SUR and Panel Models
     Wooldridge, J. *Econometrics Analysis*, Ch 7 & 10, pp 143-182 & 247-298
     Greene, W.H. Econometrics Analysis, Ch 13-14, pp 283-377

IV. Stochastic Regressors and Systems of Regression Equations
    A. General Issues and Identification
       Wooldridge, J. *Econometric Analysis*, Ch 9, pp 209-245
       Ruud, P.A. *Classical Econometric Theory*, Ch 26, pp 697-717
    B. Limited Information Estimation
Wooldridge, *J. Econometric Analysis*, Ch 8, pp 183-208
C. Full Information Estimation and Testing
Wooldridge, *J. Econometric Analysis*, Ch 9, pp 209-246

IV. Time-Series Models
A. Stationary Time-Series Models
   Enders, W., *Applied Econometric Time-Series*, Ch 1 and 2, pp 1-128
B. Nonstationary Time-Series Models and Cointegration
C. Forecasting