**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 econometric models, with special emphasis on qualitative and censored data, panel data, multiple endogenous variables, and time-series data. The emphasis will be to provide an intuitive, yet rigorous, theoretical understanding of the statistical methods used to analyze such data and 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.

**Grading:**

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

**Textbooks:**

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

II. Properties of estimators and M-estimation
   A. Large Sample
      Convergence in probability
      Limiting distributions
      Convergence in distribution
      Asymptotic distributions
   B. M-estimators

III. Estimating Systems of Equations by OLS and GLS
    Multivariate Linear Model
    Seemingly unrelated regressions (SUR)
    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 and M-estimators
    Ruud, P. A. *Classical Econometrics*, Ch 13, pp 245-280

III. Estimating Systems of Equations by OLS and GLS: SUR and Panel Data Models
    Greene, W.H. Econometrics Analysis, Ch 14, pp 339-357, 363-369
    Wooldridge, J. *Econometrics Analysis*, Ch 7& 10, pp 143-182 & 247-298
    Greene, W.H. *Econometric Analysis*, Ch 13, pp 283-338

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

V. Time-Series Models
   A. Stationary Time-Series Models
   B. Nonstationary Time-Series Models and Cointegration
   C. Forecasting