

# Quantitative Methods in Finance (FINA 8397)

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Tuesday, 9-12, Room 210

## Outline

This course is the second part of the first year Ph.D. sequence in Econometrics. The goal of the Econometrics sequence is to provide you with a broad overview of modern econometric tools and techniques. This means understanding when to use which test, which estimator and why. This sequence is NOT designed to teach you how to use SAS or Eviews. I will assume that you already have a familiarity with OLS, the linear regression and other basics from the first part of the Econometrics sequence.

## Prerequisites

This class is designed for first year PhD students in Finance or related fields. The pre-requisite is an introductory econometrics/statistics course. A fundamental knowledge of linear and matrix algebra, calculus and statistics is a prerequisite for this course.

## Reading Material

I will make available to you a set of notes and handouts. This will be our main text. The following are extremely useful references which are available on-line through Amazon.com.

*Econometric Analysis*, 5<sup>th</sup> Edition, by William H. Green, Prentice Hall, 2003.  
This is an excellent overview of Econometrics at the level of first year PhD students in Finance or Economics. It includes an introduction on linear algebra.

*Time Series Analysis*, by J.D. Hamilton, Princeton University Press, 1994.  
This is the modern bible of time series for economists. It is intended for students who already have a rudimentary knowledge of econometrics.

## How You Are Graded

The examinable material for this course includes the topics that are covered in class. Exam policies: All exams and problem sets must be finalized within a week of the return of the work (i.e., complaints, disputes, questions settled).

Assessment for this course will be:

Assignments	30%
Midterm	25%
Final exam	25%
Class Participation	20%

## **Class Schedule (subject to change!)**

### **Part 1, Review of Measure Theory: What is a random variable?**

### **Part 2, Review of the Multiple Regression**

### **Part 3, Generalized Least Squares**

- Heteroskedasticity
- Autocorrelation

### **Part 4, Maximum Likelihood Estimation (MLE)**

### **Part 5, Simultaneous Equations**

### **Part 6, Generalized Method of Moments (GMM)**

### **Part 7, Limited Dependent Variables**

- Binary choice models
- Probit, Logit Models

### **Part 8, Time-Series Analysis**

- Lag operators
- ARMA models
- Switching models

### **Part 9, Continuous Time Models**

- Brownian motion
- Diffusions

### **Part 10, Estimation of Continuous Time Models**

- QMLE
- Indirect Inference
- Euler approximations
- Continuous GMM