

The New School for Social Research  
Department of Economics  
Prof. Dr. Christian Proaño  
E-mail: proanoac@newschool.edu  
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## **GECO 6282 Advanced Econometrics II:**

### **Empirical Macroeconometrics**

#### **Course Description**

The primary purpose of this course is to introduce you to a variety of state-of-the-art estimation techniques used in empirical macroeconomic research. A special emphasis will be put on multivariate time series analysis (VAR & VECM modeling), GMM and nonlinear estimation techniques, state space modeling and real-time issues in econometrics.

#### **Course Outline**

##### **I. Introduction**

- The Evolution of Macroeconometric Modeling
- Modern Approaches to Empirical Macroeconometric Modeling

##### **II. Review of Univariate Time Series Analysis**

1. Stationary Time Series
  - AR Models
  - MA Models
  - ARMA Models
  - Model Selection
2. Non-Stationary Time Series
  - Trend- vs. Difference Stationary Series
  - Unit Root and Stationarity Tests
3. Time Series Decomposition Methods

### **III. Multivariate Time Series Analysis**

1. ARDL Models
2. Cointegration and Error Correction
  - Short- vs. Long-Run Dynamics
  - Estimation
3. VAR Models:
  - Model Selection and Diagnosis
  - Granger Causality
  - Impulse Response Analysis
  - Structural VAR Models
4. VECM Models

### **IV. Instrumental Variables Estimation**

1. Introduction
2. Traditional Instrumental Variables Estimation Techniques
3. GMM Estimation

### **V. Nonlinear Time Series Models**

1. Introduction
2. Structural Change in Econometric Models
  - Introduction
  - Tests for Structural Change
  - Estimation
3. Tests for Nonlinearity
4. Smooth Transition Models: LSTAR and ESTAR

### **VI. State-Space Modeling**

1. Introduction
2. The Kalman Filter
3. Time-Varying Coefficients Estimation
4. Markov-Switching Models

## VII. Further Topics in Advanced Macroeconometrics

### References

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- Enders, W. (2009), *Applied Econometric Time Series*, third edn, John Wiley & Sons, Inc.
- Favero, C. A. (2001), *Applied Macroeconometrics*, Oxford University Press, Oxford.
- Franses, P. H. and van Dijk, D. (2000), *Non-Linear Time Series Models in Empirical Finance*, Cambridge University Press, Cambridge, UK.
- Greene, W. (2007), *Econometric Analysis*, sixth edn, Prentice Hall.
- Hamilton, J. D. (1994), *Time Series Analysis*, Princeton University Press.
- Hayashi, F. (2000), *Econometrics*, Princeton University Press, Princeton.
- Lütkepohl, H. (2010), *New Introduction to Multiple Time Series Analysis*, Springer, Berlin.