

## **COURSE: High-dimensional time series analysis**

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### **COURSE BACKGROUND**

The course covers the basic aspects of multivariate time series analysis, with the focus on modeling and forecasting a large set of variables. Empirical applications will be illustrated using updated software tools.

### **LEARNING OBJECTIVES**

- ✓ To study the basic theory of multivariate processes.
- ✓ To gain experience in analyzing multivariate time series data.
- ✓ To learn Vector Auto-Regressive (VAR) models.
- ✓ To learn Diffusion Indexes, Factor Models, and their applications.

### **METHODOLOGY**

Theoretical lessons and practice using R and Matlab. The R package MTS will be heavily used.

### **EXAM**

The exam is a written one of 1 hour.

### **CONTENTS**

- Multivariate linear time series: introduction and basic concepts (Chapter 1 of the textbook).
- Vector Auto-Regressive (VAR) Models (Chapter 2 of the textbook).
- Bayesian VARs (Chapter 2 of the textbook).
- Factor models (Chapter 6 of the textbook).

### **TEXTBOOK**

Ruey S. Tsay (2014) *Multivariate Time Series Analysis with R and Financial Applications*, Wiley, ISBN: 978-1118617908.

Web page for the textbook: <http://faculty.chicagobooth.edu/ruey.tsay/teaching/mtsbk/>

### **ADDITIONAL SUGGESTED READING**

Koop, G.M. (2013), Forecasting with Medium and Large Bayesian VARs, *Journal of Applied Econometrics*, 28, 177-203

Stock, J.H., and M.W. Watson (2011), Dynamic Factor Models, in Clements, M.P., and D.F. Henry (eds.) *Oxford Handbook of Economic Forecasting*, Oxford University Press.