

**Academic Year 2021-2022**  
**Syllabus**  
**Latent Variable Models**  
**Prof. Alessio Farcomeni**

### **Course Description**

The course will briefly introduce latent variable models for empirical exercises in economics, finance, and business. We will give an overview of possible specifications of univariate and multivariate latent variable models, with special attention to interpretation and connections with the concept of unobserved heterogeneity. We will mostly focus on latent Markov models with categorical outcomes, but most of the concepts apply in general. The *R* software for statistical computing will be used throughout.

### **Prerequisites**

Attending students must have a good knowledge of linear and logistic regression models, and the *R* software.

### **Schedule of Topics**

Latent variables and unobserved heterogeneity. The EM algorithm. Time-fixed and time-varying unobserved heterogeneity. Latent Markov models. Covariates for the manifest distribution. Covariates for the latent distribution. Multivariate outcomes. Recent developments and routes for further research.

### **Textbook**

Bartolucci, F., Farcomeni, A. and Pennoni, F. (2013) *Latent Markov Models for Longitudinal Data*, Chapman & Hall/CRC Press

### **Examination**

Students will have to take a written exam. A mix of closed and open questions will both the theoretical and practical aspects of the material, for instance through interpretation of output from data analyses.

### **E-mail**

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