UCLouvain

lecon2601

2023

Advanced Econometrics II - Time Series Econometrics

5.00 credits	30.0 h	Q2

Teacher(s)	Van Bellegem Sébastien ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	The course must cover the important and essential themes of the econometrics of time series analysis and their application in some fields of economics, like macroeconomics and finance. The basic concepts of stationarity and ergodicity are taught in the prerequisite course. The main themes for this course are those of linear time series models (autoregressive and moving average models), unit roots and cointegration. Both univariate and multivariate models must be taught. For non linear time series models, a selection of topics has to be done mainly among ARCH models, Makov-switching models, and state-space models. In all topics, the themes of model building, evaluation and prediction are included.
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 The purpose is to train the students in the tools and models useful for the econometric analysis of economic time-series. Students will learn to understand in depth and apply correctly the techniques. The course prepares to research in the field of time-series analysis and its applications.
Evaluation methods	Students are expected to complete a take-home final project by themselves. The project will consist of both analytical and empirical questions.
Teaching methods	Weekly lecture.
Content	The course aims to find models that explain dynamical observations in economics. It considers the model-based method and attempts to infer model parameters by iteratively fitting observations with theoretical predictions from trial models. To this aim, it provides a necessary introduction to the basic theory of the following three types series: discrete-time Markov chain, continuous-time Markov chain, and continuous-time and continuous-state Markov processes. The structure of the course is given as follows (subject to change) 1. Numerical methods 2. Stochastic numerical methods 3. Markov chains 4. Branching process 5. Continuous-time Markov chains 6. Birth and death processes 7. Continuous time Markov processes 8. Diffusion processes 9. Stochastic differential equations 10. Applications: competition, epidemic, population and spatial models
Inline resources	Moodle UCL (> https://moodleucl.uclouvain.be/).
Bibliography	William J. Stewart (2009), Probability, Markov Chains, Queues, and Simulation: The mathematical basis of performance modeling, Princeton University Press Crispin Gardiner (2009), Stochastic Methods: A handbook for the natural and social sciences, 4th Edition , Springer
Faculty or entity in charge	ECON

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Economics: Econometrics	ETRI2M	5		
Master [60] in Economics : General	ECON2M1	5		
Master [120] in Statistics: General	STAT2M	5		
Master [120] in Economics: General	ECON2M	5		