UCLouvain

lstat2170

2019

Times series

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

5 credits	22.5 h + 7.5 h	Q2

Teacher(s)	von Sachs Rainer ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	The principal subjects of this course on an introduction into time series analysis will include the modelling, estimation and prediction of two types of processes - linear processes and heteroscedastic models of non-linear processes. We follow basically a parametric approach - the student will learn how to quantify statistical uncertainty while estimating the model parameters for the problem of forecasting future values of the observedseries.
Aims	1 The aim of this course is to give a good comprehension of the theory and application of stochastic time series modelling, with a view towards prediction (forecasting). - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** The examination will be oral. An applied data analysis project has to be prepared on the computer.
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Basic models of linear time series will be treated in the first part. The data analysis, i.e. estimation of the model parameters for forecasting, will be based predominantly on Box-Jenkins methods. In the second part of the course some elements of modelling financial data with the more recently developed ARCH and GARCH models will be given and included into the practical part of the course (done with the S-Plus software).
Content	1. Modelling time series data: an introduction 2. Linear processes - simple parametric models (ARMA) 3. Estimation and prediction of ARMA models 4. Box-Jenkins analysis - (S)ARIMA models 5. Non-linear processes - heteroscedastic (G)ARCH models - applications to modelling financial data
Bibliography	Brockwell, P. and R. Davis (1996), Introduction to Time Series and Forecasting. Springer, New York Brockwell, P and R. Davis (1991), Time Series, Theory and Methods. Springer, New York Gourieroux, Ch. (1992), Modèles ARCH et applications financières. Economica, Paris
Other infos	Prerequisites A general knowledge of basic statistical concepts (on the level of a first introductory course in statistics) is necessary.
Faculty or entity in charge	LSBA

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Biomedical Engineering	GBIO2M	5		
Master [120] in Mathematical Engineering	MAP2M	5		
Master [120] in Data Science : Statistic	DATS2M	5		
Master [120] in Statistic: Biostatistics	BSTA2M	5		
Certificat d'université : Statistique et sciences des données (15/30 crédits)	STAT2FC	5		
Master [120] in Economics: General	ECON2M	5		
Master [120] in Actuarial Science	ACTU2M	5		
Master [120] in Statistic: General	STAT2M	5		