lstat2170

2024

Times series

5.00 credits	30.0 h + 7.5 h	Q2

Teacher(s)	von Sachs Rainer ;
Language :	English
Place of the course	Louvain-la-Neuve
Prerequisites	Concepts and tools equivalent to those taught in teaching units LSTAT2020 — Logiciels et programmation statistique de base LSTAT2120 — Linear models
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.
Learning outcomes	**At the end of this learning unit, the student is able to :** 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).
Evaluation methods	The examination will be oral. An applied data analysis project has to be prepared on the computer.
Teaching methods	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 R-software). Some extensions for treating multivariate (bivariate) time series finalise the course.
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 6. Extensions to multivariate (bivariate) series
Inline resources	https://moodle.uclouvain.be/course/view.php?id=1960
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	Learning outcomes
Master [120] in Data Science : Statistic	DATS2M	5		🔍
Master [120] in Biomedical Engineering	GBIO2M	5		🔍
Master [120] in Statistics: Biostatistics	BSTA2M	5		🔍
Master [120] in Actuarial Science	ACTU2M	5		🔍
Master [120] in Statistics: General	STAT2M	5		🔍
Master [120] in Mathematical Engineering	MAP2M	5		🔍
Master [120] in Economics: General	ECON2M	5		🔍
Certificat d'université : Statistique et science des données (15/30 crédits)	STAT2FC	5		🔍