




5 credits

30.0 h + 12.0 h

Q1

Teacher(s)	Gao Zhengyuan ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	Time series analysis requires to understand the notions of stationarity and non-stationarity, which will be presented in an intuitive and detailed way by the use of examples of macroeconomic and financial time series. Then, econometric models adapted to model such series will be explained and applied. The theme of prediction is obviously very important for time series and will be covered for each type of model. Although the course is focused on the univariate approach, an introduction to multivariate aspects is foreseen. Inference methods (like ordinary least squares and maximum likelihood) are taught or reminded in the context of the models that require them.
Aims	<p>1 The objective is to train students to use econometric methods for modelling and predicting economic and financial time series. The emphasis is put on applications in macroeconomics and finance, and to the extent necessary for that, on understanding the methods and models.</p> <p>-----</p> <p><i>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".</i></p>
Evaluation methods	There are two parts to the exam: (1) a writing exam (14 points out of 20), and (2) a practical part with R (6 points out of 20). The second part consists of two home assignments.
Teaching methods	<p>The course includes lectures by the lecturer and tutorials supervised by an assistant.</p> <p>The teacher explains the theory and some implementations. The methods are each illustrated by examples of application in various fields of the economy.</p> <p>During the practical work sessions, students learn to apply the methods seen during the course on real data. This learning is done with the software R.</p>
Content	<p>(subject to change)</p> <ol style="list-style-type: none"> <li>1. Time Series Data and Programming</li> <li>2. Stationarity</li> <li>3. Moving Average Model (MA)</li> <li>4. Auto-Regressive Model (AR)</li> <li>5. ARMA Modeling</li> <li>6. Non-stationarity and Integrated process</li> <li>7. Filters and Seasonality</li> <li>8. System Identification</li> <li>9. Vector AR</li> <li>10. VAR Modeling</li> <li>11. Kalman Filter</li> </ol>
Inline resources	See Moodle UCL ( > <a href="https://moodleucl.uclouvain.be/">https://moodleucl.uclouvain.be/</a> ).
Bibliography	<ul style="list-style-type: none"> <li>• Introductory Time Series with R (2009), Paul S.P. Cowpertwait, Andrew V. Metcalfe.</li> <li>• Les supports de cours sont disponibles sur moodle.</li> </ul> <p>Livre de référence (Reference book): Introductory Time Series with R (2009), Paul S.P. Cowpertwait, Andrew V. Metcalfe.</p> <p>Autres livres de référence (Other reference books) Time Series Analysis and Its Applications with R Examples (2011), <u>3rd Edition</u>, Robert H. Shumway, David S. Stoffer Time Series Analysis: Forecasting and Control (2015), <u>5th Edition</u>, George E. P. Box, Gwilym M. Jenkins, Gregory C. Reinsel, Greta M. Ljung</p>
Faculty or entity in charge	ECON

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Economics: General	<a href="#">ECON2M</a>	5		
Master [120] in Statistic: General	<a href="#">STAT2M</a>	5		
Master [120] in Mathematical Engineering	<a href="#">MAP2M</a>	5		
Master [120] in Agriculture and Bio-industries	<a href="#">SAIV2M</a>	5		