# Time series and analysis forecasting

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***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The Time Series Analysis and Forecasting course provides students with the fundamental knowledge to build and apply time series forecasting models in a variety of experimental data contexts using various statistical approaches. At the end of the course students should be able to choose an appropriate model for a given dataset and fit the model using appropriate software packages, as well as to compute and evaluate the model forecasts.

***COURSE CONTENT***

* The multiple regression models
* Time series: definition and main characteristics
* Stochastic processes
* Probability models for time series: stationarity, moving average (MA), autoregressive (AR), and autoregressive integrated moving average (ARIMA) models
* Autoregressive distributed lag (ADL) models
* Vector autoregression (VAR) models
* Model testing

***READING LIST***

* *Time Series Analysis and Its Applications: With R Examples*, 4th Edition, by Robert H. Shumway and David S. Stoffer, Springer Verlag.
* *Introduction to Econometrics*, 4th Edition, James H. Stock, Mark W. Watson, Pearson
* *Forecasting: Principles and Practice,* 3rd Edition, Rob J Hyndman and George Athanasopoulos

***TEACHING METHOD***

The course will include lectures and class exercises based on traditional teaching and teach by example principles. It is strongly advised to attend lectures for working on case studies and examples, and for revising materials.

The course also involves lectures and exercise sessions using the integrated development environment (PyCharm, Jupiter, RStudio, Tensorflow). Active participation, and ongoing personal study are required.

***ASSESSMENT METHOD AND CRITERIA***

Knowledge on statistical techniques and basic skills on Python programming are recommended.

Attendance at lectures and practical sessions are strongly recommended.