

NOVA Information Management School

NOVA IMS

Course	Forecasting Methods
Coordinator:	Jorge Morais Mendes
ECTS	6
Objectives:	<p>The main objective of this course is to develop the skills needed to do empirical research in fields operating with time series data sets. The course intends to meet two goals. It provides tools for empirical work with time series data and is an introduction into the theoretical foundation of time series models. Much of statistical methodology is concerned with models in which the observations are assumed to be independent. However, many data sets occur in the form of time series where observations are dependent. In this course, we will concentrate on time series analysis, with a balance between theory and applications. After completing this course, a student will be able to analyze time series data using available software. In order to emphasize application of theory to real (or simulated) data, we will use R software.</p>
Attending requirements:	Statistics and linear algebra (recommended)
Curricular Unit Contents:	<ol style="list-style-type: none"> 1. Time series basics: overview, autocorrelation and AR(1) model 2. R tutorial 3. Moving Average (MA) models and partial autocorrelation 4. ARIMA Models: non-seasonal ARIMA models; diagnostics; forecasting 5. Seasonal ARIMA models; identification 6. Decomposition models 7. Exponential smoothing 8. The Periodogram 9. Regression with ARIMA errors 10. Two time series and cross-correlation 11. Var models 12. ARCH and GARCH models

	13. Longitudinal analysis 14. Intervention analysis
Teaching methods:	The course is based upon lectures and lab classes
Grading methods:	<ul style="list-style-type: none"> • (60%) Final exam (1st or 2nd round dates) • (40%) Project
Bibliography:	<ul style="list-style-type: none"> • Shumway, R.H. and Stoffer, D.S. Time Series Analysis and its Application with R Examples, 3rd edition, Springer, 2011. (http://www.stat.pitt.edu/stoffer/tsa3/) • Makridakis, S., Wheelwright, S.C., Hyndman, R.J. Forecasting: Methods and Applications, 3rd edition, John Wiley & Sons, 1998. • Forecasting: principles and practice: https://www.otexts.org/book/fpp • Little Book of R for Time Series: http://a-little-book-of-r-for-time-series.readthedocs.org/en/latest/ • Murteira, B., Muller, D., Turkman F. Análise de Sucessões Cronológicas, 1ª edição, McGraw Hill, 1993