Time Series Analysis

Academic Year: (2019 / 2020) **Review date: 01-05-2020**

Department assigned to the subject: Statistics Department

Coordinating teacher: KAISER REMIRO, REGINA

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

OBJECTIVES

Knowledge acquisition of: 1) univariate time series models; 2) multivariate time series models; 3) stochastic volatility models; 4) network analysis and connectivity; 5) visualization techniques in networks; 6) graphical models and modelling of dependency; 7) hidden Markov models; 8) estimation and interpretation of hidden Markov models; 9) basis representation of functional data; 10) regression models with functional prediction/response; 11) classification with functional data.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Basic concepts in Time Series Analysis.
1.1. Random samples and properties of time series.
1.2. Decomposition of a time series: trend, seasonality, cycle and noise.
1.3. Stationary transformations for trend and seasonal.
1.4. Deterministic and stochastic components.

2. Linear Univariate ARIMA models.
2.1. Sationarity and differencing.
2.2. Autocorrelation function and its estimation.
2.3. Autoregressive models AR(p).
2.4. Moving Average models MA (q).
2.5. Non seasonal ARIMA models.
2.6. Estimation and order of selection.
3.7. Forecasting.
3.8. Seasonal ARIMA models.

3. Volatility models.
3.1. ARCH and GARCH modelling.
3.2. Testing strategy for heterocedastic models.
3.3. Volatility forecast.

4. Multivariate time series
4.1. Time series regression.
4.2. VAR models.
4.3. Cointegration.
4.4. Forecasting properties.

% end-of-term-examination:	40
% of continuous assessment (assigments, laboratory, practicals…):	60

BASIC BIBLIOGRAPHY

- Brockwell P.J. and Davis R.A. Introduction to Time Series and Forecasting., Springer., 2002
- Enders W. Applied Econometric Time Series., Wiley, 2015
- Hamilton J. Time Series Analysis., Princeton University Press, 1994
- Mills T.C. The Econometric Modelling of financial Time Series., Cambridge University Press, 1999