Time Series (STEM-EAP17)

Master's in Applied Econometrics and Forecasting
1st Semester 2021/2022
Wednesdays 18:00-21:00, F2-103

Instructor: **Prof. Nuno Crato**, 105 Quelhas 4, 21 392 5846 (x. 3846)
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Textbook: **W.S. Wei**, *Time Series Analysis: Univariate and Multivariate Methods,* 2nd Ed., Addison-Wesley, 2005.

Support: P. Brockwell & R. Davis, Introduction to Time Series and Forecasting, 3rd ed., Springer 2016

T.C. Mills, Applied Time Series Analysis: A Practical Guide to Modelling and Forecasting, Academic Press 2019

Software: PEST/ITSM, EVIEWS, Python, R, or any other software with time series analysis and forecasting capability

Goals: This is a first graduate course on univariate time series analysis and forecasting. It deals with linear models, autocorrelation analysis, and basic spectral methods. It intends to introduce the fundamental time series theoretical tools and to initiate students' training in the practical analysis of economic and financial time series.

Evaluation: Two tests (2 x 15%), group project (35%) and final exam (35%).

Classes	Topics	Textbook
15 Sep	Stationary stochastic processes and time series	2.1 – 4
22 Sep	ACF, PACF, MA(∞) e AR(∞)	2.5 – 6
06 Oct	Autoregressive and moving average processes	3.1 – 2
13 Oct	Duality AR-MA and ARMA models – TEST 1	3.3 – 4
20 Oct	Nonstationary processes	4.1 – 3
27 Oct	Forecasting. Seasonality	5.1 – 7, 8.1 – 3
03 Nov	Model identification and fitting	6.1 – 2, 7.1 – 7
10 Nov	Model selection. Project preparation – TESTE 2	8.4
17 Nov	Unit root tests and practical examples	9.1 – 4
24 Nov	Fourier analysis	11.1 – 2
01 Dec	The spectrum and the periodogram	12.1 – 3
08 Dec	Periodogram, spectral estimation	13.1-13.3
15 Dec	Group projects presentation and discussion	

Note: Dec 1 and 8 are holidays and in due time we may have to adjust the schedule