

Times Series

Course title - Intitulé du cours	Time Series
Level / Semester - Niveau /semestre	M2 / S1
School - Composante	Ecole d'Economie de Toulouse
Teacher - Enseignant responsable	Barthe Franck
Other teacher(s) - Autre(s) enseignant(s)	
Other teacher(s) - Autre(s) enseignant(s)	
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Other teacher(s) - Autre(s) enseignant(s)	
Lecture Hours - Volume Horaire CM	12
TA Hours - Volume horaire TD	
TP Hours - Volume horaire TP	10
Course Language - Langue du cours	Anglais
TA and/or TP Language - Langue des TD et/ou TP	Anglais

Teaching staff contacts - Coordonnées de l'équipe pédagogique :

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Course's Objectives - Objectifs du cours :

The objective of this module is twofold : provide the students with a good understanding of the main probabilistic models used in the statistic analysis of time series, and apply these models to concrete data. COURSE OUTLINE Time series analysis deals with the description, modeling and forecasting of data which are collected along time and enjoy strong correlations between successive observations. After reviewing the classical methods to extract the trend and seasonality of a time series, we will focus on the study of the residual/noise term. We will introduce the main notions in the study of weakly stationary random processes (autocorrelation, partial autocorrelation, spectral density, innovation). The AutoRegressive Moving Average processes will be presented, together with the methods allowing to identify them from observations. Eventually, models with autoregressive conditional heteroskedasticity will be considered, as they are employed commonly in modeling financial time series that exhibit time-varying volatility clustering. The class also includes sessions on machines to implement all of these methods through the use of the R software.

Prerequisites - Pré requis :

Probability and Statistics course of bachelor level. Basic knowledge on complex numbers. R framework.

Practical information about the sessions - Modalités pratiques de gestion du cours :

Laptops are accepted in the class.

Grading system - Modalités d'évaluation :

Final exam and short report to hand after the final session on machines.

Bibliography/references - Bibliographie/références :

ARAGON Y. – « Séries temporelles avec R », Springer BROCKWELL P. & DAVIS R. « Introduction to time series and forecasting » Springer GOURIEROUX C. et MONFORT A. – « Cours de séries temporelles », Economica.

Distance learning – Enseignement à distance :

Material on Moodle (lecture notes, exercise sheets, solve exercises), plus some remote classes