

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY		
ACADEMIC UNIT	DEPARTMENT OF STATISTICS		
LEVEL OF STUDIES	1st Cycle (UNDERGRADUATE)		
COURSE CODE	6145	SEMESTER	4 th
COURSE TITLE	Time Series Analysis		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
Lectures		4	8
Workshops			
Labs		2	
COURSE TYPE		Compulsory - Background	
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:		GREEK	
IS THE COURSE OFFERED TO ERASMUS STUDENTS			
COURSE WEBSITE (URL)		https://www.dept.aueb.gr/en/stat/content/time-series-analysis-8-ects	

(2) LEARNING OUTCOMES

Learning outcomes
<p>The aim of this course is to provide students with the learning of using appropriate time series models and techniques required for the analysis of time series data. After successfully completing the course, students will be able to:</p> <ul style="list-style-type: none"> • know the basic concepts of stationary processes • have learned the ARMA stochastic time series models • have learned about the time-varying ARCH/GARCH volatility models • be able to apply the Box-Jenkins methodology in empirical applications • be able to model and forecast time series data • know how to implement time series analysis using R
General Competences
<ul style="list-style-type: none"> • Searching, analysing and synthesizing data and information, using the necessary technologies • Adapting to new situations • Decision-making • Autonomous work • Teamwork • Working in an international environment

- Working in an interdisciplinary environment
- Generating new research ideas
- Project planning and management

(3) SYLLABUS

This course provides the theory and practice of time series analysis. It introduces the basic theory of stationary processes (characteristics of stationary and non-stationary time series and unit root testing), it describes and presents analytically stochastic time series models, ARMA models in particular, and the Box-Jenkins methodology for ARIMA models. The course introduces the class of conditional heteroscedastic models (ARCH/GARCH) and presents practical time series forecasting techniques. Illustrative examples applying time series models and techniques to actual economic and financial data are presented using R package. The empirical analysis consists of (a) unit root testing to exchange rate series and financial series, e.g. stocks and indices, and (b) modeling and forecasting economic/financial time series.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	YES	
TEACHING METHODS	Activity	Semester workload
	Lectures	40
	Lab Assignment	20
	Studying and Analyzing Bibliography	55
	Tutorial	20
	Assignment writing	10
	Self Study	55
	Course Total	200
STUDENT PERFORMANCE EVALUATION	Written examination at the end of the semester: 100% Project: 10%	
	Information is available at eclass	

(5) ATTACHED BIBLIOGRAPHY

- Δημέλη Σ. (2003, 3η Έκδοση): Σύγχρονες Μέθοδοι Ανάλυσης Χρονολογικών Σειρών, Εκδόσεις ΚΡΙΤΙΚΗ, Αθήνα.
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- Enders, Walter. Applied Econometric Time Series. New York: Wiley, 2010.
- Cowpertwait, Paul S.P., and Metcalfe V. Andrew. Introductory Time Series with R. New York: Springer Texts in Statistics, 2009.
- Cryer, Jonathan D., and Chan Kung-Sik. Time Series Analysis with Applications in R. Springer Texts in Statistics, 2010.
- Gujarati, Damodar N. Basic Econometrics. New York: McGraw-Hill, 2008.

- Pindyck, R.S. and D.L. Rubinfeld. *Econometric Models and Economic Forecasts*. New York: McGraw-Hill, 1991.
- Shumway, Robert H. and David S. Stoffer. *Time Series Analysis and Its Applications with R Examples*. New York: Springer Texts in Statistics, 2011.
- Tsay, Ruey S. *Analysis of Financial Time Series*. New York: Wiley, 2010.
- Wooldridge, Jeffrey. *Introductory Econometrics: A Modern Approach*. South-Western College Publishing, 2009.
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