



Subject card

Subject name and code	TIME SERIES MODELING, PG_00063716						
Field of study	Economic Analytics						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Part-time studies (on-line)	Mode of delivery			blended-learning		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Katedra Statystyki i Ekonometrii -> Faculty of Management and Economics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Piotr Paradowski				
	Teachers		dr Piotr Paradowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	16.0	0.0	16.0	0.0	0.0	32
	E-learning hours included: 24.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	32		5.0		88.0	125
Subject objectives	Effectively uses in-depth knowledge of economic time series analysis methods, applying the results of analyzes to formulate forecasts						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W04] analyzes complex problems in an in-depth way on the basis of reliable data and properly selected methods, obtaining logical solutions		creates time series models using known methods of their estimation, using advanced statistical software		[SW1] Assessment of factual knowledge		
	[K7_U03] formulates research problems and selects appropriate analytical methods for their effective solution, using advanced IT tools, and evaluates the results critically		formulates research problems of complex economic phenomena, the solutions of which uses for forecasting, carrying out a critical assessment of the results		[SU4] Assessment of ability to use methods and tools		
Subject contents	Classical time series analysis (trend, cyclical fluctuations) Exponential smoothing models Holt and Winters model Stochastic processes and time series Characteristics of stochastic processes Process spectrum autocorrelation functions Study of the stationarity of the time series Autoregressive (AR) processes Moving average (MA) processes Mixed processes (ARMA) Non-stationary mixed autoregression-moving average (ARIMA) processes Identification and estimation of models of stochastic processes Time series testing and forecasting						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Laboratory exercises		60.0%		50.0%		
	Final written exam		60.0%		50.0%		

Recommended reading	Basic literature	<p>Artur Suchwałko, Adam Zagdański, Analiza i prognozowanie szeregów czasowych, Wydawnictwo Naukowe PWN, 2015</p> <p>John D. Levendis, Time Series Econometrics: Learning Through Replication, Springer, 2018</p> <p>Douglas C. Montgomery, Cheryl L. Jennings, Murat Kulahci, Introduction to Time Series Analysis and Forecasting, 3rd Edition, Wiley, 2024</p>
	Supplementary literature	<p>S. Beckett, Introduction to Time Series Using Stata, Revised Edition, Stata Press, 2020</p> <p>M. Verbeek, A Guide to Modern Econometrics, 5th Edition, Wiley, 2017</p> <p>J. M. Box-Steffensmeier, J. R. Freeman, M.P. Hitt, and J. C. W. Pevehouse, Time Series Analysis for the Social Sciences, Cambridge University Press, 2014</p> <p>M. Pickup, Introduction to Time Series Analysis, SAGE Publications, 2015</p> <p>C. Ngai Hang, Time series: applications to finance with R and Splus, Wiley, 2011</p> <p>T. Kufel, Ekonometria Rozwiązywanie problemów z wykorzystaniem programu GRETL, PWN, 2011</p> <p>S.M. Kot, A. Sokółowski, J. Jakubowski, Statystyka, Difin, Warszawa, 2007</p> <p>M. Osińska, Ekonometria współczesna, TNOiK, 2007</p> <p>G.E.P. Box, G.M. Jenkins, Analiza szeregów czasowych PWN, Warszawa, 1983</p> <p>R. Otnes, L. Enochson, Analiza numeryczna szeregów czasowych, WNT, 1978</p>
	eResources addresses	<p>Adresy na platformie eNauczanie: MODELOWANIE SZEREGÓW CZASOWYCH (PG_00063716) - Moodle ID: 40216 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40216</p>
Example issues/ example questions/ tasks being completed	<p>What is a stochastic process and a time series? What is time series stationarity (including weak stationarity)? When is an AR(1) autoregression process stationary? What are the consequences of parameter ρ for the intervals (0;1) and (-1;0)? How do we define the AR(3) function? How do we define the MA(2) moving average function? State the stationarity condition of the ARMA process (p;q) In what situations do we use the generalized ARIMA model to model a time series?</p>	
Work placement	Not applicable	

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