



## Subject card

Subject name and code	TIME SERIES MODELING, PG_00063706						
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	Mode of delivery			at the university		
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		prof. dr hab. Stanisław Kot				
	Teachers		prof. dr hab. Stanisław Kot				
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: 0.0						
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) Stochastic processes and time series Characteristics of stochastic processes Process spectrum autocorrelation functions Stationarity of 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 Cointegration of time series Vector autoregressive (VAR) models, measuring the length of lags, estimation, hypothesis testing Impuls response function						
Prerequisites and co-requisites	statistics, mathematical statistics, econometrics						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Project		60.0%		50.0%		
	Exam		60.0%		50.0%		

Recommended reading	Basic literature	T. Kufel, Ekonometria Rozwiązywanie problemów z wykorzystaniem programu GRET, PWN, 2011 M. Osińska, Ekonometria współczesna, TNOiK, 2007 Box G.E.P. i Jenkins G.M. Analiza szeregów czasowych PWN, Warszawa, 1983 Kot S.M., Sokołowski A., Jakubowski J. Statystyka, Difin, Warszawa, 2007
	Supplementary literature	R. Otnes, L. Enochson, Analiza numeryczna szeregów czasowych, WNT A. Weron, R. Weron, Inżynieria finansowa, WNT C. Ngai Hang, Time series: applications to finance with R and Splus, Wiley
	eResources addresses	Adresy na platformie eNauczanie: Modelowanie szeregów czasowych nst - Moodle ID: 40455 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40455">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40455</a>
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 <math>\rho</math> 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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