

GDAŃSK UNIVERSITY

Subject card

Subject name and code	FORECASTING - QUANTITATIVE METHODS, PG_00044960								
Field of study	Economic Analytics								
Date of commencement of studies	October 2022		Academic year of realisation of subject			2023/2024			
Education level	second-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study				
Mode of study	Full-time studies		Mode of delivery		at the university				
Year of study	2		Language of instruction			English			
Semester of study	3		ECTS credits			2.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Katedra Statystyki i E	aculty of Management and Economics							
Name and surname	Subject supervisor		dr Piotr Paradowski						
of lecturer (lecturers)	Teachers	dr Piotr Paradowski							
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	boratory Project		Seminar	SUM	
of instruction	Number of study hours	0.0	0.0	30.0	30.0 0.0		0.0	30	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic ed in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	30		4.0		16.0		50	
	time series analysis and various forecasting techniques. Since the econometric methods that relate to forecasting are rather extensive, this course mainly focuses on regression-based forecasts and a GARCH volatility models. We will also cover econometrics topics such as autoregressive and moving average models and other topics related to forecasting.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K7_W10] has an in-depth knowledge of quantitative methods to describe and analyse socio-economic processes using information technology		The student is able to use Stata statistical software for advanced estimation of socio-economic processes.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects				
	[K7_U02] can use theoretical knowledge in the field of economics and finance to obtain, analyse and interpret data on economic processes and phenomena and on their basis formulate own opinions		The student collects appropriate information, constructs forecasts and verifies them.			[SU1] Assessment of task fulfilment			
	[K7_W07] has an in-depth knowledge on methods of social and economic phenomena description, including market information acquisition techniques and methods of analysis and modelling of economic processes		The student obtains data on market information from various sources and uses methods of analysis and modeling of economic processes.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects				
	[K7_K05] can think and act in an entrepreneurial way, understanding the consequences of actions taken		The student thinks in an entrepreneurial way.			[SK1] Assessment of group work skills			
	[K7_U04] can forecast complex socio-economic processes and phenomena using advanced methods and tools for the analysis of quantitative and qualitative data		The student selects appropriate methods and calculates forecasts of complex socio-economic phenomena.		[SU4] Assessment of ability to use methods and tools				

Subject contents	1. Review of Basic Linear Regression Analysis							
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	2. Regression from a Forecasting Perspective							
	3. Cross Sections: Forecast Model Building and Use							
	4 ForecastingTrends and Seasonal							
	5. Time-Series Models: Autoregressive Models							
	6. Forecasting Cycles with Autoregressions							
	7. Forecasting Cycles from a Moving-Average Perspective							
	8. Forecasting Cycles from an Autoregressive Perspective							
	9. Estimating, Forecasting and Diagnosing GARCH Models							
	10. Forecasting: Advanced Topics							
	Mothods of Quantitativo Analysis In	particular it is assumed the student i	s familiar with rogrossion model					
Prerequisites and co-requisites	estimation and related hypothesis testing techniques.							
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade					
	Case study	60.0%	100.0%					
Recommended reading	Basic literature	Diebold, Francis X. (2017), Forecas	ting in Economics, Business,					
		Finance and Beyond, Department of Economics, University of Pennsylvania, http://www.ssc.upenn.edu/~fdiebold/Textbooks.html. [Freely available under the Creative Commons Attribution- NonCommercial-NoDerivatives 4.0 International License at <u>https://</u> www.sas.upenn.edu/~fdiebold/Teaching221/Forecasting.pdf].						
	Supplementary literature	Stock, James H & Watson, Mark W. (2020). Introduction to Econometrics 4th edition Pearson						
	Becketti, Sean (2020). Introduction to Time Series Using Stata,							
	Diebold, Francis X. (2006). Elements of Forecasting, 4th edition. South- Western Pub.							
	Granger, C.W.J. (2014). Forecasting in Business and Economics, 2nd edition. Academic Press.							
	eResources addresses Adresy na platformie eNauczanie:							
	FORECASTING - QUANTITATIVE METHODS - Moodle ID: 34141							
			1,000136/view.prip:10-34141					

Example issues/ example questions/ tasks being completed	Ex 6. GARCH volatility forecasting (from the required textbook, Diebold, Francis X. (2017), p. 305)
	You work for Xanadu, a luxury resort in the tropics. The daily temperature in the region is beautiful year- round, with a mean around 76 (Fahrenheit!) and no conditional mean dynamics. Occasional pressure systems, however, can cause bursts of temperature volatility. Such volatility bursts generally dont last long enough to drive away guests, but the resort still loses revenue from fees on activities that are less pop- ular when the weather isnt perfect. In the middle of such a period of high temperature volatility, your boss gets worried and asks you to make a forecast of volatility over the next ten days. After some experimentation, you find that daily temperature y_t follows
	y_t O_t-1 ~ N(m, s_t^2) , where s_t^2 follows a GARCH(1,1) process, s_t^2 = w + a*e_t-1^2+ b*s_t-1^2
	a. Estimation of your model using historical daily temperature data yields m=76, w=3, a=.6, and b=0. If yesterdays temperature was 92 degrees, generate point forecasts for each of the next ten days conditional variance.
	b. According to your volatility forecasts, how many days will it take until volatility drops enough such that there is at least a 90% probability that the temperature will be within 4 degrees of 76?
	c. Your boss is impressed by your knowledge of forecasting, and asks you if your model can predict the next spell of bad weather. How would you answer him?
Work placement	Not applicable