

Subject card

Subject name and code	Advanced Forecasting, PG_00178710						
Field of study	Informatics and Econometrics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Optional subject group 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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		5.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Department of Econometrics -> Faculty of Management -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Lech Kujawski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	8.0	8.0	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		2.0		91.0	125
Subject objectives	Gaining advanced knowledge and skills in the field of forecasting and the assessment of prediction accuracy.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[IiEMU2_W06] The student possesses a structured understanding of the processes, methods, and tools necessary for the design, creation, development, and provision of suitable conditions for informatics, econometrics or statistics tools.		Demonstrates the ability to design an appropriate forecasting model for a given time series, select adequate estimation and validation tools, and compute, interpret, and report measures of forecast accuracy.		[SW2] presentation/project/paper/report		
	[IiEMU2_U03] The student is able to obtain and verify data from properly selected sources and to collect, process, and visualize it using modern econometrics, informatics or statistics tools.		Demonstrates proficiency in addressing challenges related to the exploration of large economic and financial databases, making informed decisions about data processing and presentation, and providing clear justification for methodological choices		[SU2] presentation/project/paper/report		
Subject contents	Theoretical foundations of forecasting based on econometric models forecasts based on the conditional expected value (optimal predictor in the classical regression model, optimal predictor in the generalized regression model).The issue of model forecast stability Chow tests. Recursive model analysis CUSUM and CUSUM of squares tests, Harvey-Collier test. Forecasting based on dynamic models. Forecasting using simultaneous equation models. Forecasts based on VAR models forecast error variance decomposition. Time series forecasting using VARMA models. Time series forecasting using nonlinear models. Forecasting using time-varying parameter (TVP) models. Forecasting based on Kalman Filter models.Machine Learning in forecasting.						

Prerequisites and co-requisites	Successfully completed coursework in econometrics and statistics.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	A written individual semester paper focusing on forecasting methods and their application in the analysis of economic data	51.0%	100.0%
Recommended reading	Basic literature	1. Hyndman, R.J., Athanasopoulos, G. (2021), <i>Forecasting: Principles and Practice</i>, OTexts 2. Durbin, J., Koopman, S.J. (2012), <i>Time Series Analysis by State Space Methods</i>, Oxford University Press. 3. Misztal, A. (2022), <i>Zastosowanie uczenia maszynowego w analizie danych ekonomicznych</i>, SGH. 4. Wróbel, A. (2012), <i>Modele równowagi ogólnej jako narzędzie wspomagania decyzji w polityce gospodarczej</i>, SGH.	
	Supplementary literature	1. Koop, G., Korobilis, D. (2010), <i>Bayesian Multivariate Time Series Methods for Empirical Macroeconomics</i>, Foundations and Trends in Econometrics. 2. Kołodziejczyk, D. (2009), <i>Filtr Kalmana zastosowanie w analizie szeregów czasowych</i>, materiały SGH.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Preparation of a forecast for a non-stationary time series, including an assessment of forecast accuracy using both ex post and ex ante evaluation methods.		
Work placement	Not applicable		

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