University of Gdańsk

Subject card

Subject name and code	Advanced Forecasting, PG_00178710		
Field of study	Informatics and Econometrics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
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_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
[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

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.

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