University of Gdańsk

Subject card

Subject name and code	Forecasting, PG_00178514						
Field of study	Informatics and Econometrics						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2028/2029		
Education level	Bachelor's 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	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		7.0		
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	16.0	16.0	8.0	0.0	0.0	40
	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	40		2.0		133.0	175
Subject objectives	Gaining knowledge of the theoretical foundations of forecasting theory under conditions of uncertainty and risk. Learning selected forecasting methods applicable to typical situations encountered in economic decision-making. Acquiring practical skills in generating forecasts and analyzing forecasting accuracy both ex ante and ex post.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[IiEL3_U02] Students can select or construct econometrics, informatics or statistics tools and apply them to describe and solve economic and social problems.	Selects a suitable forecasting model, constructs a forecast, and evaluates its accuracy against empirical data using ex post measures; in selected cases computes and interprets ex ante forecast accuracy indicators.	[SU2] presentation/project/paper/ report
[IiEL3_U01] The student can analyze and interpret social and economic processes and phenomena using knowledge and econometrics, informatics or statistics tools from management and quality sciences, economics and finance.	Recognizes and decomposes time series components and justifies decisions regarding the selection of appropriate forecasting methods.	[SU2] presentation/project/paper/ report
[IiEL3_U03] Students can obtain data from appropriately selected sources, use these data to solve economic and social problems, and process and interpret them using econometrics, informatics or statistics tools.	Explores economic and financial databases to identify time series relevant for forecasting.	[SU2] presentation/project/paper/ report
[IiEL3_W05] To an advanced degree, the student knows and understands the methods, techniques and informatics or statistics tools used to acquire, collect, process and present data in decision-making processes.	Solves challenges in exploring large databases of economic and financial data and decides on the methods of their processing and presentation.	[SW2] presentation/project/paper/ report

Subject contents

1. **Forecasting theory basic concepts**: forecasting as a process of inferring the future; functions of economic forecasts; forecasting methods; classification of forecasting methods; forecast variable, forecast, forecast error, forecasting horizon; time series, its components and types of time series models; forecasting vs. smoothing; stages of the forecasting process.
2. **General issues in analyzing forecasting accuracy**: ex post forecast accuracy measures (absolute error, relative error, ex post bias, mean absolute ex post forecast error, mean squared forecast error, mean ex post forecast error, mean percentage error, mean absolute percentage error MAPE, turning point accuracy and reliability coefficients, Theils decomposition of mean squared forecast error, corrections based on observed ex post errors).
3. **Forecasting methods based on moving average smoothing**: simple (naïve) forecasting methods; smoothing and forecasting using unweighted moving averages; smoothing and forecasting using weighted moving averages (linear, harmonic, exponential); moving trend.
4. **Adaptive forecasting methods**: Pegels' classification of smoothing-based methods; smoothing models for series level without and with seasonality (including Browns method); smoothing models with trend without and with seasonality (including Holts and Winters methods); models with damped trend.
5. **Basics of forecasting using single-equation econometric models**: classification of forecasts based on econometric models (unconditional and conditional forecasts; dynamic and static forecasts); forecast, mean ex ante forecast error, confidence interval for the forecast variable.
6. **Trend models (linear, nonlinear, creeping, with seasonality)**: the issue of model forecast stability (Chow tests), recursive model analysis (CUSUM and CUSUM of squares tests, Harvey-Collier test), point and interval forecasts (fan charts). From theory to practice generating forecasts for the static Phillips model and the dynamic model of consumption based on income (Permanent Income Hypothesis).

Prerequisites and co-requisites

Completed course in statistics and econometrics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written semester paper in forecasting	51.0%	100.0%

Recommended reading

Basic literature	1. Dittmann P, *Prognozowanie w przedsiębiorstwie*, Oficyna Wydawnicza, Kraków, 2022 2. Melich-Iwanek K., Adamus-Hacura M., Warzecha K., *Metody prognozowania*, Uniwersytet Ekonomiczny w Katowicach, 2018 3. Gajda J.B., *Prognozowanie i symulacja a decyzje gospodarcze*, Wydawnictwo C.H.Beck, Warszawa 2001
Supplementary literature	1. Hyndman R.J., *Forecasting, principles and practice*, OTexts, 2021 2. Makridakis S., Wheelright S.C., Hyndman R.J., *Forecasting; Methods and Applications*, third edition, John Wiley & Sons, 1998
eResources addresses	

Example issues/ example questions/ tasks being completed

Semester project involving the forecasting of a non-stationary time series and evaluation of forecast performance ex ante and ex post.

Work placement

Not applicable