GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	FORECASTING AND SIMULATIONS, PG_00066430		
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	Full-time studies	Mode of delivery	e-learning
Year of study	1	Language of instruction	English
Semester of study	2	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Statistics and Econometrics -> Faculty of Management and Economics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Michał Pietrzak	
	Teachers	dr hab. Michał Pietrzak	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	30.0	0.0	0.0	60

E-learning hours included: 60.0

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	60	4.0	61.0	125

Subject objectives

Analyzes economic phenomena in an innovative way, using in-depth knowledge in the selection of appropriate forecasting methods and verification of the received forecasts

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W03] Demonstrates in-depth knowledge of the applications of analytical methods and techniques for formulating and solving analytical problems	selects appropriate methods by calculating forecasts of complex socio-economic phenomena	[SW1] Assessment of factual knowledge
[K7_U04] Prepares and delivers convincing presentations of the results of specialized analyses, providing in-depth interpretations during debates and meetings with diverse audiences.	prepares professional presentations of innovative solutions to complex problems, interpreting connections between variables in the forecasting and simulation process	[SU5] Assessment of ability to present the results of task

Subject contents

Introduction to the subject of forecasting and simulation - basic concepts
Assessment of the quality of forecasting models and forecasts
Adaptive forecasting methods review
Forecasting based on linear and non-linear trends, with seasonal fluctuations and without fluctuations
Other forecasting methods based on time series
Assumptions for forecasting based on econometric models
Forecasting based on cause-and-effect econometric models - conditional forecasts
The use of autoregressive models in forecasting
Forecasting in conditions of autocorrelation of the random component
Forecasting in conditions of instability of structural parameters
Forecasting based on multi-equation models
Qualitative data models in forecasting

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	55.0%	60.0%
Case study + presentation	55.0%	20.0%
Test + Quiz	55.0%	20.0%

Recommended reading	Basic literature	Anderson, David R., Dennis J. Sweeney, and Thomas A. Williams. An introduction to management science: quantitative approaches to decision making. Cengage learning, 2019. Montgomery, Douglas C., Cheryl L. Jennings, and Murat Kulahci. Introduction to time series analysis and forecasting. John Wiley & Sons, 2015.
	Supplementary literature	Cieślak M., Prognozowanie gospodarcze - metody i zastosowania, PWN Warszawa 1997 i nowsze Radzikowska B. (red.), Metody prognozowania. Zbiór zadań, AE Wrocław 2004
	eResources addresses	Adresy na platformie eNauczanie: Forecasting and Simulations_2024_2025 - Moodle ID: 42783 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=42783
Example issues/ example questions/ tasks being completed	Based on monthly observations of cash in the vaults of monetary financial institutions of MFIs for the period from January 2017 to July 2020 (National Bank of Poland https://www.nbp.pl/home.aspx?f=/statystyka/statystyka.html), determine all possible expired forecasts and the expired forecast of phenomena for August 2020 using the following methods: naive method, simple moving average method with k smoothing constants of 3.4 and 5, respectively, weighted moving average method with k=3 smoothing constant and simple method of Brown's exponential smoothing with the smoothing constant =0.7 and the real time prediction h=1. Calculate the errors for the August 2020 forecast and the root mean square error of the expired forecasts.	
Work placement	Not applicable	

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