

Subject card

Subject name and code	Forecasting and Simulation, PG_00157246						
Field of study	Informatics and Econometrics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
Education level	Master'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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		5.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Department of Statistics -> Faculty of Management -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Tomasz Jurkiewicz				
	Teachers		dr Tomasz Jurkiewicz				
			dr Lech Kujawski				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	0.0	30
	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	30		20.0		80.0	130
Subject objectives	Acquisition of in-depth knowledge and advanced skills in forecasting based on various types of econometric models. Gaining practical ability to solve problems through computer simulation.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[liEMU2_K01] The student understands the need for continuous completion and deepening of acquired knowledge. The student inspires and organizes others' learning processes.	Is familiar with random number generators for uniform distributions, is able to evaluate the quality of generators through statistical tests and control tasks. He/She also knows methods for generating random numbers with any distribution.	[SK2] presentation/project/paper/report
	[liEMU2_W04] The student has an in-depth knowledge of advanced mathematical, statistical, econometric and IT methods that enable the acquisition, processing and analysis of data reflecting the functioning and growth of the national economy and its components, as well as the phenomena and processes occurring in their environment.	Is able to build a simulation model.	[SW2] presentation/project/paper/report
	[liEMU2_U05] The student is able to make a statistical description of basic and detailed economic categories at an advanced level, formulate and verify hypotheses about their formation.	Is aware of the applications of simulation methods—both the advantages and disadvantages of stochastic and deterministic simulations.	[SU2] presentation/project/paper/report
	[liEMU2_U06] The student is able to forecast complex economic phenomena and processes at an advanced level and check the properties of the obtained forecasts.	Knows the theoretical foundations of forecasting based on econometric models—forecasts based on conditional expected value (optimal predictor in the classical regression model, optimal predictor in the generalized regression model).	[SU2] presentation/project/paper/report
	[liEMU2_K03] The student is able to communicate freely with the public inside and outside the workplace, transfer his knowledge and share his skills through various media.	Understands the issue of forecasting stability in models—tests such as Chow's test. Analysis of model recursion includes tests like CUSUM and CUSUM of squares, and Harvey-Collier test.	[SK2] presentation/project/paper/report
Subject contents	[liEMU2_W02] The student has an in-depth knowledge of economic structures and institutions, the processes taking place in them, the connections between them and their dynamics, and has an in-depth knowledge of the phenomena and processes taking place in their environment.		
	Theoretical Foundations of Forecasting Based on Econometric Models: - Forecasts based on conditional expected value (optimal predictor in classical regression model, optimal predictor in generalized regression model). - Stability of model forecasts Chows test. - Recursive analysis of models CUSUM and CUSUM of squares tests, Harvey-Collier test. - Forecasting based on dynamic models. - Forecasting using multi-equation models. - Forecasting using VAR models variance decomposition of forecast errors. - Forecasting using interdependent models reduced form with and without constraints. **Concepts and Types of Simulation:** - Genesis and demand for computer simulations. - Applications of simulation methods advantages and disadvantages of stochastic and deterministic simulations. - Building a simulation model. - Random number generators for uniform distributions: evaluating generator quality through statistical tests and control tasks. - Methods for generating random numbers with any probability distribution. **Programming Basics in R:** - Examples of problem-solving using computer simulation.		
Prerequisites and co-requisites	None		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Two projects: forecasting, simulation. Graded separately, the positive final grade is the arithmetic mean of the positive partial grades.	51.0%	100.0%
Recommended reading	Basic literature	None	

	Supplementary literature	None
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Discuss the construction of the SARIMA model 2. Discuss the methods of testing the properties of the model used in the project. 3. Discuss the methods of testing the predictive properties of the model used in the project.	
Work placement	Not applicable	

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