

Subject card

Subject name and code	Introduction to Modelling in Economics and Finance, PG_00157372						
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		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish Polish		
Semester of study	1		ECTS credits		4.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Department of Econometrics -> Faculty of Management -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Paweł Miłobędzki				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	25.0	0.0	0.0	0.0	45
	E-learning hours included: 0.0						
	Additional information: The lecture will feature multimedia presentations, and the tutorial will involve problem-solving activities.						
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	45		20.0		35.0	100
Subject objectives	Systematising knowledge of the mathematical statistics basics and acquiring skills in specifying, estimating and verifying a linear regression model.						

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.	The student recognizes the importance of continuously enhancing his/her understanding of the national economy and its various components, as well as the methods and techniques for modelling them. He/she also motivates and coordinates the learning process for others in this field.	[SK1] oral statement/conversation/discussion [SK5] implementation of a problem task
	[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.	The student can freely communicate within the study environment and beyond, using various communication channels to share knowledge and skills in modelling the national economy.	[SK1] oral statement/conversation/discussion
	[liEMU2_U07] The student is able to build advanced formal models of complex economic phenomena and processes, estimate them, carry out their verification and apply them to modeling, forecasting and optimization of resources of economic institutions of varying degrees of complexity, their structure and the course of processes in them.	The student can specify, estimate, and validate advanced econometric models that exhibit the functioning of the national economy and its components.	[SU4] test/exam - oral or written [SU5] implementation of a problem task [SU6] demonstration of practical skills
	[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.	The student possesses advanced knowledge of econometric methods, allowing for the modelling of the national economy and its components and the processes occurring in their environment.	[SW4] test/exam - oral or written
	[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.	The student possesses a comprehensive understanding of economic structures and institutions, including the processes, connections, dynamics, and phenomena within them and their environment which enables him/her to model the national economy and its components.	[SW4] test/exam - oral or written [SW1] oral statement/conversation/discussion [SW5] implementation of a problem task
	[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.	At an advanced level, the student can statistically describe selected economic categories that reflect the functioning of the national economy and its components and formulate and verify hypotheses regarding their development.	[SU5] implementation of a problem task [SU6] demonstration of practical skills
Subject contents	1. Random variable and its distribution: events, sample space, probability, random variable and its distribution, selected distributions of a discrete and continuous random variable, the importance of the normal distribution and its applications in statistics, central limit theorem. 2. Distribution of a statistical feature in the population and distribution of a random variable in the sample: simple random sampling, dependent and independent sampling and sample distributions. 3. Sample statistics and estimators as tools for statistical inference: the notion and properties of an estimator, methods for deriving estimators, parametric and non-parametric inference, distribution of mean, variance and proportion. 4. Interval estimation: the concept of a confidence interval, methods of its construction, confidence intervals for the mean, variance and proportion, sample size and the range of the confidence interval. 5. Hypothesis testing: null and alternative hypotheses, test statistics, decision rule, type I and II error, size and power of the test, tests for mean, variance and proportion, comparing two populations. 6. Linear regression model: basic forms, interpretation of structural parameters, numerical and stochastic assumptions. 7. Estimation methods: method of moments, least squares, maximum likelihood, properties of estimators. 8. Model validation: goodness of fit, testing for the significance of structural parameters, autocorrelation, heteroskedasticity and normality of random errors, functional form, restrictions imposed on structural parameters and their stability. 9. Model estimation in case of departure from stochastic assumptions: estimators robust to heteroskedasticity and autocorrelation, generalised least squares (GLS), random explanatory variables, two-step least squares (2SLS), instrumental variables method (IV), specification tests.		
Prerequisites and co-requisites	Knowledge of the basics of mathematics.		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tutorial – Colloquium.	51.0%	50.0%
	Course Final Assessment: Written Exam with Questions and Open Tasks.	51.0%	50.0%
Recommended reading	Basic literature	1. Koop G. (2011), Wprowadzenie do ekonometrii, Wolters Kluwer Polska. 2. Maddala G.S. (2013), Ekonometria, Wydawnictwo Naukowe PWN.	
	Supplementary literature	-	
	eResources addresses	Basic http://www.learneconometrics.com/gretl/index.html) - Adkins L.C. (2018), Using gretl for Principles of Econometrics (5th edition, November 12, 2018) and 5th edition data directory.	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.