



Subject card

Subject name and code	MULTI-DIMENSIONAL DATA ANALYSIS, PG_00060927						
Field of study	Economic Analytics						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Part-time studies (on-line)	Mode of delivery			blended-learning		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Katedra Statystyki i Ekonometrii -> 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	8.0	0.0	16.0	0.0	0.0	24
	E-learning hours included: 18.0						
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	24	11.0		65.0		100
Subject objectives	Presents effective solutions to multidimensional research problems using information from many sources, selecting appropriate methods of data preparation and processing						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W03] demonstrates in-depth preparation in the application of analytical methods and techniques for formulating and solving problems	creates models of multidimensional economic phenomena using advanced methods of data preparation and processing methods, according to a specific research goal			[SW1] Assessment of factual knowledge		
	[K7_U01] creates innovative solutions to complex and unstructured problems, taking into account the variability of the environment by synthesising information from many sources	integrates information from many sources to obtain innovative solutions to complex socio-economic and business problems			[SU2] Assessment of ability to analyse information		
Subject contents	Fundamentals of Multivariate Statistical Analysis (MSA) Databases. Eurostat, OECD, World Bank and ILO as the main source of data for multivariate analysis Possibilities of using MSA for socio-economic and business analysis Selection of diagnostic variables, similarity measures Stimulation and normalization of variables, weighting of variables Methodology for creating composite indicators Sensitivity analysis as a tool for evaluating composite indicators Linear ordering of objects, measures of similarity of rankings Shapley value, Balinski-Young method, Borda method, Condorcet efficiency Quantitative storytelling Taskonomic grouping - k-means method, silhouette index Ward's hierarchical agglomerative grouping method Selection of representatives of groups of spatial objects Principal component analysis Factor analysis Correspondence analysis						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	60.0%	70.0%
	Test	60.0%	30.0%
Recommended reading	Basic literature	Walesiak, M., Gatnar, E (2009). Statystyczna analiza danych z wykorzystaniem programu R Panek, T. Zwierzchowski, J. (2013). Statystyczne metody wielowymiarowej analizy porównawczej. Teoria i zastosowania Pawełek, B. (2008). Metody normalizacji zmiennych w badaniach porównawczych złożonych zjawisk ekonomicznych	
	Supplementary literature	Młodak A., (2006). Analiza taksonomiczna w statystyce regionalnej Kukuła K. (2000). Metoda unitaryzacji zerowanej	
	eResources addresses	Adresy na platformie eNauczanie: Wielowymiarowa analiza danych nst 2024 - Moodle ID: 40031 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40031	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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