



## Subject card

Subject name and code	MULTIVARIATE DATA ANALYSIS, PG_00068717						
Field of study	Economic Analytics						
Date of commencement of studies	October 2025	Academic year of realisation of subject			2026/2027		
Education level	second-cycle studies	Subject group			Optional subject group Specialty subject group Subject group related to scientific research in the field of study		
Mode of study	Part-time studies (on-line)	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department Of Statistics And Econometrics -> Faculty Of Management And Economics -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor						
	Teachers						
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: 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	24		4.0		47.0	75
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_U01] creates innovative solutions for complex and unstructured processes, considering unpredictable environmental conditions through the synthesis of information from various sources.		integrates information from multiple sources to develop innovative solutions to complex socio-economic and business problems		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K7_W06] knows and understands the principles of evaluating the reliability of utilized data, applying in-depth specialized knowledge in the field of economic analysis.		knows and understands the principles of data credibility assessment and the methods of data preparation and processing, using in-depth knowledge of economic analytics to create models of multidimensional economic phenomena in line with a defined research objective.		[SW1] Assessment of factual knowledge		
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
	Test	60.0%	30.0%
	Exam	60.0%	70.0%
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 Pawelek, 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:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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