

Subject card

Subject name and code	Multivariate Analysis of Qualitative Data, PG_00157240						
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		4.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Department of Statistics -> Faculty of Management -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Kamila Migdał-Najman				
	Teachers		dr hab. Kamila Migdał-Najman				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	8.0	8.0	0.0	0.0	0.0	16
	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	16		20.0		65.0	101
Subject objectives	1. Learning the essence of multidimensional statistical analysis methods that are used in the area of features expressed on a weak measurement scale, the conditions of their use and practical limitations. 2. Free use of acquired knowledge in solving socio-economic problems.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[liEMU2_K02] The student can communicate freely with the public on specialised topics in the field of computer science and econometrics in and outside the workplace, communicate his knowledge and share his skills through various media. Culturally participates in discussions, is not afraid to ask questions and knows how to give constructive criticism.	The student is able to establish communication with the environment in the field of specialist topics in the field of multivariate statistical methods used in the analysis of qualitative characteristics. The student is able to convey his knowledge, share it using various media. The student discusses, asks questions and expresses constructive criticism in the methodological and practical area.	[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report [SK8] observation of student's independent or team work
	[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 understands the need for continuous supplementation and deepening of knowledge in the area of statistical methods of multidimensional analysis of qualitative features. Is able to inspire and organize the learning process of others.	[SK4] test/exam - oral or written [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 is able to communicate with the environment in the workplace and outside of it. Is able to indicate the usefulness of multidimensional solutions in the area of qualitative characteristics in socio-economic research, is able to share this knowledge.	[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report [SK6] demonstration of practical skills [SK8] observation of student's independent or team work
	[liEMU2_U02] The student is able to proficiently acquire detailed information about economic processes and phenomena through direct observation, planned experimentation or database queries, as well as collect and process it using modern information technology tools.	The student is able to plan the research organization stage in the research process, including data collection. The student is able to obtain multidimensional data sets describing socio-economic processes and phenomena. The student is able to process the obtained data using modern IT tools.	[SU3] text preparation/written work [SU5] implementation of a problem task
	[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 has in-depth knowledge in the area of advanced methods of statistical multivariate analysis. The student is able to apply the methods in practice. The student understands the idea of methods of statistical multivariate analysis in the area of qualitative characteristics. The student is able to describe socio-economic processes and phenomena using these methods.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report [SW3] text preparation/written work
Subject contents	The role of measurement scales in research. Types of measurement scales and their characteristics. Nominal scale, permissible actions on a nominal scale. Ordinal scale, permissible actions on an ordinal scale. Reliability coefficients of a survey questionnaire. Measurement of object similarity from the point of view of measurement scales. One-dimensional, two-dimensional and multidimensional analysis of data expressed on a nominal scale. Application of cluster analysis to data expressed on a weak scale. Origin and development of correspondence analysis in the world. The concept of classical correspondence analysis. Basic concepts: tag matrix, correspondence matrix, row and column profiles. Average row and column profiles. Graphical presentation of profiles. Correspondence analysis algorithm. Chi-square distance. Decomposition of matrices according to singular values. Graphical presentation of correspondence analysis and methods of its analysis. The concept of total inertia. Multidimensional correspondence analysis. Basic concepts: complex marker matrix, Burt matrix, multidimensional contingency table, joint contingency table. Methods of selecting the dimension of the projection space: measure of the share of inertia of the selected dimension in the total inertia, the "elbow" criterion, the criterion of the number of features. Assessment of the quality of the mapping of the co-occurrence of feature categories: the reproduction matrix, the maximum likelihood statistic, the chi-square statistic. Application of correspondence analysis in marketing, social and economic research. The issue of symbolic data. Factor analysis. Model and essence of factor analysis. Measures of data quality used in factor analysis. Application of factor analysis in marketing research. Methods of symbolic data analysis. Specificity of symbolic data. Classification of symbolic data analysis methods. Application of symbolic data analysis methods in practice. Presentation of other multidimensional methods of qualitative data analysis.		
Prerequisites and co-requisites	The student completed the subject: statistical multivariate analysis.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam	51.0%	50.0%
	final project	51.0%	50.0%

Recommended reading	Basic literature	1. Gatnar E., Walesiak M. (2004), Metody statystycznej analizy wielowymiarowej w badaniach marketingowych, Wydawnictwo Akademii Ekonomicznej we Wrocławiu 2. Stanimir A. (2005) Analiza korespondencji jako narzędzie do badania zjawisk ekonomicznych, Wydawnictwo Akademii Ekonomicznej we Wrocławiu 3. Balicki A. (2009), Statystyczna analiza wielowymiarowa i jej zastosowania społeczno-ekonomiczne, UG, Gdańsk 4. Ostasiewicz W. red. (1999) Statystyczne metody analizy danych, Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław 5. Gatnar E. (1998), Symboliczne metody klasyfikacji danych, PWN, Warszawa 1998.
	Supplementary literature	1. Greenacre M.J. (1993) Correspondence Analysis in Practice. Academic Press, London, San Diego New York, Boston, Sydney, Tokyo 2. Statystyczna analiza danych z wykorzystaniem programu R / redaktor naukowy Marek Walesiak, Eugeniusz Gatnar, PWN, Warszawa (2012) 3. Dudek A. (2013), Metody analizy danych symbolicznych w badaniach ekonomicznych, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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