

Subject card

Subject name and code	Multivariate Analysis of Qualitative Data, PG_00157329										
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	full-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	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		50.0	100				
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_U09] The student has an in-depth ability to prepare written works, oral speeches and multimedia presentations on the functioning and growth of the national economy and its components, the course of complex economic phenomena and processes, the acquisition of data about them, their collection, processing and analysis with the help of modern mathematical, statistical, econometric and IT tools, as well as their use in modeling, forecasting and optimization.	Has an in-depth ability to prepare written works, oral presentations and multimedia presentations in the area of using a multidimensional approach to the analysis of qualitative characteristics. Based on these methods, is able to assess the course of complex phenomena and economic processes, acquire data, collect them, process them and analyze them using modern statistical and IT tools.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report [SU4] test/exam - oral or written [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
	[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
	[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_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_U01] The student can comprehensibly, orally and in writing, present and justify in depth advanced economic theories and apply them to explain the functioning of the national economy and its components. Understands and can explain the content of communications from economic institutions, articles in the economic press and scientific journals.	The student is able to present and justify in an in-depth manner, in speech and writing, advanced methods of statistical multidimensional analysis applied in the area of qualitative characteristics. He is able to apply them to explain complex socio-economic phenomena and processes. He understands and is able to explain the content of announcements of economic institutions, articles published in the economic press and scientific journals.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report [SU4] test/exam - oral or written [SU6] demonstration of practical skills
	[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_W03] The student has an in-depth knowledge of man as a subject who creates economic structures and institutions.	The student has in-depth knowledge of man as an entity creating economic structures and institutions.	[SW4] test/exam - oral or written [SW1] oral statement/conversation/discussion

	Course outcome	Subject outcome	Method of verification
	[liEMU2_W05] The student has an in-depth knowledge of socio-economic data sources, their databases and how to create them.	The student has in-depth knowledge of the sources of socio-economic data used in the analysis of sets of multidimensional qualitative characteristics, their databases and the method of their creation.	[SW4] test/exam - oral or written [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.	The student is able to perform an advanced level of statistical description of basic and detailed economic categories, formulate and verify hypotheses regarding their formation based on the multidimensional approach applied in the area of qualitative characteristics.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report [SU4] test/exam - oral or written [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
	[liEMU2_K06] The student knows the need for ethical, sustainable and socially responsible behavior in professional and social life. Initiates and organises activities for the social environment and public interest.	The student is aware of the need for ethical, balanced and socially responsible behavior in professional and social life. Initiates and organizes activities for the social environment and public interest.	[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report [SK6] demonstration of practical skills
	[liEMU2_K04] The student can work in a team, co-create it, effectively manage and supervise it; efficiently adapts his behavior and conduct to his role in it; is ready to take responsibility for the team and bear the consequences; understands the necessity of systematicity and consistency in action; is open to other team members and critical of himself.	The student is able to work in a team, co-create it, effectively manage it and supervise it; efficiently adapts his/her behaviour and manner of conduct to the role played in it; is ready to take responsibility for the team and bear the consequences; understands the need for systematicity and consistency in action; is open to other team members and critical of himself/herself.	[SK2] presentation/project/paper/report [SK8] observation of student's independent or team work
	[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 is able to build advanced multidimensional models to analyze the qualitative characteristics of complex economic phenomena and processes, estimate them, verify them and apply them.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report [SU4] test/exam - oral or written [SU8] observation of student's independent or team work
	[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
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, elbow criterion, criterion of the number of features. Assessment of the quality of the mapping of the co-occurrence of feature categories: reproduction matrix, maximum likelihood statistic, 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.		

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