



Subject card

Subject name and code	ESSENTIALS OF STATISTICS, PG_00061437						
Field of study	Engineering Management						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2023/2024		
Education level	first-cycle 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 (on-line)		Mode of delivery		blended-learning		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Statistics and Econometrics -> Faculty of Management and Economics						
Name and surname of lecturer (lecturers)	Subject supervisor		Dagna Wlekińska				
	Teachers		Dagna Wlekińska				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	16.0	0.0	16.0	0.0	0.0	32
	E-learning hours included: 24.0						
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	32		10.0		83.0	125
Subject objectives	Selects an appropriate methodology for testing regularities occurring in mass processes, using statistical software to process data and interpret obtained results						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W02] demonstrates advanced preparation in the methods and techniques of formulating and solving problems		formulates the problem appropriately, obtains the data, selects methods necessary for solving the given problem, and interprets the results correctly		[SW1] Assessment of factual knowledge		
	[K6_U07] applies information technology to improve critical analysis and evaluation of data and management processes		uses statistical software that facilitates the analysis of mass data and supports decision-making processes		[SU2] Assessment of ability to analyse information		

Subject contents	<p>What is a statistical survey? Population and sample Full and partial surveys Stages of a statistical survey Random selection methods Non-random selection methods Advantages and disadvantages of each method Theory of measurement and operations allowed on each scale Classification of statistical characteristics The concept of a random variable Basic information about the most important distributions (zero-one, normal) Central Limit Theorem Statistical series Histogram Distributant Importance of measures of central tendency Differences between classical and positional measures Arithmetic mean, harmonic mean, median, dominant, quartiles, percentiles Importance of measures of variation Variance, standard deviation, coefficient of variation, quarter deviation, positional coefficient of variation, spread, decile spread Box-and-whisker plot Importance of asymmetry measures Third central moment, coefficient of asymmetry, positional coefficient of asymmetry Examples of asymmetric distributions Importance of measures of distribution flattening Fourth central moment, kurtosis, positional coefficient of concentration Practical applications of correlation analysis Apparent correlation Functional dependence vs. stochastic dependence Covariance, Pearson's linear correlation coefficient, Spearman's rank correlation coefficient, Kendall's tau coefficient, gamma coefficient, Pearson's correlation ratios Scatter plot Practical applications of correlation analysis of qualitative characteristics Contingency tables Chi-square test of independence V-Cramer coefficient Difference between correlation and regression analysis Practical applications of regression analysis Introduction to modeling - simple regression and multiple (linear) regression Main assumptions of KMNK Assessment of the significance of parameters Measures of accuracy of the estimated model Time series Time series of periods and moments Geometric mean, chronological mean Individual increments and indexes Aggregate indexes of prices and quantities (Laspeyres, Paasche, Fisher) Simple moving average Components of a time series (trend, seasonal, cyclical and random fluctuations) Linear trend model Modern methods of data visualization Why a pie chart is usually a bad idea Errors in survey preparation Errors in conducting the survey Errors in developing the results of the study Errors of inference (survival error, anecdotal evidence, ecological error)</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam	60.0%	50.0%
	tutorial exam I	60.0%	25.0%
	tutorial exam II	60.0%	25.0%
Recommended reading	Basic literature	Aczel, A. (2010). Complete Business Statistics, New Jersey: Wohl Publishing Barrow, M. (2012), Statistics for Economics, Accounting and Business Studies, Harlow: Prentice Hall	
	Supplementary literature	Newbold, P., Carlson, W.L., Thorne, B. (2019). Statistics for Business and Economics, New York: Pearson Education Agresti, F. (2012). Statistics. The Art and Science of learning from data, Boston: Pearson Education	
	eResources addresses	Adresy na platformie eNauczanie: Podstawy statystyki Z - online - Moodle ID: 34652 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=34652	

Example issues/ example questions/ tasks being completed	<p>Statistical data in the analysis of the dynamics of mass phenomena</p> <p>Types of time series, series of moments and periods. Definitions and examples</p> <p>Chronological average, application to series of moments</p> <p>Simple methods of studying the dynamics of economic phenomena, absolute growths, relative growths</p> <p>Indexes of dynamics (indicators of dynamics). Essence and types, chain index, single base index</p> <p>Possible substitutions of indexes from one type to another and substitution of the base in single base indexes</p> <p>Calculation of the average rate of change, use of the geometric mean</p> <p>Methods of extracting the development trend</p> <p>Mechanical method. Ordinary and concentrated moving averages - concept, interpretation, conditions of applicability</p> <p>Analytical method, trend function, hypothesis of linear trend, empirical econometric model</p>
Work placement	Not applicable

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