GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	ESSENTIALS OF STATISTICS, PG_00061386		
Field of study	Engineering Management		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
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	Mode of delivery	at the university
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	Katedra Statystyki i Ekonometrii -> Faculty of Management and Economics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Krzysztof Świetlik	
	Teachers		

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: 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	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	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)
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 II	60.0%	25.0%
tutorial exam I	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:

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