GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Essentials of Statistics, PG_00044222		
Field of study	Engineering Management		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2022/2023
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	Full-time studies	Mode of delivery	blended-learning
Year of study	2	Language of instruction	Polish
Semester of study	3	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	dr Jakub Golik dr inż. Krzysztof Świetlik	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	30.0	0.0	0.0	60

E-learning hours included: 30.0

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	60	8.0	57.0	125

Subject objectives

Achieve the skills of statistical analysis of business environment, resources and analysis of internal processes and use of information techniques for this purpose.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W05] knows the statistical and IT methods and tools that enable the acquisition and presentation of data on the organisation's resources, including technical resources	The student recognizes the importance and relevance of the information from the company and their analysis using appropriate statistical methods to make the right decisions in the management of the company	[SW1] Assessment of factual knowledge
[K6_W06] has a basic knowledge of methods and tools for conducting research and analyses related to particular areas of the enterprise's operations and its environment	student knows the methods of statistical surveys in the enterprise and its environment	[SW1] Assessment of factual knowledge
[K6_U09] obtains data for analysis and interpretation of results using information technology	Student verifies the research hypotheses on the functioning of the company and the effects of the operation on the basis of chosen statistical methods	[SU2] Assessment of ability to analyse information
[K6_W11] has the basic knowledge of mathematics, physics and chemistry necessary to solve technical problems	The student is able to choose the appropriate mathematical tools to identify and solve problems in business management	[SW1] Assessment of factual knowledge

Subject contents

PART 1 - ANALYSIS OF THE STRUCTURE

1 Basic concepts, statistical survey - stages, graphical and tabular presentation of distribution - types of tables and statistical graphs, examples.
2 The empirical distribution. Structural and distributive series , determination of the number of classes.
3 Measures of position - classical and positional. Mean, dominant, median, quantiles . Methods of counting, examples.
4 Measures of variation (dispersion) - classical and positional. The variance, standard deviation, coefficient of variation, the range, the quartered eviation. Methods of counting , examples.
5 Measures of asymmetry and concentration. Types of distributions, the Lorenz curve, the Gini coefficient. Methods of counting, examples. Comparing distributions - a relative indicator of the similarity of the structures.

PART 2 - ANALYSIS OF CORRELATION AND REGRESSION
1 Correlation analysis for quantitative characteristics. The concept of correlation , statistical presentation of correlation , measures of correlation , Pearson's correlation coefficient.
2 Introduction to statistical inference (types of hypotheses, the level of significance, the probability test). Correlation analysis for qualitative characteristics . Conformance Test Pearson , Yates correction, coefficients of correlation convergence - T Czuprowa , Cramer's V , C Pearson .
3 Partial and multiple correlation. Coefficients of rank correlation - Spearman , Kendall
4 Basics of regression analysis. Linear regression , classical least squares method , the coefficient of determination and convergence , correlation index , the interpretation of the strength and direction of impact variables.
5 Multiple and non-linear regression. The dependent variable and the independent variables , transformations of nonlinear regression function - power function , exponential , hyperbolic, polynomials , interpretations .
PART 3 - ANALYSIS OF THE DYNAMICS
1 Time series . Indexes dynamics - Chain and Single base , transformations , the average rate of change , interpretation , methods of counting , examples.
2 The use of indices - the analysis of changes , short-term forecasting.
3 Time trend models - decomposition of the time series, analysis of seasonal fluctuations , linear and nonlinear models, time trend interpretation , examples.
4 Composite Indexes - Laspeyres and Paasche

Prerequisites and co-requisites

the basis of mathematical analysis, the basis of probability

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory test	60.0%	50.0%
Lecture test	60.0%	50.0%

Recommended reading

Basic literature	1. Jóźwiak J., Podgórski J., Statystyka od podstaw, PWE, Warszawa, 2012 2. Starzyńska W. (red), Podstawy statystyki, Diffin, Warszawa, 2009
Supplementary literature	Aczel Amir D., Sounderpandian J., Statystyka w zarządzaniu, Wydawnictwo Naukowe PWN, Warszawa, 2017
eResources addresses	Adresy na platformie eNauczanie: Podstawy Statystyki - stacjonarne WZiE, zima 2022/2023 - Moodle ID: 26399 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=26399

Example issues/ example questions/ tasks being completed

In two Gdansk hospitals that can accommodate the same number of patients in the surgery ward, falls a different number of patients on one bed (average per week) and there is, respectively, 7 and 5. Determine the average number of patients falling on the bed in these hospitals.

On the basis of the following data, examine the correlation between the time used for learning and assessment in statistics.

Pearson correlation coefficient indicates the correlation .....
The theoretical model of linear regression shows that .....
Tthe observed variation in the monthly charges for electricity differs from estimated ones on the average of ....., which is .....% of the average level of charges.
..... variability of the cost of electricity has been not explained by the size of the family.

Work placement

Not applicable