



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	mgr 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						
Podstawy Statystyki - stacjonarne WZiE, zima 2022/2023 - Moodle ID: 26399 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=26399							
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	<p>PART 1 - ANALYSIS OF THE STRUCTURE</p> <p>1 Basic concepts, statistical survey - stages, graphical and tabular presentation of distribution - types of tables and statistical graphs, examples.</p> <p>2 The empirical distribution. Structural and distributive series, determination of the number of classes.</p> <p>3 Measures of position - classical and positional. Mean, dominant, median, quantiles. Methods of counting, examples.</p> <p>4 Measures of variation (dispersion) - classical and positional. The variance, standard deviation, coefficient of variation, the range, the quartered deviation. Methods of counting, examples.</p> <p>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.</p> <p>PART 2 - ANALYSIS OF CORRELATION AND REGRESSION</p> <p>1 Correlation analysis for quantitative characteristics. The concept of correlation, statistical presentation of correlation, measures of correlation, Pearson's correlation coefficient.</p> <p>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 Czaprowa, Cramer's V, C Pearson.</p> <p>3 Partial and multiple correlation. Coefficients of rank correlation - Spearman, Kendall</p> <p>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.</p> <p>5 Multiple and non-linear regression. The dependent variable and the independent variables, transformations of nonlinear regression function - power function, exponential, hyperbolic, polynomials, interpretations.</p> <p>PART 3 - ANALYSIS OF THE DYNAMICS</p> <p>1 Time series. Indexes dynamics - Chain and Single base, transformations, the average rate of change, interpretation, methods of counting, examples.</p> <p>2 The use of indices - the analysis of changes, short-term forecasting.</p> <p>3 Time trend models - decomposition of the time series, analysis of seasonal fluctuations, linear and nonlinear models, time trend interpretation, examples.</p> <p>4 Composite Indexes - Laspeyres and Paasche</p>											
Prerequisites and co-requisites	the basis of mathematical analysis, the basis of probability											
Assessment methods and criteria	<table border="1"> <thead> <tr> <th>Subject passing criteria</th> <th>Passing threshold</th> <th>Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Laboratory test</td> <td>60.0%</td> <td>50.0%</td> </tr> <tr> <td>Lecture test</td> <td>60.0%</td> <td>50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Laboratory test	60.0%	50.0%	Lecture test	60.0%	50.0%
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Recommended reading	<p>Basic literature</p> <p>Supplementary literature</p> <p>eResources addresses</p>	<p>1. Józwiak J., Podgórski J., Statystyka od podstaw, PWE, Warszawa, 2012</p> <p>2. Starzyńska W. (red), Podstawy statystyki, Diffin, Warszawa, 2009</p> <p>Aczel Amir D., Sounderpandian J., Statystyka w zarządzaniu, Wydawnictwo Naukowe PWN, Warszawa, 2017</p>										
Example issues/ example questions/ tasks being completed	<p>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.</p> <p>On the basis of the following data, examine the correlation between the time used for learning and assessment in statistics.</p> <p>Pearson correlation coefficient indicates the correlation</p> <p>The theoretical model of linear regression shows that</p> <p>The observed variation in the monthly charges for electricity differs from estimated ones on the average of, which is% of the average level of charges.</p> <p>..... variability of the cost of electricity has been not explained by the size of the family.</p>											
Work placement	Not applicable											