GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	ESSENTIALS OF STATISTICS, PG_00058397
Field of study	Economic Analytics

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	Full-time studies	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	assessment

Conducting unit	Department of Statistics and Econometrics -> Faculty of Management and Economics

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Agnieszka Wałachowska
	Teachers	dr inż. Agnieszka Wałachowska
		dr inż. Krzysztof Świetlik
		Olga Komorowska
		dr Jarosław Krajewski

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	10.0	55.0	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 knowledge of methods and techniques related to the field of study in economic analytics to explain complex problems.	formulates the problem appropriately, obtains the data, selects methods necessary for solving the given problem, and interprets the results correctly	[SW3] Assessment of knowledge contained in written work and projects
	[K6_U07] Applies advanced information technologies to enhance data analysis and decision-making processes.	uses statistical software that facilitates the analysis of mass data and supports decision-making processes	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment

Subject contents	Population and sample
	Full and partial tests
	Random and non-random selection methods
	Classification of statistical characteristics
	The concept of a random variable and basic information about distributions (discrete, continuous)
	Importance of measures of central tendency
	Differences between classic and positional measures
	Arithmetic mean, harmonic mean, median, dominant, quartiles, percentiles
	Importance of measures of variation
	Variance, standard deviation, coefficient of variation, quadrant deviation, positional coefficient of variation, range, decile range
	Box-and-whisker plot
	Importance of asymmetry measures
	Third central moment, asymmetry coefficient, positional asymmetry coefficient
	Examples of asymmetric distributions
	Importance of measures of distribution flattening
	Fourth central moment, kurtosis, positional concentration coefficient
	Statistical series
	Histogram
	Distributor
	Central Limit Theorem

	Verification of statistical hypotheses introductory information
	Type I and II error
	Test significance level
	Practical applications of correlation analysis
	Apparent correlation
	Functional dependence and stochastic dependence
	Covariance, Pearson's linear correlation coefficient, Spearman's rank correlation coefficient, Kendall's tau coefficient, gamma coefficient, Pearson's correlation relations
	Scatterplot
	Practical applications of the analysis of the interdependence of quality features
	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
	The main assumptions of KMNK
	Assessment of the significance of parameters
	Measures of the accuracy of the estimated model
	Analysis of the dynamics of phenomena
	Increments and individual indexes
	Aggregate price and quantity indices (Laspeyres, Paasche, Fisher)

	Time series
	Time series of periods and moments
	Time series components (trend, seasonal, cyclical and random fluctuations)
	Trend extraction (mechanical and analytical method)
	Simple moving average
	Exponential smoothing
	Modern methods of data visualization
	Errors in test preparation
	Errors in conducting the study
	Errors in the preparation of research results
	Inference errors

Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	tutorial exam II	60.0%	50.0%
	written exam	60.0%	50.0%

Recommended reading	Basic literature	
		Barrow, M. (2017), Statistics for Economics, Accounting and Business Studies, Harlow: Prentice Hall.
		Newbold, P., Carlson, W.L., Thorne, B. (2019). Statistics for Business and Economics, New York: Pearson Education.

	Supplementary literature	Anderson D. (2019), Essentials Of Statistics For Business & Economics, Cengage Learning Bąk I.,Markiewicz I., Mojsiewicz M., Wawrzyniak K. (2021), Formulas and tables Statistical and econometric methods, CeDeWu
	eResources addresses	Podstawowe https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40142 - https://enauczanie.pg.edu.pl/moodle/course/view.php?id=39587 - Adresy na platformie eNauczanie: Podstawy statystyki 2024/2025 lab - Moodle ID: 40139 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40139 Podstawy statystyki WYKŁAD 2024/2025 - Moodle ID: 40076 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40076 Podstawy statystyki LABORATORIUM 2024/2025 - Moodle ID: 40077 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40077 Podstawy statystyki 2024/2025 - Moodle ID: 40005 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40005
Example issues/ example questions/ tasks being completed	What is a statistical feature? Provide types of features and examples. The concept of general population and samples. Calculation and interpretation of basic descriptive measures of distribution. Knowledge of basic distributions of a random variable. Correlation coefficient (calculation method, interpretation). Assumptions of the Classical Linear Regression Model (KMRL). Time series components, trend analysis, measurement of seasonal fluctuations. Simple methods of examining the dynamics of economic phenomena, absolute growth, relative growth.	
Work placement	Not applicable	

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