GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	MATHEMATICAL STATISTICS, PG_00058556		
Field of study	Economic Analytics		
Date of commencement of studies	October 2023	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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	6.0
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	dr Błażej Kochański	
	Teachers	dr Błażej Kochański	

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	15.0	103.0	150

Subject objectives

Selects and uses appropriate statistical methods to analyze data, using statistical software to process and interpret the results.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W05] Possesses advanced knowledge of data integration from multiple sources and advanced analytical methods, enabling the analysis of complex economic problems.	integrates data from multiple sources and, using a variety of statistical methods, obtains results usable in practical multidisciplinary applications	[SW1] Assessment of factual knowledge
[K6_U07] Applies advanced information technologies to enhance data analysis and decision-making processes.	uses statistical software to improve analysis of mass data to support decision-making processes	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information

Subject contents

- Population and sample.
- Basic rules of probability. Bayes formula.
- Random variables, expected value, variance.
- Distributions of discrete and continuous random variables.
- Sample distributions. Point and interval estimation.
- Testing statistical hypotheses. Level of significance and power of the test.
- Statistical tests and confidence intervals for one mean/proportion.
- Statistical tests for two means/proportions.
- Chi-square test.
- ANOVA.
- Tests for normality of distribution.
- Non-parametric tests.
- Tests in linear regression models.

Prerequisites and co-requisites

probability theory, descriptive statistics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lecture - Final Exam	60.0%	50.0%
Laboratory - Tests and Quizzes	60.0%	50.0%

Recommended reading	Basic literature	• Kot, Stanisław Maciej, Jakubowski, Jacek, Sokołowski, Andrzej. 2011. Statystyka. Warszawa: Difin. • Aczel, A. 1996. Complete Business Statistics. Chicago, Ill London: Irwin • McClave, James T., P. George Benson, and Terry Sincich. 2008. Statistics for Business and Economics. Upper Saddle River: Pearson Prentice Hall
	Supplementary literature	• Field, Andy, Jeremy Miles, and Zoe Field. 2012. Discovering Statistics Using R. Los Angeles: SAGE Publications. • Józefacka, Natalia M., Mateusz F. Kołek, Aleksandra Arciszewska-Leszczuk, and Paweł Iwankowski. 2023. Metodologia i statystyka Przewodnik naukowego turysty. Tom 1. Warszawa: Wydawnictwo Naukowe PWN
	eResources addresses	Podstawowe https://openstax.org/details/books/introductory-statistics - Free statistics textbook Adresy na platformie eNauczanie: Statystyka matematyczna 2024/2025 (niestac.) - Moodle ID: 39449 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=39449
Example issues/ example questions/ tasks being completed	• Poor quality batteries were installed in 1% of a certain company's mobile phones. The probability that poor quality batteries will stop working within the first month of use is 0.49. Ordinary batteries installed in other phones may stop working properly in the first month with a probability of 0.03. In a sample selected from the population of phones, the battery stopped working within the first month. What is the probability that the battery was of good quality? • In a certain population, the average number of children in a family is 1.67 and the standard deviation of the number of children in a family is 0.32. We randomly select 47 families from this population. What is the probability that among these randomly selected families the average number of children will be less than 1.61? What is the probability that the sample mean will deviate from 1.67 by more than 0.05? Enter a value such that the probability of obtaining a sample mean higher than this value is 40%. • ABC has recently introduced a new method of preventing defects in manufactured machines. Historically, the failure rate (the number of machines with faults detected in the first year of operation in the total number of machines produced) in the company was 8%. After introducing the new method, 16 defects were found in a sample of 250 machines. The company's analysts hypothesised that there had been a reduction in the number of defects. An appropriate test should be performed, assuming a significance level of = 0.05. • A sociologist claims that in a certain population the distribution of people according to education is as follows: higher education - 16.2%, secondary education - 47.2%, primary education - 22.6%, vocational education - 14%. A sample of 180 people was taken from this population. It was found that 28 of them had higher education, 71 - secondary education, 49 - primary education, 32 - vocational education. Can the sociologist's claim be rejected at the significance level = 0.1?	
Work placement	Not applicable	

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