GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Experimental data analysis methods, PG_00062727						
Field of study	Technologies for Industry 5.0						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2027/2028			
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	at the university			
Year of study	2		Language of instruction	Polish			
Semester of study	3		ECTS credits	2.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Department of Functional Materials Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Sebastian Molin				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30		2.0		18.0	50
Subject objectives	Obtaining information about theoretical and simple practical skills necessary for basic statistical dataanalysis.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U06] performs analysis, exploration and cleaning of data sets, can use statistical models and machine learning models, integrate various analytical, management and data storage tools	Students will be able to effectively analyze, explore, and clean experimental data sets. They will acquire the ability to apply advanced statistical models and machine learning techniques to interpret complex data. Students will learn to integrate various analytical tools, efficiently manage data, and optimize storage solutions. Furthermore, they will develop critical thinking and problem-solving skills in the context of data analysis, contributing to a better understanding of industrial processes and informed decision-making in the Industry 5.0 environment.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_K01] is aware of the need to constantly update and enrich knowledge and practical skills, and improve professional, personal and social competences	The student understands the importance of continuous development in experimental data analysis within the context of Industry 5.0. They can independently expand their knowledge of new analytical methods and tools by following the latest trends and scientific publications. The student is aware of the dynamic changes in this field and actively seeks opportunities to improve their skills through participation in training sessions, workshops, and conferences.	[SK1] Assessment of group work skills
[K6_W06] demonstrates knowledge related to data analysis and engineering, machine learning, knows the principles of integrating data with management systems to analyze complex engineering and technological problems	The student possesses advanced knowledge and skills in analyzing data from industrial experiments. They can apply modern statistical and machine learning methods to interpret complex datasets. The student is capable of designing and conducting experiments, then analyzing results using specialized software. They understand the importance of data analysis in the context of Industry 5.0 and can integrate obtained results with production management systems, enabling process optimization and data-driven decision-making. The student is prepared to tackle complex engineering and technological challenges using data analysis techniques.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture
1. Introduction to statistics and data analysis.2. Selected aspects of statistics and probability.3. Distribution functions and their properties (normal, t-test, F, logarthitmic, etc.).4. Expected values, variance, covariance, correlation factors.5. Random numbers generators, Monte Carlo simulations.6. Properties of the normal distribution function (Gauss function).7. Graphical data presentation.8. Graphical methods of data analysis.9. Quantitative data presentaion: t-test of sample averages.10. Variance uquality tests.11. Kolmogorov-Smirnov tests.12. Analysis of variance examples.13. Least square methods.14. Linear regression.15. Nonlinear regression.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lab excercices assessment	100.0%	20.0%
Final test	50.0%	80.0%

Recommended reading

Basic literature	1. Analiza danych, S. Brandt, Wydawnictwo Naukowe PWN, 2002.2. Metody statystyczne i obliczeniowe analizy danych, Wydawnictwo, PWN, 1976.3. Basics of data analysis, S. Brandt
Supplementary literature	Web pages with educational resources, statistical databases.
eResources addresses	

Example issues/ example questions/ tasks being completed

1. Please describe the definitions of the distribution function.2. Please describe coviariance.3. Please present the properties of the normal distribution function.

Practical activites within the subject	Not applicable

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