GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fundamentals of data analysis, PG_00058677		
Field of study	Hydrogen Technologies and Electromobility		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Biomedical 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	dr inż. Patryk Błaszczak	

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 data analysis.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U09] is able to use their knowledge in the field of programming methods and techniques and select and apply appropriate programming methods and tools in creating computer software or programming devices or controllers using microprocessors or programmable elements or systems, characteristic for a given field of study	The student can use mathematical/ statistical tools and can present the results of own experiments.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_K02] can work in a group taking on different roles in it	The student can work in groups, share responsibilities and jointly analyze problems containing statistical data.	[SK3] Assessment of ability to organize work
[K6_U01] Is able to obtain information from literature, databases and other sources, integrate them, interpret them and draw conclusions and formulate opinions; has the ability to self-educate m.in. in order to improve professional competences	The student can critically analyze presented results, understand the role of measurement uncertainities and errors.	[SU2] Assessment of ability to analyse information

<table>
<tr><td>Subject contents</td><td>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.

Course content – laboratory
Laboratory excercices:
1. Introduction, rules, software presentation;
2. Basics of MS Excel;
3. Basic statistics using MS Excel;
4. Gnuplot software;
5. Final project - grade</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td></td><td>60.0%</td><td>20.0%</td></tr>
<tr><td></td><td>50.0%</td><td>80.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>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</td></tr>
<tr><td>Supplementary literature</td><td>Web pages with educational resources, statistical databases.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Please describe the definitions of the distribution function.

2. Please describe coviariance.

3. Please present the properties of the normal distribution function.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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