



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 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		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						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Sebastian Molin				
	Teachers		dr inż. Kacper Jurak				
			dr hab. inż. Sebastian Molin				
Lesson types and methods of instruction	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_W11] knows and understands mathematics at an advanced level to the extent necessary to formulate and solve simple issues related to the field of study		The student can propose simple mathematical models for analysis of the stated problems.		[SW3] Assessment of knowledge contained in written work and projects		
	[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 uncertainties and errors.		[SU2] Assessment of ability to analyse information		

Subject contents	1. Introduction to statistics and data analysis. 2. Selected aspects of statistics and probability. 3. Distribution functions and their properties (normal, t-test, F, logarithmic, 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
		60.0%	20.0%
		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	Adresy na platformie eNauczanie: PODSTAWY ANALIZY DANYCH [TWIE, 2024/25] - Moodle ID: 39935 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=39935	
	Example issues/ example questions/ tasks being completed	1. Please describe the definitions of the distribution function. 2. Please describe covariance. 3. Please present the properties of the normal distribution function.	
Work placement	Not applicable		

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