



Subject card

Subject name and code	Basics of Data Analysis, PG_00047835						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject				2023/2024	
Education level	first-cycle studies	Subject group				Optional subject group 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	3	Language of instruction				Polish	
Semester of study	6	ECTS credits				3.0	
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 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		3.0		42.0	75
Subject objectives	Obtaining the theoretical and practical part necessary for statistical evaluation of measurement results and the results of calculations.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	Student is able to use mathematical/statistical tools and is able to present the results of their own experiments.			[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W01] knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study	Student is able to critically analyze available popular science and technical literature.			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	Student is able to use basic software tools for data processing.			[SU4] Assessment of ability to use methods and tools		

Subject contents	1 Introduction. Statistical and computational methods. 2 Selected elements of probability theory. Random variables and their most important properties. 3 Gallery distributions: normal, t, F, exponential, logarithmic, and other. 4 Expected values, variances, covariances and correlation coefficients. 5 Generating random numbers. Monte Carlo simulation. 6 Properties of the normal distribution. Central limit theorem. 7 Presentation of the test in graphical form. Histograms. Interpretation of histograms. 8 Graphical analysis techniques. Autocorrelation plots. 9 Quantitative assessment techniques. The confidence interval, t-test equality of means. 10 F-test of equality of standard deviation. Levene test of equality of variances. Tests Chi-square compliance with established distribution 11 Kolmogorov-Smirnov test compliance with the assumed distribution. 12 The method of maximum likelihood, as the basis of modern data analysis. Examples interpretation of results. 13 Least squares method for measuring direct and indirect. 14 linear regression. Indicators of quality of the fit 15 Nonlinear regression. Indicators of quality of the fit, the phenomenon of interaction parameters, the causes											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1" data-bbox="451 575 1477 676"> <thead> <tr> <th data-bbox="451 575 794 609">Subject passing criteria</th> <th data-bbox="794 575 1137 609">Passing threshold</th> <th data-bbox="1137 575 1477 609">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 609 794 642">laboratory</td> <td data-bbox="794 609 1137 642">50.0%</td> <td data-bbox="1137 609 1477 642">40.0%</td> </tr> <tr> <td data-bbox="451 642 794 676">lecture</td> <td data-bbox="794 642 1137 676">60.0%</td> <td data-bbox="1137 642 1477 676">60.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	laboratory	50.0%	40.0%	lecture	60.0%	60.0%
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Example issues/ example questions/ tasks being completed	1. Verification of normal distribution of the variable under consideration. 2. Check the statistical significance of the result using the Student's t test.											
Work placement	Not applicable											

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