GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00056097		
Field of study	Mechanical and Medical Engineering		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	
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	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Krzysztof Tesch	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	30.0	0.0	0.0	45

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	45	0.0	0.0	45

Subject objectives

To provide general knowledge on methodology of experimental methods

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U05] he/she is able to use analytic and modelling methods to formulate and solve engineering tasks related to the mechanical-medical area	The student is able to use analytical, simulation and computer methods to formulate and solve engineering tasks in the field of mechanical and medical engineering	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_U08] he/she is able to assess whether proposed methods and tools can be used in practice to solve simple engineering task related to machine design, manufacturing and utilization	The student is able to assess the usefulness of routine methods and tools for solving a simple practical engineering task in the field of design, manufacture and operation of machines, and to select and apply the appropriate method and tools.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_W09] he/she has basic knowledge related to numerical methods and engineering software used to analyze, model and design a given mechanical system	The student has elementary knowledge of numerical methods or basic knowledge of computer programs used for the analysis and simulation of mechanical systems as well as in the design process	[SW1] Assessment of factual knowledge
[K6_U03] he/she is able to use information-communication skills to solve typical engineering tasks related to design, production and utilization	The student is able to use information and communication techniques appropriate to the implementation of tasks typical in engineering activities in the field of design, manufacture and operation of machines.	[SU1] Assessment of task fulfilment

Subject contents

Design of experiments. Experimental study. Experiment stages planning. Physical measurement. Uncertainty of physical measurement. Measurement errors. Application of random variables to measured values. Typical distribution of random variables. Numerical characteristics of random variables. Statistical hypothesis testing. Methods of experimental data presentation.

Prerequisites and co-requisites

Mathematics.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	50.0%	50.0%
	Written exam	50.0%	50.0%
Recommended reading	Basic literature	D.C. Montgomery, "Design and Analysis of Experiments", Wiley & Sons, 2005 M. Korzyński, "Metodyka eksperymentu. Planowanie realizacja i statystyczne opracowanie wyników eksperymentów technologicznych", WNT, 2006.	
	Supplementary literature	A. Strzałkowski, A. Śliżyński, "Matematyczne metody opracowywania wyników pomiarów", PWN, 1978	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	1. Explain Buckingham theorem. 2. What is the total differential method for estimating the maximum absolute error? 3. What is the method of least squares? 4. Give an example of a nonlinear function, which can be reduced to linear and such that can not be. 5. What is the physical quantity, measure of a physical quantity and unit? 6. What is the physical measurement, direct measurement, indirect measurement? 7. Indicate and describe the types of measurement errors. 8. What is the difference between precision of measurement accuracy? 9. Describe the normal distribution (graph and the formula for density, the expected value, variance, standard deviation). What is the interpretation of the probability density in the chart? 10. Describe the continuous uniform distribution (graph and the formula for density, the expected value, variance, standard deviation). 11. What is the mean square error, probable error, average error? 12. Describe the central limit theorem 13. What is an experiment, an experimental study; model of the phenomenon. 14. What is the theory of the experiment and what problems does it include? 15. Give the chosen objectives of the experiment. 16. Discuss the characteristics of the object of experimental research. 17. What are the classical methods of experimental research? Briefly discuss one selected method. 18. How is the planning of an experiment carry on?		
Work placement	Not applicable		

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