GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Experiment design and analysis, PG_00061894		
Field of study	Materials Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	Obligatory subject group 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	5.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division Of New Functional Materials For Energy Conversion -> Institute Of Nanotechnology And Materials Engineering -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jakub Karczewski	
	Teachers	dr hab. inż. Jakub Karczewski dr inż. Marta Prześniak-Welenc dr inż. Radosław Pomećko dr hab. inż. Marcin Łapiński dr inż. Bartłomiej Cieślik	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	30.0	0.0	0.0	60
	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	60	5.0	60.0	125

Subject objectives	The aim of the course is to familiarize the student with basic information regarding the process of planning, performing and publishing experimental data.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W06] Knows selected methods, techniques, tools and materials used in solving simple engineering problems within the scope of materials engineering.	The student is able to analyze a series of measurement data, present the results in the form of clear graphs, and analyze measurement uncertainties	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation
[K6_U01] Can properly use selected analytical, simulation and experimental methods, as well as devices for measuring the fundamental properties of materials and technological processes.	The student is able to plan an experiment and conduct simple measurement experiments. Is able to correctly analyze the received measurement data	[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
[K6_U11] Is able to notice non-technical aspects when forming and solving project tasks, including environmental, economic and legal aspects. Applies the rules of occupational health and safety.	The student knows and understands the hazards in laboratory work. Student basic principles of research ethics.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_U02] Can operate typical laboratory equipment and analyze material tests	The student is able to plan an experiment and conduct simple measurement experiments. Is able to correctly analyze the received measurement data	[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task

Subject contents

lectures/classes

- measurement errors and uncertainties;
- measurements of complex quantities
- statistical distribution of measurements
- graphical presentation of results - linear regression
- scientific methodf
- ormulating scientific hypotheses
- research ethics
- preparation of a scientific publication

lab:

- designing and conducting a simple experiment enabling statistical analysis of the collected measurement data
- designing and conducting a simple experiment enabling the analysis of complex quantities
- designing and conducting an experiment demonstrating the ability to formulate scientific hypotheses, analyze the results of complex values, graphically present results and report experimental data

Prerequisites and co-requisites

the student should have basic knowledge of mathematics at secondary school level

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
exercises and a lecture in the form of a written test	50.0%	50.0%
presentation of laboratory results in the form of a "scientific publication"	50.0%	50.0%

Recommended reading

Basic literature	W. Hyk, Z. Słojek "Analiza statystyczna w laboratorium badawczym"PWN Warszawa 2020
Supplementary literature	-
eResources addresses	Adresy na platformie eNauczanie: Metody planowania i analizy eksperymentu - Moodle ID: 34171 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=34171

Example issues/ example questions/ tasks being completed

- calculate the standard deviation for the given series of experimental data
- provide the sources of measurement uncertainties
- draw a line graph from the given data, calculate the slope of the line and the fit coefficient

Work placement

Not applicable

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