University of Gdańsk

Subject card

Subject name and code	Analysis of Experimental Data , PG_00182287						
Field of study	Physics						
Date of commencement of studies	October 2025		Academic year of realisation of subject	2025/2026			
Education level	Bachelor's 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	3.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Division of Atomic and Molecular Physics -> Institute of Experimental Physics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Marek Józefowicz				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	45.0	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	30.0	75	
Subject objectives	The aim of the course is: a. to familiarize students with the principles of planning and conducting basic physical experiments in accordance with scientific methodology; b. to familiarize students with the basics of analyzing measurement uncertainty in experimental sciences; c. to acquire the skills to correctly compile and present the results of experimental measurements.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[FIZL3_U02] has the ability to perform measurements of basic physical quantities; is able to develop, describe and present the results of physics experiments and computer simulations; is able to perform quantitative analyses and formulate qualitative conclusions on this basis; can estimate measurement uncertainties	a. properly plans and conducts a simple physical experiment; b. critically evaluates the results obtained from the experiment, discusses them, and formulates conclusions based on the observations recorded; c. presents and compares the results of measurements using computer programs dedicated to data analysis.	[SU2] presentation/project/paper/ report [SU3] text preparation/written work [SU8] observation of student's independent or team work
[FIZL3_W03] knows how to plan and perform a physical experiment and analyze the results obtained; knows the elements of the theory of measurement uncertainty in application to advanced physics experiments, knows the basic units of the SI system and its most important derived units; knows other systems of units of measurement	a. correctly plans and conducts a simple physical experiment; b. understands the basic concepts of statistical data analysis used in the analysis of measurement results; c. uses statistical data analysis to describe and explain specific physical processes.	[SW2] presentation/project/paper/ report [SW3] text preparation/written work
[FIZL3_W02] understands the role of physical experiments, mathematical theoretical models that bring reality closer and computer simulations in the methodology of scientific research; is aware of technological, instrumental and methodological limitations in scientific research	a. is able to solve problems using probability calculus and statistical methods; b. critically evaluates the results of experiments, discusses them, and formulates conclusions based on observations; c. is able to perform quantitative analyses and formulate qualitative conclusions based on them.	[SW2] presentation/project/paper/ report [SW3] text preparation/written work

Subject contents

1. Mean value and standard uncertainty (deviation) of a series of direct measurements.
2. Standard uncertainty of the arithmetic mean
3. Mean value of a series of independent and dependent indirect measurements.
4. Combined standard uncertainty of a series of independent indirect measurements.
5. Combined standard uncertainty of a series of dependent indirect measurements.
6. Standard uncertainty (standard deviation) of the mean of a series of independent indirect measurements.
7. Assessment of maximum uncertainty in indirect measurements using the total differential method
8. Assessment of maximum uncertainty in indirect measurements using the logarithmic derivative method
9. Linear regression method (fitting a linear function to experimental results).
10. Histogram and distribution of a discrete random variable (mean of the distribution, variance, distribution function).
11. Histogram and distribution of a continuous random variable (mean of the distribution, variance, distribution function).
12. Normal (Gaussian) distribution (mean of the distribution, variance, distribution function).
13. Standardized normal distribution (mean, variance, cumulative distribution function).
14. Student's t-distribution
15. Binomial (Bernoulli) and Poisson distributions

Prerequisites and co-requisites

High school level mathematics skills. Basic knowledge of a simple computer spreadsheet (EXCEL).

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
not applicable	0.0%	10.0%
not applicable	51.0%	30.0%
not applicable	51.0%	60.0%

Recommended reading

Basic literature	not applicable
Supplementary literature	not applicable
eResources addresses	

Example issues/ example questions/ tasks being completed

not applicable

Work placement

Not applicable

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