



## Subject card

Subject name and code	Experimental methods in physics, PG_00059251						
Field of study	Civil Engineering						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2022/2023		
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	2		ECTS credits		1.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Instytut Nanotechnologii i Inżynierii Materiałowej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Tadeusz Miruszewski				
	Teachers		dr hab. inż. Agnieszka Witkowska  Piotr Okoczuk  dr inż. Bartosz Trawiński  Hanna Świątek  dr inż. Marcin Łapiński  dr hab. inż. Natalia Wójcik  dr inż. Anna Rybicka  dr inż. Bogumiła Strzelecka, doc. PG  Karolina Milewska  dr inż. Kamil Kolincio  dr hab. inż. Jakub Karczewski  Michał Maciejewski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	0.0	0.0	15
	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	15		2.0		8.0	25
Subject objectives	Students realize five laboratory experiments:1. Measurement of the center of gravity2. Young's modulus measurement3. Measurement of the modulus of elasticity4. Measurement of the coefficient of linear expansion5. Resistance measurement using a Wheatstone bridgeStudents are to perform measurements, process the results and discuss the obtained results.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U01] Apply knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering to solve engineering problems and issues.	The student will learn to use measuring equipment, learn about the linear regression method, learn to estimate measurement uncertainties.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	[K6_W01] Demonstrate knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering at a level necessary to achieve the other programme outcomes.	Students gets with the measuring apparatus, independently realizes measurments, discusses the results of measurments.	[SW3] Assessment of knowledge contained in written work and projects
Subject contents	Measurement of Young's modulus, measurement of the spring constant, measurement of the linear expansion coefficient, measurement of the center of mass of a system of bodies and measurement of the resistance of individual resistances		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	taking measurements and reports	50.0%	100.0%
Recommended reading	Basic literature	Exercise instructions:  <a href="https://ftims.pg.edu.pl/wydzial/laboratoria-wydzialowe/laboratorium-z-fizyki-czesc-1">https://ftims.pg.edu.pl/wydzial/laboratoria-wydzialowe/laboratorium-z-fizyki-czesc-1</a>	
	Supplementary literature	Fundamentals of Physics D. Halliday, R Resnick, J. Walker	
	eResources addresses	Adresy na platformie eNauczanie: Metody doświadczalne z fizyki - Moodle ID: 28740 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28740">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28740</a>	
Example issues/ example questions/ tasks being completed	Graph linearization Linear regression method Correct record of the final result		
Work placement	Not applicable		