



## Subject card

Subject name and code	, PG_00065437						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2024		Academic year of realisation of subject		2024/2025		
Education level	second-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Zakład Systemów i Urządzeń Energetyki Ciepłej -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Paweł Ziółkowski				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	5.0	5.0	0.0	0.0	0.0	10
	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	10		5.0		35.0	50
Subject objectives	The aim of the course is to analyse measurement error using lasers and nanoparticles so that the student becomes familiar with qualitative and quantitative measurements and their uncertainties and errors. An equivalent objective is to present good practice in planning and conducting experimental studies using lasers and nanoparticles.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U71] is able to apply knowledge from humanistic, social, economic or legal sciences in order to solve problems		The student is able to apply knowledge of economic sciences to design an experiment to achieve the required quality and at the same time not exceed the financial possibilities of the undertaking.		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		
	[K7_K81] is able to cooperate in international team at her/his own university, during work placement and during study abroad		The student is able to cooperate in an international team within his/ her own university when conducting experiments and discussing the results. The student refers to experimental results and their errors during internships or study abroad.		[SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness [SK1] Assessment of group work skills		
	[K7_W08] possesses widened knowledge within the range of design methods of hydraulic systems, heating and fluid-flow machines and transport devices		The student has an extended knowledge of design methods for hydraulic systems, thermal-fluid devices so as to ensure that processes can be properly measured and diagnosed.		[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
Subject contents	1.Basic concepts in the use of nanoparticles and lasers2.Examples of simple and complex experiments3.Planning an experiment4.Input, output, control, dependent and independent variables5. Qualitative and quantitative measurements and their uncertainties and errors6 Analysing measurement data7 Good practice in planning and conducting experimental studies8. Measurement data acquisition and corrections in commercial software						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Laboratory classes		60.0%		100.0%		

Recommended reading	Basic literature	TOMASZ W. WOJTATOWICZ: METODY ANALIZY DANYCH DOŚWIADCZALNYCH. Politechnika Łódzka ŁÓDŹ 1998
	Supplementary literature	websites
	eResources addresses	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>• Basics of planning an experiment</li> <li>• Input, output, control, dependent and independent variables</li> <li>• Qualitative and quantitative measurements and their uncertainties and errors</li> <li>• Measurement data acquisition</li> <li>• Good practice in planning and conducting experimental studies</li> <li>• Examples of experiments</li> </ul>	
Work placement	Not applicable	

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