



## Subject card

Subject name and code	Measurement techniques, PG_00065896						
Field of study	Nuclear Engineering						
Date of commencement of studies	February 2025		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group		Specialty subject group 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	2		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Zakład Maszyn Przepływowych -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Wojciech Włodarski				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30		5.0		15.0	50
Subject objectives	Providing general knowledge about the methodology of the experiment, broadening the knowledge of selected measurement techniques.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U01] utilizes acquired analytical, simulation, and experimental methods, as well as mathematical models to analyse and evaluate processes occurring in nuclear power sector and related industries		The student uses analytical, simulation and experimental methods to formulate and solve engineering tasks.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K7_U13] evaluates the feasibility and potential for utilizing new technical and technological achievements in accomplishing tasks characteristic for the field of study		Students are able to plan and carry out experiments, including measurements and computer simulations, critically interpret the results obtained and draw conclusions.		[SU1] Assessment of task fulfilment		
	[K7_W04] recognizes and interprets selected issues in the field of advanced detailed knowledge, particularly in the scope of methods, techniques, tools, algorithms and standards specific to Nuclear Power Technologies taking into account the principles of safety and radiological protection		Students are able to plan and carry out experiments, including measurements and computer simulations, critically interpret the results obtained and draw conclusions.		[SW1] Assessment of factual knowledge		

Subject contents	Content covered in the lecture:		
	<div>1. historical development of the experimental method</div> <div>2. elements of the experimental method</div> <div>3. approximation of the test object function</div> <div>4. analysis of measurement errors</div> <div>5. selected measurement techniques</div> <div>6. measurement data acquisition</div> <div>Contents realised in laboratory classes:</div> <div>1. Practical use of experiment planning methods</div> <div>2. selected measurement techniques e.g. measurement of pressure, temperature, force, speed, resistance, inductance, power</div> <div>3. evaluation of measurement errors</div> <div>4. experimental determination of the coefficients of a technical object model</div>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		51.0%	100.0%
Recommended reading	Basic literature	Leon Kukielka Podstawy badań inżynierskich Politechnika Koszalińska 2000	
		<div>Zbigniew Polański Metodyka badań doświadczalnych Politechnika Krakowska 1978</div> <div>Kazimierz Mańczak Technika planowania eksperymentu Wydawnictwo Naukowo Techniczne 1976</div> <div>Roma Górecka Teoria i technika eksperymentu Politechnika Krakowska 1998</div> <div>Mieczysław Korzyński Metodyka eksperymentu Wydawnictwo Naukowo Techniczne 2013</div> <div>Zbigniew Polański Planowanie doświadczeń w technice Państwowe Wydawnictwo Naukowe 1984</div> <div>Jerzy Godziszewski Zasady planowania doświadczeń i opracowywania wyników pomiaru Akademia Górniczo-Hutnicza w Krakowie 1982</div>	

	Supplementary literature	A. Strzałkowski, A. Śliżyński, "Matematyczne metody opracowywania wyników pomiarów", PWN, 1978
	eResources addresses	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed	Describe the types of measurement errors	
Work placement	Not applicable	

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