



Subject card

Subject name and code	Storage of energy, PG_00064763						
Field of study	Power 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	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marcin Jaskólski				
	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		8.0		12.0	50
Subject objectives	The aim of the course is to familiarize students with energy storage technologies and methods of their application in balancing energy systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W01] explains and describes, based on general knowledge in the field of scientific disciplines forming the theoretical foundations of Power Engineering, the structure, principles of operation and environmental impact of energy systems, machines and devices, transmission grids and internal installations		Planning an energy storage installation for selected initial conditions.		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving		Critically evaluates knowledge of energy storage for the purpose of completing a task.		[SK5] Assessment of ability to solve problems that arise in practice		
	[K7_U01] utilizes acquired analytical, simulation, and experimental methods, as well as mathematical models for analysis and evaluation of energy systems, machines and devices, transmission grids and internal installations		Conducts analysis of the energy storage system using analytical methods.		[SU1] Assessment of task fulfilment		
Subject contents	Lecture: The need to store energy. Technologies for storing energy. The structure and the use of energy storage systems in energy systems. Rules for the selection of energy storage devices for the purposes of production and consumption balancing. Technical and economic analysis of energy hybrid systems using energy storage. Laboratory: Electrical energy storage modelling. Energy storage sizing for a selected facility.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Evaluation test	60.0%	50.0%
	Text work	60.0%	50.0%
Recommended reading	Basic literature	https://www.sciencedirect.com/science/article/pii/S0196890420308347 https://www.sciencedirect.com/science/article/pii/S2352152X20318351 https://www.sciencedirect.com/science/article/pii/S1364032116308218	
	Supplementary literature	https://doi.org/10.3390/en13061402 https://ieeexplore.ieee.org/abstract/document/8580457 https://www.sciencedirect.com/science/article/pii/S2352152X1630010X https://www.sciencedirect.com/science/article/pii/S1364032118301436 https://www.sciencedirect.com/science/article/pii/S277268352200022X	
	eResources addresses	Adresy na platformie eNauczanie:	
	Example issues/ example questions/ tasks being completed	1. Determine the parameters of the energy storage system on the basis of the generation variability data and demand profile. 2. Assign energy storage technologies to the functions they are to perform in energy systems (eg due to the possible capacity and duration of operation). 3. Present the structure of battery energy storage system.	
Work placement	Not applicable		

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