



## Subject card

Subject name and code	Smart Grids, PG_00064761						
Field of study	Power Engineering						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2026/2027		
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 -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Zbigniew Lubośny				
	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	Getting acquainted with the idea of Smart Grids (intelligent networks), with their architecture and principles of control and management. Gaining knowledge about designing such networks.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W04] demonstrates knowledge encompassing selected issues in the field of advanced detailed knowledge, particularly in the scope of methods, techniques, tools, and algorithms specific to Power Engineering		Is able to use mathematical methods to solve problems covered by the course.		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_U15] evaluates the feasibility of advanced methods and tools for solving complex engineering tasks of a practical nature, characteristic of the field of study, and selects and applies appropriate methods and tools for this purpose		Is able to analyse and interpret processes occurring in the power system.		[SU2] Assessment of ability to analyse information		
	[K7_W12] identifies and interprets the main developmental trends and significant new achievements in the field of engineering and technical sciences and disciplines relevant to the course of study		Has structured knowledge of the construction of power networks and stations that form SmartGrids.		[SW1] Assessment of factual knowledge		
Subject contents	Smart Grid Architectural Designs, Smart Grid Communications and Measurement Technology, Performance Analysis Tools for Smart Grid Design, Stability Analysis Tools for Smart Grid, Computational Tools for Smart Grid Design, Pathway for Designing Smart Grid, Renewable Energy and Storage, Interoperability, Standards, and Cyber Security, Research, Case Studies for the Smart Grid						
Prerequisites and co-requisites	Electric power systems						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test	60.0%	100.0%
Recommended reading	Basic literature	Buchholz B. M., Styczynski Z. A: Smart grids - Fundamentals and technologies in electricity networks, Springer 2014, 2020Momoh J.: Smart Grid: Fundamentals of Design and Analysis, Wiley-IEEE Press, 2012Borlase S.: Smart Grids: Advanced Technologies and Solutions. 2017	
	Supplementary literature	Any book related to Smart Grids	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Decribe smart grid architecture		
	Voltage control in smart grids		
	Frequency control in smart grids		
Work placement	Not applicable		

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