



## Subject card

Subject name and code	Voltage Regulation of the Power System, PG_00042319						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
Education level	second-cycle studies		Subject group				
Mode of study	Part-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		3.0		
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		prof. dr hab. inż. Ryszard Zajczyk				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	10.0	0.0	0.0	20
	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	20		7.0		48.0	75
Subject objectives	Student recognizes the processes of voltage regulation of the Power system, becomes acquainted with voltege regulation devices and circuits.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U02] is able to prepare and deliver a short oral presentation on a selected technical topic		prepares and presents a multimedia presentation on a given topic		[SU5] Assessment of ability to present the results of task		
	[K7_W02] has an in-depth and structured knowledge of electrical measurements electrical measurements, the methods and equipment used for electrical measurements of non-electrical quantities, he/she knows the principles of testing operation tests of electrical equipment, has a structured knowledge of electricity quality issues		has knowledge in the field of electrical engineering specified by the learning outcome		[SW1] Assessment of factual knowledge		
	[K7_U03] is able to obtain information from literature, databases and other sources, also in English, draw conclusions, formulate and fully justify opinions. substantiate opinions; is able to identify directions for further learning and implement the process of self-education		takes part in laboratory classes and prepares a report on the exercises carried out		[SU1] Assessment of task fulfilment		
	[K7_W05] has detailed knowledge of the regulatory processes in the electricity system electricity system, electricity safety and electricity safety automation		knows the principles of regulation of synchronous generators, power transformers and turbines and uses them to implement the issues discussed in class		[SW1] Assessment of factual knowledge		

Subject contents	The criteria and limitations of voltage regulations. Technical limitations, standards. Criteria of regulations. Algorithms and structure of loop control. Algorithms of territorial regulation. Rational/ reasonable loop control structure of voltage levels and distribution of reactive power. Regulators of individual devices: generators, transformers, capacitor banks. Constructions, algorithms, research, starting. integrated control of ARNE and ARST. Superior regulators/integrated controls. Determining the set values for integrated controls.		
	L: Simulation studies of a simple LV, HV and MV power system in the scope of voltage regulation in generation, transmission and distribution nodes using the PLANS simulator		
Prerequisites and co-requisites	electrical power engineering, electrical power engineering systems		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical exercise	60.0%	50.0%
	Midterm colloquium	60.0%	50.0%
Recommended reading	Basic literature	[1] Zajczyk R.: Regulacja napięcia i mocy biernej w systemie elektroenergetycznym. Wer_2018. Wydanie elektroniczne (pdf).	
		[2] Machowski J.: Regulacja i stabilność systemu elektroenergetycznego Oficyna Wydawnicza Politechniki Warszawskiej Warszawa 2007	
		[3] Machowski J., Lubośny Z.: Stabilność systemu elektroenergetycznego. WNT Warszawa 2018	
	Supplementary literature	Hellmann W., Szczurba Z.: Regulacja częstotliwości i napięcia w systemie elektroenergetycznym. WNT, Warszawa, 1978 r.	
		Kujaszczyk Sz. i inni. Elektroenergetyczne sieci rozdzielcze. Tom 1 i 2. Wydawnictwo Naukowe PŁON. Warszawa 1994 r.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Examples of questions and issues to develop served during the lectures.		
	1 Source voltage in the power system		
	2. Sources of reactive power in the power system		
Work placement	Not applicable		

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