



## Subject card

Subject name and code	, PG_00053423						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	4		Language of instruction		Polish		
Semester of study	7		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	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		40.0	75
Subject objectives	Student recognizes the processes of voltage regulation of the Power system, becomes acquainted with voltage regulation devices and circuits.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W06] knows the structure of computers and microprocessors and the tasks of operating systems, has basic knowledge of the basics of computer software, drivers, microprocessor technology, design of simple algorithms and the operation of information networks		The student has the ability to apply IT knowledge in the power industry		[SW1] Assessment of factual knowledge		
	[K6_U03] can prepare and present a presentation on the problems and results of an engineering task		The student will learn to prepare presentations		[SU1] Assessment of task fulfilment		
	[K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions		The student has the ability to analyze issues using literature		[SU2] Assessment of ability to analyse information		
	[K6_W10] has basic knowledge related to mechatronics and robotics systems		The student has knowledge in this field, which will enable him to use it in this subject		[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.						
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		Hellmann W., Szczerba Z.: Regulacja częstotliwości i napięcia w systemie elektroenergetycznym. WNT, Warszawa, 1978 r.				

	Supplementary literature	Kujsczyk 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	<p>Examples of questions and issues to develop served during the lectures.</p> <p>1 Source voltage in the power system</p> <p>2. Sources of reactive power in the power system</p>	
Work placement	Not applicable	