GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Control of Processes in Electrical Power Engineering, PG_00042318						
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		dr hab. inż. Robert Małkowski				
	Teachers						

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	10.0	10.0	0.0	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

Knowledge related to regulatory processes occurring in the power system.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	does not concern the content of the classes	[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	does not concern the content of the classes	[SU1] Assessment of task fulfilment
[K7_U02] is able to prepare and deliver a short oral presentation on a selected technical topic	does not concern the content of the classes	[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 voltage and frequency control in the power system. Can describe phenomena related to control processes in the power system.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>LECTURES: Generator as a regulated object. Generator controllers, limits of operation points for synchronic generators.Influence of automatic control of a tap changing step-up transformer on power capability area of generating unit. Connecting electric power subsystems to parallel running after system breakdown. Defining limits of criterial parameters. Relations between basic electric parameters in power grid. Protective Automatic : under-frequency load shedding systems, under-voltage load shedding systems.

CLASSES: Coupling parameters of simple power grid model elements(generators, transformers, power lines) to conduct research including various load level in modelled power grid. Calculating load flow. Characterizating dependencies of voltage and/or transformer tap controllers on voltage levels and load flow in analised grid.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of basic electrotechnics Knowledge of basic electrical machinery Knowledge of basic electroenergetics</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Midterm colloquium</td><td>50.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>1. Hellmann W., Szczerba Z.: Regulacja częstotliwości i napięcia w systemie elektroenergetycznym. Warszawa: WNT 1978. 2. Kożuchowski J.: Sterowanie systemów elektroenergetycznych. Warszawa: PWN 1981. 3. Machowski Jan: Regulacja i stabilność systemu elektroenergetycznego, Oficyna Wydawnicza Politechniki Warszawskiej, 2007.</td></tr><tr><td>Supplementary literature</td><td>1. Kowalik R.: Teletechnika. Podstawy dla elektroenergetyków. Wyd. Politechniki Warszawskiej 1999. 2. J. Machowski, J. Bialek, J. Bumby : "Power System Dynamics and Stability". John Wiley & Sons, Chichester, New York, 1997.</td></tr><tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Describe example waveforms (figure below) of switching currents for the case of synchronization with failure to meet the voltage equality condition.

2. List the terms of cooperation of a parallel group of generators. Describe the consequences of not meeting these conditions.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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