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 2022	Academic year of realisation of subject	2022/2023
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	Student Explains regulation processes in Power grid in normal work state and after disturbance. Calculates chosen operation parameters of power grid with simplifying assumptions taken to consideration. On the base of the basic mathematical relations students can describe fundamental elements of power system	[SW1] Assessment of factual knowledge
K7_W01	Student Explains regulation processes in Power grid in normal work state and after disturbance. Describes controllers used to maintain correct operation of power grid. Chooses correct operation algorithms for those controllers. Calculates chosen operation parameters of power grid with simplifying assumptions taken to consideration.	[SK2] Assessment of progress of work
K7_U03	A student sees the importance of broadening his/her individual knowledge and skills concerning related fields.	[SU3] Assessment of ability to use knowledge gained from the subject
K7_U02	Depending on the amount of students, students prepares a multimedia presentation	[SU2] Assessment of ability to analyse information

<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></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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