GDAŃSK UNIVERSITY OF TECHNOLOGY

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 acquianted 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

<table>
<tr><td>Subject contents</td><td>The criteria and limitations of voltage regulations. Technical limitations, standards. Criteria of regulations.Algorythms and structure of loop control. Algorythms 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</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>electrical power engineering, electrical power engineering systems</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>Practical exercise</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Midterm colloquium</td><td>60.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>[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</td></tr>
<tr><td>Supplementary literature</td><td>Hellmann W., Szczerba Z.: Regulacja częstotliwości i napięcia w systemie elektroenergetycznym. WNT, Warszawa, 1978 r.

Kujszczyk Sz. i inni. Elektroenergetyczne sieci rozdzielcze. Tom 1 i 2. Wydawnictwo Naukowe PLON. Warszawa 1994 r.</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>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</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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