GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Power engineering for automation engineers, PG_00059855		
Field of study	ELEKTROENERGETYKA DLA AUTOMATYKÓW		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Robert Kowalak	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	0.0	0.0	45

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	45	10.0	45.0	100

Subject objectives

Familiarization with the structure of the power system, its operation, regulatory processes and system data processing. Performing flow and short-circuit calculations. Familiarization with regulatory processes in the power system.

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	Presents the structures of basic control and protection systems used in the power industry. Describes the structures of data collection, visualization, processing and archiving systems used in the power industry.	[SW1] Ocena wiedzy faktograficznej
[K6_W07] has basic knowledge related to control and automation systems	Describes the principles of power system regulation. Presents basic regulation and protection systems in power devices.	[SW1] Ocena wiedzy faktograficznej
[K6_K05] can think and act in an entrepreneurial way	Identifies threats to the operation of the power system.	[SK5] Ocena umiejętności rozwiązywania problemów występujących w praktyce
[K6_U04] has the ability to self-educate, among other things, in order to improve professional qualifications	Performs calculations of current and power flows and voltage levels in the power system.	[SU1] Ocena realizacji zadania [SU2] Ocena umiejętności analizy informacji
[K6_W11] knows the hazards arising from devices, installations, systems and technical systems, basic principles of occupational health and safety, taking into account the role of control and security systems in controlling automation and robotics facilities	Describes threats in the operation of the power system and methods of limiting and eliminating them. Performs calculations for symmetrical short circuits.	[SW1] Ocena wiedzy faktograficznej

Subject contents	Course content – lecture LECTURE: Structure of the power system, main devices that are elements of the systems for generating, transmitting and distributing electrical energy. Equivalent diagrams of the elements of the power system. Generation and regulation of active and reactive power in the power system. Power and frequency regulation in the power system - primary and secondary regulation. Voltage regulation in the power system. EAZ systems. Control of the system operation - systems for collecting, visualizing, processing and archiving data. EXERCISES: Equivalent diagrams of transformers and overhead and cable lines. Calculation of current and power flows, power losses, voltage levels in networks supplied from one side and two sides. Calculation of short-circuit currents for symmetrical short-circuits.
Prerequisites and co-requisites	Electrical engineering

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Final pass	60.0%	60.0%
Colloquia during the semester	60.0%	40.0%

Recommended reading

Basic literature	Kremens Z., Sobierajski M.: Analiza systemów elektroenergetycznych. WNT Warszawa 1996. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych, Wydawnictwo Naukowe PWN, Warszawa 2021. Machowski J.: Regulacja i stabilność systemu elektroenergetycznego, Oficyna wydawnicza Politechniki Warszawskiej., Warszawa 2007. Zajczyk R.: Modele matematyczne systemu elektroenergetycznego do badania elektromechanicznych stanów nieustalonych i procesów regulacyjnych, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2003. Kowalak R.: Kompensatory i ich wpływ na pracę systemu elektroenergetycznego, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2019.
Supplementary literature	Wasiak I.: ELEKTROENERGETYKA W ZARYSIE Przesył i rozdział energii elektrycznej, Politechnika Łódzka, Łódź 2010. Kahl T.: Sieci elektroenergetyczne, WNT Warszawa 1981. Machowski J.: Regulacja i stabilność systemu elektroenergetycznego, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2007.
eResources addresses	

Example issues/ example questions/ tasks being completed	Determine the current distribution and voltage levels in a power network. Discuss the process of voltage and reactive power regulation in a power system. Discuss the process of active power and frequency regulation in a power system.
Practical activites within the subject	Not applicable

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