GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electric Power Systems, PG_00053196		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2027/2028
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Robert Kowalak	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	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	3.0	27.0	75

Subject objectives

To acquaint students with the work of the power system.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_K01	The student learns the principles of operation of the power system	[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills
K6_U06	The student has knowledge of the structure of the National Power System and the principles of its operation	[SU2] Assessment of ability to analyse information
K6_W09	The student has knowledge of the processes of generation, transmission and distribution of electricity in the power system	[SW1] Assessment of factual knowledge

Subject contents

Generating active Power in the Power system. The sources of active power and their profiles. Turbine regulators. Generating and compensation of reactive Power in the Power system. The sources of reactive power and their profiles. Synchronous generators as a regulated source of reactive power. Induction systems of synchronous generators. Regulators of the generator. Capacitors and chokes as a static source of reactive power. Regulators of condensers baterries. The principles of reactive power compensation in transmission and distributive grids. Automatic regulation of tension and frequency in the power system. Frequency regulation in the power system. Primary and secondary regulation. ARCM grids. Frequency regulation of the Power system. Integrated control of ARNE and ARST.

Prerequisites and co-requisites

Electrical Power Engineering

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Practical exercise	60.0%	40.0%
Midterm colloquium	60.0%	60.0%

Recommended reading	Basic literature	1. Zajczyk R.: Regulacja częstotliwości i mocy w systemie elektroenergetycznym. Wer_2014. Wydanie elektroniczne (pdf). 2. Zajczyk R.: Regulacja napięcia i mocy biernej w systemie elektroenergetycznym. Wer_2014. Wydanie elektroniczne (pdf). 3. Kremens Z., Sobierajski M.: Analiza systemów elektroenergetycznych. WNT Warszawa 1996. 4. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych WNT Warszawa 2013. 5. Machowski J..: Regulacja i stabilność systemu elektroenergetycznego, Oficyna wydawnicza Politechniki Warszawskiej., Warszawa 2007. 6. Machowski J, Białek J.W., Bumby J.,R..: Power system dynamics and stability. John Wiley & Sons New York1997. 7. Kundur P.: Power System Stability and Control. McGraw-Hill, Inc. 1994. 8. Anderson P.M., Fouad A.A.: Power system control and stability IEEE Press Power Engineering Series and John Wiley & Sons, New York 2003.
	Supplementary literature	1. Hellmann W., Szczerba Z.: Regulacja częstotliwości i napięcia w systemie elektroenergetycznym. Warszawa: WNT, 1978. 2. Machowski J., Bernas S.: Stany nieustalone i stabilność systemu elektroenergetycznego. Warszawa WNT 1989. 3. Saccommanno F.: Electric Power Systems Analysis and Control IEEE Press Series on Power Engineering, New York, 2003 4. Wood A.J., Wollenberg B.F.: Power generation, operation & control John Wiley & Sons, New York 1984 5. Weedy B.M.: Electric power systems John Wiley & Sons, Chichester 1987
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Discuss the process of adjusting the frequency and active power in the power system. Discuss the process of voltage and reactive power in the power system.	
Work placement	Not applicable	

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