

Subject card

Subject name and code	Electric Power Systems, PG_00053196								
Field of study	Electrical Engineering								
Date of commencement of studies	October 2023		Academic year of realisation of subject			2025/2026			
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 Electri	ineering -> Faculty of Electrical and Control Engineering							
Name and surname	Subject supervisor	dr hab. inż. Robert Kowalak							
of lecturer (lecturers)	Teachers								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	:t	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 classes include plan				Self-study		SUM		
	Number of study 45 hours		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%			

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Recommended reading	Basic literature	 Zajczyk R.: Regulacja częstotliwości i mocy w systemie elektroenergetycznym. Wer_2014. Wydanie elektroniczne (pdf). Zajczyk R.: Regulacja napięcia i mocy biernej w systemie elektroenergetycznym. Wer_2014. Wydanie elektroniczne (pdf). Kremens Z., Sobierajski M.: Analiza systemów elektroenergetycznych. WNT Warszawa 1996. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych WNT Warszawa 2013. Machowski J.:: Regulacja i stabilność systemu elektroenergetycznego, Oficyna wydawnicza Politechniki Warszawskiej., Warszawa 2007. Machowski J, Białek J.W., Bumby J.,R.:: Power system dynamics and stability. John Wiley & Sons New York1997. Kundur P.: Power System Stability and Control. McGraw-Hill, Inc. 1994. 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	 Hellmann W., Szczerba Z.: Regulacja częstotliwości i napięcia w systemie elektroenergetycznym. Warszawa: WNT, 1978. Machowski J., Bernas S.: Stany nieustalone i stabilność systemu elektroenergetycznego. Warszawa WNT 1989. Saccommanno F.: Electric Power Systems Analysis and Control IEEE Press Series on Power Engineering, New York, 2003 Wood A.J., Wollenberg B.F.: Power generation, operation & control John Wiley & Sons, New York 1984 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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