



## Subject card

Subject name and code	Management and Control in Power Industry, PG_00042180						
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
Education level	first-cycle studies	Subject group			Optional subject group 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	6	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
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	dr hab. inż. Robert Małkowski dr inż. Seweryn Szultka					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	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	5.0		25.0	75	
Subject objectives	Presentation of the basic issues related to electric power system operation. In particular the power units and their participation in the control of voltage and frequency.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W09	Student knows and understands the principles of functioning of modern heating and power systems			[SW1] Assessment of factual knowledge		
	K6_U03	Students can identify selected elements of power system objects and the ways of controlling them. They can indicate positive and negative influence they have on the environment.			[SU3] Assessment of ability to use knowledge gained from the subject		
	K6_W07	Student knows modelling methods of power grid elements, has ability to create model of power grids part, using PowerFactory DigSilent software. Student has ability to use mentioned software to conduct basic research and simulation concerning control and management of power grid.			[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	<b>Lecture:</b> Connecting electric power subsystems to parallel running after system breakdown. Frequency control in a Power Systems. Influence of automatic control of a tap changing step-up transformer on power capability area of generating unit. Voltage stability.  <b>Laboratory:</b> Coupling parameters of simple power grid model elements (generators, transformers, power lines ) to conduct research including various load level in modeled power grid. Calculating load flow. Dependencies of voltage changed and/or transformer tap controllers moves on voltage levels and load flow in analyzed grid.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture	50.0%	60.0%
	Laboratory	50.0%	40.0%
Recommended reading	Basic literature	<p>Machowski J., Lubośny Z., Białek J., Bumby J.: <i>Power System Dynamics. Stability and Control</i>. 3rd edition. Hoboken: John Wiley &amp; Sons, 2020. 888 s. ISBN 9781119526346</p> <p>Małkowski R.: <i>Transformatory z regulacją przekładni pod obciążeniem w systemie elektroenergetycznym</i>. Gdańsk: Politechnika Gdańska, 2019.96 s. ISBN 978-83-7348-778-9</p> <p>Machowski J., Lubośny Z.: <i>Stabilność systemu elektroenergetycznego</i>. Warszawa: Wydawnictwo Naukowe PWN, 2018.920 s. ISBN 978-83-01-20006-0</p>	
	Supplementary literature	Kundur P.: <i>Power System Stability and Control</i> . New York: McGraw Hill 1994. ISBN 007035958X.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Describe influence of automatic control of a tap changing step-up transformer on power capability area of generating unit.		
Work placement	Not applicable		