



Subject card

Subject name and code	Management and Control in Power Industry, PG_00055967						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2023/2024		
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		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Zakład Przekształtników i Magazynowania Energii -> Department of Power Electronics and Electrical Machines -> 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				
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		6.0		49.0	100
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_W08] has basic knowledge in the field of intellectual property protection and patent law, knows and understands the basic processes of energy production and use, knows and understands the principles of modern heating and power systems		The student is able to describe the ways of controlling U and f in the power system.		[SW1] Assessment of factual knowledge		
	[K6_U03] has the preparation necessary to work in an industrial environment, applies the principles of occupational health and safety, can perform diagnostics of the regulation system of a simple energy facility		Student potrafi przeprowadzić diagnostykę systemu regulacji prostego obiektu energetycznego		[SU2] Assessment of ability to analyse information		
Subject contents	Lecture: 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. Laboratory: 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		
	Laboratory		50.0%		40.0%		
	Lecture		50.0%		60.0%		

Recommended reading	Basic literature	<p>Machowski J., Lubośny Z., Bialek J., Bumby J.: Power System Dynamics. Stability and Control. 3rd edition. Hoboken: John Wiley & Sons, 2020. 888 s. ISBN 9781119526346</p> <p>Małkowski R.: Transformatory z regulacją przekładni pod obciążeniem w systemie elektroenergetycznym. Gdańsk: Politechnika Gdańska, 2019.96 s. ISBN 978-83-7348-778-9</p> <p>Machowski J., Lubośny Z.: Stabilność systemu elektroenergetycznego. Warszawa: Wydawnictwo Naukowe PWN, 2018.920 s. ISBN 978-83-01-20006-0</p>
	Supplementary literature	Kundur P.: Power System Stability and Control. New York: McGraw Hill 1994. ISBN 007035958X.
	eResources addresses	<p>Adresy na platformie eNauczanie:</p> <p>Zarządzanie i sterowanie w energetyce [2023/24] - Moodle ID: 35867 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=35867</p>
Example issues/ example questions/ tasks being completed	<p>Describe influence of automatic control of a tap changing step-up transformer on power capability area of generating unit.</p> <p>Describe the basic properties of selected FACTS systems</p>	
Work placement	Not applicable	