GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Power system protection automatics, PG_00057336		
Field of study	Power Engineering, Power Engineering, Power Engineering		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
Education level	second-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	1	Language of instruction	Polish
Semester of study	2	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	
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Zbigniew Lubośny
	Teachers	prof. dr hab. inż. Zbigniew Lubośny dr hab. inż. Jacek Klucznik

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	8.0	47.0	100

Subject objectives	Understanding the purpose and operating principles of power protection systems. Ability to select power station equipment elements in the field of power protection and automation.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U02] is able to use known mathematical and numerical methods to analyze and design elements, systems and power transmission networks and internal installations	Can calculate short-circuit currents. He knows the theory of symmetric components. He can put it into practice.	[SU4] Assessment of ability to use methods and tools
[K7_W03] knows advanced aspects of automation and automatic control of power systems or transmission networks and internal installations	He knows the systems of power protection automatics.	[SW3] Assessment of knowledge contained in written work and projects
[K7_U07] is able to use basic and advanced knowledge of power equipment operation to assess the technical condition of the power system	He can select settings of protection relays.	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_W04] has advanced, ordered and theoretically grounded knowledge in the field of operation and selection of electrical machines, power transmission systems and power electronic devices, classical and forward-looking power technologies and their receivers, knows the principles of selection of power equipment and installations and their receivers and their operation	He can choose accessories power station incl power automation security.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents	Electric power as a secured facility. The role of system protection and requirements. Current transformers and their connection. Voltage transformers and their connection. Theory of electric power system protection. Analog and digital relays. Basic types of protection criteria: overcurrent, voltage, differential, impedance, and angle. Information transmission in protection systems. MV transmission lines protection systems. The lines distortion. Overcurrent protection devices. Overcurrent directional protection devices. Differential protection devices. Earth fault protection devices. Automatic re-closing devices. Congestion protection devices, Voltage asymmetry protection devices.		
Prerequisites and co-requisites	Electric power systems: structures and operation.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	60.0%	100.0%
Recommended reading	Basic literature	J. Żydanowicz, M. Namiotkiewicz: Automatyka zabezpieczeniowa w elektroenergetyce. WNT, Warszawa 1983. W. Winkler, A. Wiszniewski: Automatyka zabezpieczeniowa w systemach elektroenergetycznych. WNT, Warszawa 1999. W. Korniluk, K. W. Woliński: Elektroenergetyczna automatyka zabezpieczeniowa. Wydawnictwo Politechniki Białostockiej, Białystok 2008, 2012	
	Supplementary literature	B. Synal, W. Rojewski, W. Dzierżanowski: Elektroenergetyczna automatyka zabezpieczeniowa. Oficyna wydawnicza Politechniki Wrocławskiej, Wrocław 2003. R. Kowalik, M. Januszewski, A. Smolarczyk: Cyfrowa elektroenergetyczna automatyka zabezpieczeniowa. Oficyna wydawnicza Politechniki Warszawskiej, Warszawa 2006. J. Lorenc: Admitancyjne zabezpieczenia zwarciowe, Wydawnictwo Politechniki Poznańskiej, Poznań 2007	
	eResources addresses	Adresy na platformie eNauczanie: ELEKTROENERGETYCZNA AUTOMATYKA ZABEZPIECZENIOWA [2023/24] - Moodle ID: 32210 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32210	
Example issues/ example questions/ tasks being completed	Select the settings of the delayed and instantaneous overcurrent protection in the HV / MV substation.		
Work placement	Not applicable		