



Subject card

Subject name and code	Protection Automatics in Electric Power Systems, PG_00050033						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group					
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			2.0		
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. Robert Kowalak					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	10.0	0.0	0.0	20
	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	20	5.0		25.0		50
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_U10	Is able to calculate short-circuit currents, select elements of the power station equipment, including power protection automatics.			[SU4] Assessment of ability to use methods and tools		
	K7_K04	Correctly identifies and resolves dilemmas related to the exercise of the profession, in particular those related to responsibility for one's own safety and the safety of others.			[SK2] Assessment of progress of work		
	K7_W05	Has detailed knowledge of regulatory processes in the power system, power security and power protection automation.			[SW3] Assessment of knowledge contained in written work and projects		
	K7_W11						
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	<p>J. Żydanowicz, M. Namiotkiewicz: Automatyka zabezpieczeniowa w elektroenergetyce. WNT, Warszawa 1983.</p> <p>W. Winkler, A. Wiszniewski: Automatyka zabezpieczeniowa w systemach elektroenergetycznych. WNT, Warszawa 1999.</p> <p>W. Korniluk, K. W. Woliński: Elektroenergetyczna automatyka zabezpieczeniowa. Wydawnictwo Politechniki Białostockiej, Białystok 2008, 2012</p>
	Supplementary literature	<p>B. Synal, W. Rojewski, W. Dzierżanowski: Elektroenergetyczna automatyka zabezpieczeniowa. Oficyna wydawnicza Politechniki Wrocławskiej, Wrocław 2003.</p> <p>R. Kowalik, M. Januszewski, A. Smolarczyk: Cyfrowa elektroenergetyczna automatyka zabezpieczeniowa. Oficyna wydawnicza Politechniki Warszawskiej, Warszawa 2006.</p> <p>J. Lorenc: Admitancyjne zabezpieczenia zwarciowe, Wydawnictwo Politechniki Poznańskiej, Poznań 2007</p>
	eResources addresses	<p>Adresy na platformie eNauczenie:</p> <p>ELEKTROENERGETYCZNA AUTOMATYKA ZABEZPIECZENIOWA [ET][II][Niestacjonarne][2023/24] - Moodle ID: 36123 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=36123</p>
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	