GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Power system protection automatics, PG_00064765		
Field of study	Power Engineering, Power Engineering		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2027/2028
Education level	second-cycle studies	Subject group	Specialty 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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Zbigniew Lubośny	
	Teachers		

Lesson types

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_U01] utilizes acquired analytical, simulation, and experimental methods, as well as mathematical models for analysis and evaluation of energy systems, machines and devices, transmission grids and internal installations	Is able to use mathematical methods to solve problems covered by the course.	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_W02] demonstrates structured and theory supported knowledge encompassing key issues in the field of Power Engineering, enabling modeling and analysis of energy systems, machines and devices, transmission grids and internal installations	Is able to model elements of the power system to the extent necessary to select protection automation settings.	[SW1] Assessment of factual knowledge
[K7_U15] evaluates the feasibility of advanced methods and tools for solving complex engineering tasks of a practical nature, characteristic of the field of study, and selects and applies appropriate methods and tools for this purpose	Is able to apply mathematical methods and acquired knowledge to solve real technical problems in the field of power system protection automation.	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving	Is able to analyse and interpret processes occurring in the power system.	[SK5] Assessment of ability to solve problems that arise in practice

<table>
<tr><td>Subject contents</td><td>Course content – lecture

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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Electric power systems: structures and operation.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Midterm colloquium</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>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</td></tr><tr><td>Supplementary literature</td><td>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</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Select the settings of the delayed and instantaneous overcurrent protection in the HV / MV substation.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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