GDAŃSK UNIVERSITY OF TECHNOLOGY

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 2024	Academic year of realisation of subject	2024/2025
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	3.0	27.0	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_K04] correctly identifies and resolves dilemmas associated with the exercise of the profession, in particular relating to responsibility for his own safety and the safety of others	Solves problems related to the safety of persons and property that occur in practice.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_U10] is able to calculate short-circuit currents, select substation equipment including power system automation protection automatics	Uses mathematical methods to solve problems covered by the course.	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_W11] has detailed knowledge of substation construction, is familiar with the principles of selecting substation facilities and equipment, is familiar with technologies high voltage	Selects the components of power stations.	[SW1] Assessment of factual knowledge
[K7_W05] has detailed knowledge of the regulatory processes in the electricity system electricity system, electricity safety and electricity safety automation	Analyses and interprets processes occurring in the power system.	[SW1] Assessment of factual knowledge

Subject contents

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.

Laboratory: Testing of power protection: overcurrent, voltage, differential, impedance.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="2">Electric power systems: structures and operation.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="2"><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 rowspan="3">Recommended reading</td><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>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Select the settings of the delayed and instantaneous overcurrent protection in the HV / MV substation.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.