



Subject card

Subject name and code	High-Voltage Technologies, PG_00063596						
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			Specialty subject group Subject group related to scientific research in the field of study		
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			3.0		
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	dr hab. inż. Marek Olesz					
	Teachers	dr hab. inż. Marek Olesz					
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	10.0		45.0		75
Subject objectives	The aim of the course is to educate specialists with knowledge in the field of innovative approaches to the analysis, construction and operation of high - voltage electrical, electromechanical, power and power electronic devices, as well as with the skills to conduct laboratory tests.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[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	- specifies the types of electrical, electromechanical, power and power electronic devices used in substations, - knows high-voltage technologies and can indicate the possibilities of their use.			[SW2] Assessment of knowledge contained in presentation		
	[K7_U03] is able to obtain information from literature, databases and other sources, also in English, draw conclusions, formulate and fully justify opinions. substantiate opinions; is able to identify directions for further learning and implement the process of self-education	- searches for the necessary information based on the literature, - critically evaluates the available information and formulates conclusions in the field of technological processes			[SU3] Assessment of ability to use knowledge gained from the subject		
Subject contents	Lecture: 1. Carrying out live work. 2. Exhaust gas treatment technologies. 3. Comparative analysis of the possibilities of transmitting electricity using AC and DC current. 4. Technologies for the production of varistor surge arresters 5. Possible applications of superconducting cables in HV systems. The use of superconductors in high voltage technology. 6. Optimization of the operation of HV devices in testing and measurement technology and their electromagnetic compatibility in the zone of impact of strong electric discharges. Laboratory: 1. Measurement and analysis of voltage distribution on insulators at alternating voltage. 2. Measurements of the variability of the electric field generated in the selected working space. 3. Measurements of the variability of the magnetic field generated in the selected working space. 4. Protective characteristics of surge arresters.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	passing the laboratory	60.0%	50.0%
	passing the lecture	60.0%	50.0%
Recommended reading	Basic literature	<p>1. Z. Flisowski: Technika wysokich napięć, WNT Warszawa 2017.</p> <p>2. Ciok Z.: Procesy łączeniowe w układach elektroenergetycznych, WNT Warszawa 1983.</p> <p>3. Ciok Z., Maksymiuk J., Pochanke Z., Zdanowicz L.: Badanie urządzeń energoelektrycznych, WNT, Warszawa 1992.</p> <p>4. Inżynieria wysokich napięć w elektroenergetyce, t.1 i t.2. Praca zbiorowa pod red. Hanny Mościckiej - Grzesiak. Wydawnictwo Politechniki Poznańskiej, Poznań, 1999.</p> <p>5. J. Maksymiuk, Z Pochanke: Obliczenia i badania diagnostyczne aparatury rozdzielczej, WNT Warszawa 2001.</p> <p>6. H. D. Stryczewska: Technologie plazmowe w energetyce i inżynierii środowiska, Wydawnictwo Politechniki Lubelskiej, Lublin 2009.</p>	
	Supplementary literature	<p>1. A. Haddad, D. Warne: Advances in high voltage engineering. Institution of Electrical Engineers 2004.</p> <p>2. Z. Kołaciński: Thermodynamics of short - arc plasma. PWN Warszawa 1989.</p> <p>3. Kuffel E., Zaengl W.S., Kuffel J.: High Voltage Fundamentals. Newnes 2005.</p>	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<p>1. Discuss the course of exemplary live work in the commercial power industry on MV lines</p> <p>2. Describe what exhaust gas treatment technologies are in industry.</p> <p>3. What are the possibilities of increasing the current capacity of modern power lines?</p> <p>4. Discuss contemporary development tendencies of superconductors in the power industry.</p> <p>5. What is the electromagnetic compatibility of HV devices used in the test and measurement technology?</p> <p>6. Advantages and disadvantages of direct and alternating current energy distribution</p>		
Work placement	Not applicable		

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