GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	High Voltage Engineering, PG_00038344		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study 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	1	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Mechatronics and High Voltage Engineering -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marek Olesz	
	Teachers	dr inż. Daniel Kowalak dr inż. Konrad Seklecki dr hab. inż. Marek Olesz	

Lesson types

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 principles of selection and design of high voltage insulation for use in power system

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K02] is aware of the impact of engineering activities on the environment, understands the the non-technical effects of those activities	student analyzes the distribution of electrical field in insulation systems, proposes diagnostics of electrical equipment and installations	[SK2] Assessment of progress of work
[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	The student acquires technical knowledge from various sources, including in English.	[SU2] Assessment of ability to analyse information
[K7_W03] has an extended and deepened knowledge of the field related to electrical power systems and electrical equipment	Student identifies basic aging phenomena in insulation systems	[SW1] Assessment of factual knowledge

Subject contents	Course content – lecture **Lecture:** Control of electric field distribution in high voltage insulation systems. Field distributions around overhead high voltage lines. Methods of limiting the intensity of the magnetic and electric fields around construction objects. The mechanism of pollution flashover and its relation to the construction of insulators. Calculations of parameters of support insulators. Degradation processes of insulation and assessment indicators. Forecasting the life-time of insulation. Research and monitoring of the condition of insulation of high voltage devices operating in the power system. Measurements of partial discharges in insulating systems; diagnostic indicators for insulation assessment; model studies of insulation gaps, supporting systems, and bushings; Criteria of cable line design. **Laboratory:** 1. Overvoltages in transformer windings 2. Testing of partial discharges along the surface of bushings 3. Testing of partial discharges -corona and surface discharges 4. High voltage insulation diagnostics (insulation resistance measurements)
Prerequisites and co-requisites	Credit a subject "High voltage engeneering"

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	60.0%	60.0%
Practical exercise	60.0%	40.0%

Recommended reading

Basic literature	1. H. Boryń, M. Olesz, S. Wojtas, Laboratorium TWN II, Skrypt specjalistyczny w wersji elektronicznej, WEiA PG, 2002 2. Mościcka H. (red.): Inżynieria wysokich napięć w elektroenergetyce, Wyd. Pol. Pozn. Tom 1 1996, Tom 2 1999
Supplementary literature	1. Flisowski Z. Technika wysokich napięć, WNT, Warszawa, 1988 2. Kosztaluk R. I inni: Technika badań wysokonapięciowych, WNT, Warszawa, 1985 3. Wodziński J.: Wysokonapięciowa technika prób i pomiarów, PWN, 1997
eResources addresses	

Example issues/ example questions/ tasks being completed

Provide the permissible values of the electric and magnetic fields near buildings located along high voltage lines.

Methods for reducing the intensity of electric and magnetic fields around energy facilities.

Discuss the mechanism of pollution flashover.

Provide examples of support and busching insulator designs.

Provide methods and principles for laying cable lines.

Provide principles for designing cable lines.

Principles for monitoring the insulation condition of main high voltage devices operating in the power system.

Discuss the method of measuring partial discharges.

Discuss basic methods for voltage tests of insulation systems.

The life time of insulation and its forecasting.

Practical activites within the subject	Not applicable

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