GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Lightning Protection of Electrical Power Equipment, PG_00007791		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Katedra Elektrotechniki i Inżynierii Wysokich Napięć -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marek Olesz	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	15.0	0.0	60

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	60	5.0	35.0	100

Subject objectives

The ability to design lightning and surge protection systems in buildings, including power infrastructure

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_K05	Student is able to propose basic lightning protection systems for cubature objects, power installations and electrical installations.	[SK5] Assessment of ability to solve problems that arise in practice
K6_W10	The student is able to properly select the locations of surge arresters, cross-sections of wires and to secure surge arrester systems	[SW3] Assessment of knowledge contained in written work and projects
K6_K01	The student understands the mechanisms of the atmospheric discharge strokes on the electric power supply systems and electrical installations of buildings	[SK5] Assessment of ability to solve problems that arise in practice
K6_U09	The student is able to properly select the locations of surge arresters, cross-sections of wires and to secure surge arrester systems	[SU1] Assessment of task fulfilment

Subject contents

The external and internal surges in high voltage circuits. Parameters of lightning and lightning surges. Principles of lightning protection systems of buildings. Rules for lightning protection of power stations and transmission lines. Units and surge protection systems in networks and high-voltage stations. Metal-oxide surge arresters - working principle, construction, application, selection and testing. Rules of the insulation coordination.

Prerequisites and co-requisites

Knowledge of High Voltage Engineering and Electrical Engineering.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory activities	60.0%	40.0%
Written exam	60.0%	60.0%

Recommended reading	Basic literature	1. Markowska R., Sowa A.: Ochrona odgromowa obiektów budowlanych, Dom Wydawniczy MEDIUM, Warszawa 2009 2. Szpor S.: Ochrona odgromowa. T. 1, 2. WNT, Warszawa 1973, 1975 3. Szpor S., Samuła J.: Ochrona odgromowa. WNT, Warszawa 1983
	Supplementary literature	1. Standard PN-EN 05115 Instalacje elektroenergetyczne wysokiego napięcia. 2.Standard PN-EN 62305 Ochrona odgromowa.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Development of lightning discharge, characteristic parameters of lightning discharge, registration methods. 2. Overvoltages in the power system caused by lightning strikes, their mechanism. 3. Propagation of surge waves in power lines, waveforms in lines, influence of wave impedance. 4. Principles of mapping overvoltage exposures in voltage tests of equipment insulation, main principles of insulation coordination. 5. The principles and means of lightning protection used in electrical power systems. 6. Rules for lightning protection of buildings, external and internal protection. 7. Outdoor lightning protection of building structures, LPS elements, protective zone, protective angle 8. Earthing in lightning protection, types, measurement methods, static and impulse properties. 9. Measurements of earthing of HV line towers with lightning conductors. 10. Impulse strength of electrical and electronic equipment. 11. Principles and means of internal lightning protection of building objects, concept of zone lightning protection. 12. Ectipotentialisation - the concept, principles and role in building lightning protection. 13. Checking the condition of surge protection devices, the principle of existing protection, types, scope and purpose of tests 14. Coordination principles of low voltage surge protective devices. 15. Construction and operation principle of various surge arresters: blowout and varistor spark gap and non-spark gap arresters. 16. Diagnostics of various types of surge protective devices. 17. Selection, assembly and protection of surge protective devices.	
Work placement	Not applicable	