

FACULTY OF ELECTRICAL
ENGINEERING**SUBJECT CARD**

Name in Polish: **Ochrona odgromowa i przepięciowa**
 Name in English: **Lightning and overvoltage protection**
 Main field of study (if applicable): **Electrical Engineering**
 Specialization (if applicable): **Electrical Power Engineering**
 Level and form of studies: **2nd level, full-time**
 Kind of subject: **obligatory**
 Subject code: **ELR041107**
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	15		15		
Number of hours of total student workload (CNPS):	60		30		
Form of crediting:	crediting with grade		crediting with grade		
For group of courses mark (X) final course:					
Number of ECTS points:	2		1		
including number of ECTS points for practical (P) classes :			1		
including number of ECTS points for direct teacher-student contact (BK) classes:	1.40		0.70		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of electrical engineering and high-voltage technology

SUBJECT OBJECTIVES

- C1. Gaining knowledge about the techniques of lightning and surge protection
 C2. Gaining skills of the measurement range the properties of selected surge protection devices

SUBJECT EDUCATIONAL EFFECTS*relating to knowledge:*

- PEK_W01 The student has knowledge about the high-voltage pulse exposures
 PEK_W02 The student is become familiar with the devices to overvoltage protection of a building

relating to skills:

- PEK_U01 The student can examine the basic properties of surge arresters
 PEK_U02 The student can select the devices to surge protection

relating to social competences:

- PEK_K01 Is aware about the importance and non-technical aspects of engineering activities, i.e. influence on environment, therefore takes responsible actions.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours:
Lec 1	The preliminary, introduction to the problems of the subject	2
Lec 2	Lightning strikes	2
Lec 3	Lightning protection system	2
Lec 4	Lightning protection levels	2
Lec 5	Surge arresters	2
Lec 6	Reducing surge in the overhead installations	2
Lec 7	Protection of power stations	2
Lec 8	Test	1
Total hours:		15

Form of classes - laboratory		Number of hours:
Lab 1	Preface, knowing with the rules of laboratory work, health and safety knowing	3
Lab 2	The study of static characteristics of surge protection elements	3
Lab 3	The study of dynamic characteristics of surge protection elements	3
Lab 4	Research of the surge arresters for medium voltage lines	3
Lab 5	Catch up for overdue exercise, credit lab	3
Total hours:		15

TEACHING TOOLS USED
N1. Traditional lecture using multimedia presentation
N2. Student's own work
N3. Laboratory test conducted in the traditional manner by the students exercise group
N4. Reports of the laboratory exercises

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation <i>F - forming (during semester) P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(W)	PEK_W01 PEK_W02 PEK_K01	Test
P(W)	P=F1	
F1(L)	PEK_U01 PEK_U02 PEK_K01	Checking and evaluation of the preparation to laboratory exercises
F2(L)	PEK_U01 PEK_U02 PEK_K01	Evaluation of the reports from performed researches
P(L)	P=0,5 F1+0,5 F2	

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE: [1] Sowa A., Kompleksowa ochrona odgromowa i przepięciowa. Biblioteka COSiW SEP, Warszawa 2005. [2] Szpor St., Samuła J., Ochrona odgromowa, tom 1, wiadomości podstawowe, WNT 1983. [3] Szpor St., Ochrona odgromowa, tom2, Ochrona urz. elektroenergetycznych, WNT 1975. [4] Szpor St., Ochrona odgromowa, tom 3, Piorunochrony, WNT 1978. SECONDARY LITERATURE: [1] Dehn + Soehne, Lightning protection guide. 2007. [2] Uman M.A., The art and science of lightning protection. Cambridge University Press 2008.

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
ELR041107 - Lightning and overvoltage protection
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical Engineering**
AND SPECIALIZATION **Electrical Power Engineering**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)	Subject objectives	Programme content	Teaching tool number
PEK_W01	S2EEN_W09	C.1	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7	N.1 N.2 N.4
PEK_W02	S2EEN_W09	C.1	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7	N.1 N.2 N.4
PEK_U01	S2EEN_U10	C.1 C.2	Lab1 Lab2 Lab3 Lab4 Lab5	N.2 N.3 N.4
PEK_U02	S2EEN_U10	C.1 C.2	Lab1 Lab2 Lab3 Lab4	N.2 N.3 N.4
PEK_K01	K2ETK_K03	C.1	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lab1 Lab2 Lab3 Lab4 Lab5	N.1 N.2 N.3 N.4