

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Miernictwo wysokonapięciowe i diagnostyka izolacji**  
 Name in English: **High voltage measurement and diagnostics of insulation**  
 Main field of study (if applicable): **Electrical Engineering**  
 Specialization (if applicable): **Electrical Power Engineering**  
 Level and form of studies: **2nd level, part-time**  
 Kind of subject: **optional**  
 Subject code: **ELR051168**  
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	22				
Number of hours of total student workload (CNPS):	60				
Form of crediting:	crediting with grade				
For group of courses mark (X) final course:					
Number of ECTS points:	2				
including number of ECTS points for practical (P) classes :					
including number of ECTS points for direct teacher-student contact (BK) classes:	1.40				

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Basic knowledge In the range of high-voltage technique and electrical metrology.

**SUBJECT OBJECTIVES**

- C1. Gaining theoretical knowledge and skills in the range of high-voltage metrology  
 C2. Gaining theoretical knowledge in the range of selected diagnostic test methods of materials and high voltage insulation systems

**SUBJECT LEARNING OUTCOMES***relating to knowledge:*

- PEU\_W01 The Student has specialized knowledge on measurement of high voltages and currents in high voltage circuits  
 PEU\_W02 The Student has specialized knowledge on of partial discharge measurement in high voltage circuits  
 PEU\_W03 The Student has specialized knowledge of the various diagnostic methods high voltage insulation

*relating to skills:**relating to social competences:*

- PEU\_K01 The Student will gain knowledge about any risks to personnel and equipment

**PROGRAMME CONTENT**

Form of classes - lecture		Number of hours:
Lec 1	Introduction to high voltage measurement technology. Technical standard PN / IEC 60060-1,2.	2
Lec 2	Direct measurement methods of high voltage.	2
Lec 3	Measurement of high DC voltage. High voltage divider, cooperation of capacitance voltage divider with measurement transformer.	2
Lec 4	Measurements of surge voltage.	2
Lec 5	Measurement methods of peak voltage value. Measurement methods of surge currents.	2
Lec 6	Partial discharges measurement systems - measurement of apparent charge, calibration of apparent charge measurement systems.	2
Lec 7	Aims and diagnostic test methods of high voltage electrical equipment.	2
Lec 8	Diagnosis of high voltage overhead insulation. Diagnosis of high voltage surge protection devices.	2
Lec 9	Tests of the resistance indicators of insulation and dielectric loss characteristics.	2
Lec 10	Diagnostic tests of the power transformers - the physicochemical study of power transformer insulation oil.	2
Lec 11	Final test	2
Total hours:		<b>22</b>

**TEACHING TOOLS USED**

- N1. Lectures with presentation  
N2. Individual learning

**EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT**

<b>Evaluation</b> <i>F – forming (during semester)</i> <i>P – concluding (at semester end)</i>	<b>Educational effect number</b>	<b>Way of evaluating educational effect achievement</b>
F1(w)	PEU_W01 PEU_W02 PEU_W03 PEU_K01	Grading final test.
P(w)	P=F1	

**PRIMARY AND SECONDARY LITERATURE****PRIMARY LITERATURE:**

E.Kuffel, W.S. Zaengel, J. Kuffel: High Voltage Engineering Fundaments, Elsevier, 2000

**SECONDARY LITERATURE:****SUBJECT SUPERVISOR**

Krzysztof Wieczorek, krzysztof.wieczorek@pwr.edu.pl