

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Nowoczesne aparaty elektryczne**  
 Name in English: **Modern electrical devices**  
 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: **ELR042472**  
 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):	54				
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. Student is able to discriminate between low and high voltage, and selected parameters of devices, electrical appliances and electrical installations for normal operating conditions and disturbance.
2. Student knows phenomena occurring at the switching operations, including electric arc phenomena and surges.
3. Understands the legal aspects and effects of engineering activities.
4. He can think and act in a creative way.

**SUBJECT OBJECTIVES**

- C1. Knowledge of the design and construction of modern switching devices low and high voltage.  
 C2. Knowing the possibility of using modern switching devices in power systems and networks.  
 C3. Developing tendencies of new electrical devices  
 C4. Knowing the need for lifelong learning

**SUBJECT EDUCATIONAL EFFECTS***relating to knowledge:*

- PEK\_W01 Student has in-depth knowledge of the design and operation of modern switching devices construction of low and high voltage.  
 PEK\_W02 Student has knowledge of the application of modern switching devices installations and distribution systems.  
 PEK\_W03 Student realizes in the tendencies of development of electrical devices.

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

- PEK\_K01 Student understands the need for learning and skills for life.

**PROGRAMME CONTENT**

Form of classes - lecture		Number of hours:
Lec 1	The classification, functions and rating of modern electrical devices.	2
Lec 2	Modern solutions used in backup electrical power systems.	2
Lec 3	Modern installation of reactive power compensation.	2
Lec 4	Switching interferences generated by modern electrical equipment.	2
Lec 5	Modern measuring equipment used in industrial plants and electrical power engineering plants.	2
Lec 6	Modern electrical equipment with modular structures.	2
Lec 7	Remote operation of modern electrical devices	2
Lec 8	The impact of electrical devices on the environment.	2
Lec 9	Reliability of modern electrical devices.	2
Lec 10	Diagnosis of modern electrical devices.	2
Lec 11	Final test	2
Total hours:		<b>22</b>

**TEACHING TOOLS USED**

- N1. Multimedia presentation.  
N2. Lecture information

**EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT**

Evaluation <i>F - forming (during semester)</i> <i>P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(w)	PEK_W01 PEK_W02 PEK_W03 PEK_K01	test
P(w)	P=F1	

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

[1] Maksymiuk J., Nowicki J.,: Aparaty elektryczne. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2014

**SECONDARY LITERATURE:**

[1] Markiewicz H.,: Urządzenia Elektroenergetyczne, PWN, Warszawa 2016

[2] Touran Gonen: Electrical Power Transmission System Engineering: Analysis and Design, by CRC Press

**SUBJECT SUPERVISOR**

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT  
**ELR042472 - Modern electrical devices**  
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_W13	C.1 C.2	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec8 Lec11	N.1 N.2
PEK_W02	S2EEN_W13	C.2	Lec6 Lec7 Lec9 Lec11	N.1 N.2
PEK_W03	S2EEN_W13	C.3	Lec10 Lec11	N.1 N.2
PEK_K01	K2ETK_K06	C.4	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11	N.1 N.2