

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): **Industrial Electrical Engineering**  
 Level and form of studies: **2nd level, full-time**  
 Kind of subject: **optional**  
 Subject code: **ELR052412**  
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	30				
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. 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 LEARNING OUTCOMES***relating to knowledge:*

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

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

- PEU\_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 solution used in backup electrical power systems	2
Lec 3	Modern installation of reactive power compensation.	2
Lec 4	Modern measuring equipment used in industrial plants and electrical power engineering plants	2
Lec 5	Switching interferences generated by modern electrical equipment.	2
Lec 6	Ways that restrict the switching effect computer simulation ATP/EMTP, MATLAB	2
Lec 7	Materials used in modern electrical devices.	2
Lec 8	Simulation programs used in the design of modern electrical devices.	2
Lec 9	Modern electrical equipment with modular structures.	2
Lec 10	Remote operation of modern electrical devices	2
Lec 11	Electronics control of characteristics time-current of the circuit breaker.	2
Lec 12	The impact of modern electrical devices on the environment.	2
Lec 13	Reliability of modern electrical devices.	2
Lec 14	Diagnosis of modern electrical devices.	2
Lec 15	Final test	2
Total hours:		<b>30</b>

TEACHING TOOLS USED
N1. Multimedia presentation. N2. Lecture information

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation <i>F – forming (during semester) P – concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(w)	PEU_W01 PEU_W02 PEU_K01	test
P(w)	P=F1	

PRIMARY AND SECONDARY LITERATURE
<b>PRIMARY LITERATURE:</b> [1] Maksymiuk J., Nowicki J.,: Aparaty elektryczne. Oficyna Politechniki Warszawskiej, Warszawa, 2014
<b>SECONDARY LITERATURE:</b> [1] Markiewicz H.: Urządzenia Elektroenergetyczne, PWN, Warszawa 2016 [2] Turan Gonen: Electrical Power Transmission System Engineering: Analysis and design, by CRC Press

SUBJECT SUPERVISOR
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