FACULTY OF ELECTRICAL ENGINEERING

SUBJECT CARD

Name in Polish:	**Urządzenia elektryczne 1**
Name in English:	**Electrical Devices 1**
Main field of study (if applicable):	**Electrical Engineering**
Specialization (if applicable):	
Level and form of studies:	**1st level, full-time**
Kind of subject:	**obligatory**
Subject code:	**ELR042301**
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):	90				
Form of crediting:	examination				
For group of courses mark (X) final course:					
Number of ECTS points:	3				
including number of ECTS points for practical (P) classes:					
including number of ECTS points for direct teacher-student contact (BK) classes:	2.10				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student has a knowledge of range of the basis of electrical engineering, determines the parameters of the alternating current (AC) circuits and the direct current (DC) circuits.
2. Student has a knowledge of the range basis of physics, in particular he understands mechanisms of the heat conduction and functioning of the simple machines.

SUBJECT OBJECTIVES

C1. Knowledge of the principles of classification of electrical apparatus and their basic technical parameters.
C2. Distinguishing between environmental and maintenance exposures of electric power devices.
C3. Understanding the principles of calculating short-circuit currents in networks and electric power installations for selection of electric devices.
C4. Acquirement of knowledge of solving tasks and problems, which is useful in the choice of electrical equipment in electrical installation.
C5. Understanding the principles of construction and operation of electrical devices used in electrical installations.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01	Student has a knowledge of a subject of climatic and the environment stresses of electrical power engineering equipment as well as conditions of their operation.
PEK_W02	Student is able to explain the consequences of a work current and a short-circuit current in electrical apparatus and installations and calculate of characteristic parameters of the short-circuit current in order to choice of electrical devices and elements of electrical installations.
PEK_W03	Student is able to explain a constructional aspects as well as operation of electrical apparatuses and electrical power engineering devices used in electrical installations and he has knowledge about basic rules of design of electrical installations.

relating to skills:

relating to social competences:

PEK_K01	It is aware of the necessity to acquire and deepen self-knowledge.

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours:**
Lec 1	Classification of electrical power engineering devices. Climatic and the environment stresses. Classes of the electromagnetic environment. Nominal voltages of AC and DC devices and power networks.	2
Lec 2	Conditions of the operating and the electromagnetic compatibility of electric power devices.	2
Lec 3	Short-circuit in electrical power engineering systems, courses and kinds of the short-circuit currents.	2
Lec 4	Conversion impedance of elements of electrical power engineering systems. Calculation of the short-circuit currents according to Polish Standards (PNE), examples for calculation of the short-circuit current.	2
Lec 5	Thermal influence of the operation currents.	2
Lec 6	Thermal and dynamic influence of the short-circuits currents. Examples for calculation.	2
Lec 7	Electrical power engineering switches – classification and fundamental parameters of switches.	2
Lec 8	Electrical switching arc. Rules nad ways of practical arc quenching used in low-voltage switches.	2
Lec 9	Division of the low-voltage switches. Manual switches and contactors.	2
Lec 10	Low voltage fuses: the build, basic proprieties, division and basic parameters.	2
Lec 11	Low voltage circuit-breaker: installations, motors, switching stations and networks, limitations, and residual-currents ones.	2
Lec 12	Electrical installations. Technical specifications which correspond with. Component of electrical installations of buildings and of industrial objects one. Low voltages switchgears.	2
Lec 13	Calculation power and peak current. Rules of design of low voltage installations.	2
Lec 14	Rules of design of low voltage installations.	2
Lec 15	Electrical installations conventional and intelligent – basic peculiarities and differences. Discussion of the examination questions.	2
	Total hours:	**30**

TEACHING TOOLS USED
N1. Multimedia lecture.
N2. Personal consultations.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation *F – forming (during semester)* *P – concluding (at semester end)*	**Educational effect number**	**Way of evaluating educational effect achievement**
F1(W)	PEK_W01 PEK_W02 PEK_W03 PEK_K01	Written or oral exam.
P(W)	P=F1	

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE:
[1] Markiewicz H., Urządzenia elektroenergetyczne, Wyd. 4, WNT, Warszawa 2015; [2] Markiewicz H., Instalacje elektryczne, Wyd. 8, WNT, Warszawa, current edfition.
SECONDARY LITERATURE:
[1] Selected Polish Standards recommended by the Teacher.

SUBJECT SUPERVISOR
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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
ELR042301 - Electrical Devices 1
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical 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	K1ETK_W28 K1ETK_W29	C.2 C.4	Lec1 Lec2	N.1 N.2
PEK_W02	K1ETK_W28 K1ETK_W29	C.3	Lec3 Lec4 Lec5 Lec6	N.1 N.2
PEK_W03	K1ETK_W28 K1ETK_W29	C.1 C.5	Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2
PEK_K01	K1ETK_K04	C.1 C.2 C.3 C.4 C.5	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2