

FACULTY OF ELECTRICAL
ENGINEERING**SUBJECT CARD**

Name in Polish: **Bezpieczeństwo elektryczne**
 Name in English: **Electrical safety**
 Main field of study (if applicable): **Control Engineering and Robotics**
 Specialization (if applicable):
 Level and form of studies: **1st level, full-time**
 Kind of subject: **obligatory**
 Subject code: **ARR042401**
 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):	30		30		
Form of crediting:	crediting with grade		crediting with grade		
For group of courses mark (X) final course:					
Number of ECTS points:	1		1		
including number of ECTS points for practical (P) classes :			1		
including number of ECTS points for direct teacher-student contact (BK) classes:	0.70		0.70		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of the basic principles of electrical engineering
2. Basic knowledge of the construction and operation of the electrical equipment and apparatus
3. Basic ability to connect the measurement circuits
4. Basic ability to use the electrical quantities meters

SUBJECT OBJECTIVES

- C1. Knowledge of basic construction principles of low-voltage electrical installations
 C2. Knowledge of operation rules of electric shock protection systems used in low-voltage installations
 C3. Knowledge of effectiveness criteria of electric shock protection systems in low-voltage installations
 C4. Knowledge of principles of low-voltage electrical installations testing

SUBJECT EDUCATIONAL EFFECTS*relating to knowledge:*

- PEK_W01 Student has knowledge of the effects of electrical current on the human body
 PEK_W02 Student has knowledge of the protective systems and protective measures used in low-voltage installations as well as knowledge of criteria of effectiveness of the shock protection measures in low-voltage installation
 PEK_W03 Student has knowledge of the principles of testing of low-voltage electrical installations as well as knowledge of the principles of working on low-voltage electrical equipment

relating to skills:

- PEK_U01 Student is able to perform the verification measurements in low-voltage electrical installations
 PEK_U02 Student is able to evaluate the results of measurements and make a report for verification

relating to social competences:

- PEK_K01 Student can effectively cooperate in a team performing electrical verification tests

PROGRAMME CONTENT

Form of classes - lecture		Number of hours:
Lec 1	Basic definitions and designations in protection against electric shock The impact of electric current on human beings	2
Lec 2	Principles for design and construction of low-voltage electrical installations	2
Lec 3	Low-voltage networks systems	2
Lec 4	Classes of protection of electrical equipment. Degrees of protection provided by enclosures. The criteria of protection against electric shock.	2
Lec 5	Basic protection measures used in low-voltage installations	2
Lec 6	Fault protection measures used in low-voltage installations	2
Lec 7	The principles of safe work organization on electrical equipment Principles of testing of electrical installations	2
Lec 8	Final test	1
Total hours:		15

Form of classes - laboratory		Number of hours:
Lab 1	Presentation of safety rules and guidelines in the laboratory. Establish the requirements for crediting. General introduction to the stand of laboratory.	2
Lab 2	Resuscitating of persons shocked by electric current	2
Lab 3	Measurement of insulation resistance and electric strength test of electrical installation and electrical equipment	2
Lab 4	Examination of protection by automatic disconnection of supply with overcurrent devices	2
Lab 5	Examination of protection by automatic disconnection of supply with residual current devices	2
Lab 6	Laboratory measurement of earth electrode resistance and the resistivity of soil	2
Lab 7	Measurement of insulation resistance of floors and walls. Measurement of touch voltage	2
Lab 8	Additional term Laboratory crediting	1
Total hours:		15

TEACHING TOOLS USED

- N1. Multimedia presentation
- N2. Informative lecture
- N3. Introductory, short informative lecture
- N4. Basic meters of electrical quantities
- N5. Special meters for electrical installations

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_W03	presence at the lecture
F2(w)	PEK_W01 PEK_W02 PEK_W03	final test
P(w)	$P = 0,25F1 + 0,75F2$	
F1(L)	PEK_U01 PEK_U02 PEK_K01	activity in the laboratory
F2(L)	PEK_U02	report
P(L)	$P = 0,25F1 + 0,75F2$	

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] Markiewicz H.: Bezpieczeństwo w elektroenergetyce: zagadnienia wybrane. WNT, Warszawa 2009

SECONDARY LITERATURE:

- [1] PN-IEC 60364 Instalacje elektryczne w obiektach budowlanych (norma wieloarkuszowa)
- [2] PN-HD 60364 Instalacje elektryczne niskiego napięcia (norma wieloarkuszowa)
- [3] Ustawa „Prawo budowlane” wraz z rozporządzeniami wykonawczymi

SUBJECT SUPERVISOR

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**MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
ARR042401 - Electrical safety
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Control Engineering and Robotics**

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	K1AiR_W36	C.2	Lec1	N.1 N.2
PEK_W02	K1AiR_W36	C.1 C.2	Lec2 Lec3 Lec4 Lec5 Lec6	N.1 N.2
PEK_W03	K1AiR_W36	C.3 C.4	Lec7	N.1 N.2
PEK_U01	K1AiR_U32	C.4	Lab2 Lab3 Lab4 Lab5 Lab6 Lab7	N.3 N.4 N.5
PEK_U02	K1AiR_U32	C.4	Lab2 Lab3 Lab4 Lab5 Lab6 Lab7	N.3 N.4 N.5
PEK_K01	K1AiR_K03	C.4	Lec8 Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7 Lab8	N.3 N.4 N.5