

FACULTY OF ELECTRICAL
ENGINEERING**SUBJECT CARD**

Name in Polish: **Urządzenia elektryczne 2**
 Name in English: **Electrical Devices 2**
 Main field of study (if applicable): **Electrical Engineering**
 Specialization (if applicable):
 Level and form of studies: **1st level, part-time**
 Kind of subject: **obligatory**
 Subject code: **ELR042364**
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):			20	10	
Number of hours of total student workload (CNPS):			54	27	
Form of crediting:			crediting with grade	crediting with grade	
For group of courses mark (X) final course:					
Number of ECTS points:			2	1	
including number of ECTS points for practical (P) classes :			2	1	
including number of ECTS points for direct teacher-student contact (BK) classes:			1.40	0.70	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student has ordered knowledge of the network topology distribution and receiving electrical and environmental conditions of the installation.
2. Student has the knowledge of the construction, use and performance, and security of power connectors used in electrical installations (fuses, circuit breakers).
3. He knows the basic motor control circuits.
4. Student has a knowledge of range of the basis of electrical engineering, determines the parameters of the alternating current (AC) circuits.
5. Student knows the basic of computer service.

SUBJECT OBJECTIVES

- C1. Acquirement and establish of know-how of safely operation at electrical devices and at installations.
- C2. Acquirement of knowledge of the planning as well as the realization measurements of electrical devices and installations as well as a critical opinion of obtained results.
- C3. Acquirement and establish of social competences which refer to the know-how of a co-operate in team, as well as a self-dependence, a responsibility and a honesty in the behaviour and consciousness in effects of the undertaken engineering activity.
- C4. To understand of basic legal and normative acts for the design of electrical installations and basic electrical design methodology.
- C5. To get to know the principles and criteria of electric lighting design.
- C6. To get the basic knowledge and skills determine the power requirements in buildings and planning electric installations.
- C7. To become skillful at the selection of electrical equipment distribution networks and receiving systems.
- C8. To get the basic knowledge and skills in the development of technical documentation in the design of electrical installations.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

relating to skills:

- | | |
|---------|--|
| PEK_U01 | The student should be able to prepare, carry out tests of electrical devices and installations, to make a report for verification and to evaluate the results of measurements. |
| PEK_U02 | The student should be able to formulate the requirements for electrical installations, plan power requirement and receiving installations in the sample building and also to select the components of the distribution system (for example transformers, capacitor banks, inner power supply lines). |
| PEK_U03 | The student should be able to develop electrical installations design documentation. |

relating to social competences:

- | | |
|---------|--|
| PEK_K01 | Student understand the legal aspects and the non-technical aspects of engineering activities in design and well-established sense of responsibility for their actions engineering and also has a established competence for the co-operation in a team in realization of the specified task. |
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PROGRAMME CONTENT

Form of classes - laboratory		Number of hours:
Lab 1	Introduction to the laboratory. Presentation of the principles of safe work on electrical equipment in the lab. To familiarize students with the location of laboratory stands and exercise program, the principles of measurement and reporting of measurements taken.	2
Lab 2	Working and short-circuit load of wiring and electrical apparatus.	2
Lab 3	DC and AC electrical arc.	2
Lab 4	Low-voltage circuit breakers.	2
Lab 5	The effectiveness of automatic disconnection and residual current protective devices (RCDs).	2
Lab 6	Low-voltage circuit breakers.	2
Lab 7	Low voltage motor protection.	2
Lab 8	Control systems of motors by contactors.	2
Lab 9	Introduction to the intelligent installation.	2
Lab 10	Extra classes. Final Assessment.	2
Total hours:		20

Form of classes - project		Number of hours:
Proj 1	Introduction to the course. Presentation of credit conditions. Distribution of project tasks. Discussion of the hierarchy and scope of the basic instruments for the design of electrical installations in buildings.	2
Proj 2	Planning a receiving installations in the building, lighting design.	2
Proj 3	Design of elements of the distribution network and receiving installations in the building.	2
Proj 4	Design of elements of the distribution network and receiving installations in the building.	2
Proj 5	Design of elements of the distribution network and receiving installations in the building.	2
Total hours:		10

TEACHING TOOLS USED

- N1. Standard laboratory conducted in the student groups.
- N2. Short information lecture.
- N3. Supporting computer programs to design electrical installations.
- N4. Internet database of electrotechnical equipment.
- N5. Consultations and discussions.
- N6. Individual work.

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(L)	PEK_U01	Oral or written questions (checking of preparation for classes)
F2(L)	PEK_U01 PEK_K01	Activity during classes.
F3(L)	PEK_U01 PEK_K01	Reports on implementation of exercises.
P(L)	$P = 0,6F1 + 0,2F2 + 0,2F3$	
F1(P)	PEK_U02 PEK_U03 PEK_K01	Problema discussion and active participation.
F2(P)	PEK_U02 PEK_U03 PEK_K01	Evaluation of project preparation.
F3(P)	PEK_U02 PEK_U03 PEK_K01	Defense of the project
P(P)	$P = 0,2F1 + 0,3F2 + 0,5F3$	

PRIMARY AND SECONDARY LITERATURE
<p>PRIMARY LITERATURE:</p> <p>[1] Dołęga W., Klajn A., Kobusiński M., Laboratorium z urządzeń i instalacji elektrycznych, Oficyna Wydawnicza PWr, Wrocław 2004; [1] Dołęga W., Kobusiński M., Projektowanie instalacji elektrycznych w obiektach przemysłowych. Zagadnienia wybrane., Oficyna Wydawnicza PWr, Wrocław 2012; [2] Markiewicz H., Instalacje elektryczne, Wyd. 8, WNT, current edition [3] Rozporządzenie Ministra Infrastruktury z dnia 12 kwietnia 2002 r. w sprawie warunków technicznych jakim powinny odpowiadać budynki i ich usytuowanie. (DzU nr 75, poz. 690) z późn. zm. z dnia 13 lutego 2003 r. (DzU Nr 33, poz. 270) z dnia 7 kwietnia 2004 (DzU Nr 109, poz. 1156), z dnia 6 listopada 2008 r. (DzU Nr 201, poz. 1238) oraz z dnia 12 marca 2009 r. (DzU Nr 56, poz. 461), http://www.isip.sejm.gov.pl/prawo/index.html</p> <p>SECONDARY LITERATURE:</p> <p>[1] Ustawa z dnia 7 lipca 1994 – Prawo budowlane (tekst jednolity: DzU 2006r. Nr 156, poz. 1118) z późn. zm. z dnia 10 maja 2007 r. (Dz. U. Nr 99, poz. 665), 19 września 2007r. (DzU Nr 191 poz.1373), 8 października 2008 r. (DzU Nr 206, poz. 1287), 26 czerwca 2008 (DzU N 145, poz. 914) oraz z dnia 6 maja 2010 r.(DzU Nr 121, poz. 809) http://www.isip.sejm.gov.pl/prawo/index.html. [2] Current Polish Standards.</p>

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
ELR042364 - Electrical Devices 2
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_U01	K1ETK_U25	C.1 C.2 C.3	Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7 Lab8 Lab9 Lab10	N.1 N.5 N.6
PEK_U02	K1ETK_U26	C.4 C.5 C.6 C.7	Proj1 Proj2 Proj3 Proj4 Proj5	N.2 N.3 N.4 N.5 N.6
PEK_U03	K1ETK_U26	C.8	Proj1 Proj2 Proj3 Proj4 Proj5	N.2 N.3 N.5 N.6
PEK_K01	K1ETK_K05 K1ETK_K09	C.3	Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7 Lab8 Lab9 Lab10 Proj1 Proj2 Proj3 Proj4 Proj5	N.1 N.5