

FACULTY OF ELECTRICAL
ENGINEERING**SUBJECT CARD**

Name in Polish: **Komputerowe systemy CAD projektowania w elektroenergetyce**
 Name in English: **Computer Aided Design (CAD) in Energetic**
 Main field of study (if applicable): **Electrical Engineering**
 Specialization (if applicable): **Electrical Power Engineering**
 Level and form of studies: **2nd level, full-time**
 Kind of subject: **obligatory**
 Subject code: **ELR042311**
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	30		15		
Number of hours of total student workload (CNPS):	60		60		
Form of crediting:	crediting with grade		crediting with grade		
For group of courses mark (X) final course:					
Number of ECTS points:	2		2		
including number of ECTS points for practical (P) classes :			2		
including number of ECTS points for direct teacher-student contact (BK) classes:	1.40		1.40		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student has structured and theoretically founded knowledge necessary for planning. and design of low-voltage electrical installations in industrial and municipal.
2. He has knowledge in the field of technical standards and regulations.
3. He can read design assumptions and the design of low-voltage electrical installations.
4. He able to develop project documentation in accordance with applicable regulations and standards.
5. He able to work in a team and understands the need for continuous training.

SUBJECT OBJECTIVES

- C1. Familiarize students with the basic advantages and disadvantages of CAD software used in the design of electrical installation and electrical equipment.
 C2. Familiarize students with CAD programs to design low voltage electrical installation and interpretation of the results.
 C3. Familiarize students with CAD programs to design the interior lighting and exterior, and the interpretation of the results.
 C4. Familiarize students with CAD programs to design low voltage electrical switchgear. and interpretation of the results.
 C5. Familiarize students with CAD programs to create project documentation and interpretation of the results.

SUBJECT EDUCATIONAL EFFECTS*relating to knowledge:*

- PEK_W01 The student has knowledge about the principles of designing low voltage electrical installations, indoor and outdoor lighting , low-voltage switchgear and design documentation.
 PEK_W02 The student has knowledge about the use of CAD software in the design of electric power.

relating to skills:

- PEK_U01 The student is able to interpret design intent in the field of electrical installations and lighting.
 PEK_U02 The student is able to design the electrical system and lighting using CAD software and interpret the results.

relating to social competences:

- PEK_K01 The student can work in a group and understand the necessity of lifelong learning.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours:
Lec 1	Familiar with the subject, program requirements and how to pass. General characteristics of CAD computer systems.	2
Lec 2	General characteristics of CAD computer systems design in energetic.	2
Lec 3	Design rules for electrical installations.	2
Lec 4	General characteristics of CAD software for the design of electrical installations	2
Lec 5	Detailed characteristics of the selected CAD program for designing electrical installations.	2
Lec 6	Principles of lighting design and lighting design outdoor areas.	2
Lec 7	General characteristics of CAD software to design lighting.	2
Lec 8	Detailed characteristics of the selected CAD program to design lighting.	2
Lec 9	Principles of design of low voltage electrical switchgear.	2
Lec 10	General characteristics of CAD software to design low voltage electrical switchgear.	2
Lec 11	Detailed characteristics of the selected CAD program to design a low-voltage electrical switchgear.	2
Lec 12	The rules for creating project documentation.	2
Lec 13	General characteristics of CAD software to create project documentation.	2
Lec 14	Detailed characteristics of the selected CAD program to create project documentation.	2
Lec 15	Final test.	2
Total hours:		30

Form of classes - laboratory		Number of hours:
Lab 1	Presentation of the Rules of Procedure Health and Safety Laboratory. Establish rules for passing. General knowledge of the laboratory positions.	1
Lab 2	Hand and discuss topics of electrical installation projects. The introduction of electrical design data in a selected CAD program for designing electrical installations.	2
Lab 3	Variants perform calculations for a given electrical installation using a selected CAD program for the design of electrical installation.	2
Lab 4	Production of results for a given electrical installation using a selected CAD program for the design of electrical installations.	2
Lab 5	Hand and discuss the topics of lighting projects. The introduction of lighting design data in a selected CAD program to design lighting.	2
Lab 6	Design calculations for the selected variant design data using selected CAD program to design lighting.	2
Lab 7	Production of results for a given lighting design using a selected CAD program to design lighting.	2
Lab 8	Completion of the course.	2
Total hours:		15

TEACHING TOOLS USED

- N1. Lecture with audio-visual technology, multimedia presentations.
- N2. Discussion problematic.
- N3. Computer Laboratory conducted for a group of students - each student with a separate computer.
- N4. Checking messages in the form of oral or written.
- N5. Preparation of project documentation.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation <small>F - forming (during semester) P - concluding (at semester end)</small>	Educational effect number	Way of evaluating educational effect achievement
F1(W)	PEK_W01 PEK_W02	Written test or check messages orally.
P(W)	P=F1	
F1(L)	PEK_U01 PEK_U02 PEK_K01	Activity in laboratory classes.
F2(L)	PEK_U01 PEK_U02	Evaluation of project documentation.
P(L)	P=0.3F1 + 0.7F2	

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] Markiewicz H., Urządzenia elektroenergetyczne, Wyd. 4, WNT, Warszawa 2008.
 [2] Markiewicz H., Instalacje elektryczne, Wyd. 8, WNT, Warszawa 2012.
 [3] Dołęga W., Kobusiński M., Projektowanie instalacji elektrycznych w obiektach przemysłowych. Zagadnienia wybrane., Oficyna Wydawnicza PWr, Wrocław 2009.
 [4] Current manuals CAD software contained on the website developers.

SECONDARY LITERATURE:

- [1] Praca zbiorowa, Poradnik inżyniera elektryka. Tom 3. WNT, Warszawa, 2005.
 [2] Wiatr J., Orzechowski M., Poradnik projektanta elektryka, wyd 5, Wydawnictwo Medium, Warszawa 2012.

SUBJECT SUPERVISOR

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT **ELR042311 - Computer Aided Design (CAD) in Energetic** 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_W08	C.1	Lec1 Lec3 Lec6 Lec9 Lec12	N.1 N.2
PEK_W02	S2EEN_W08	C.1 C.2 C.3 C.4 C.5	Lec1 Lec2 Lec4 Lec5 Lec7 Lec8 Lec10 Lec11 Lec13 Lec14	N.1 N.2
PEK_U01	S2EEN_U09	C.1 C.5	Lab2 Lab5 Lab7	N.2 N.3 N.4 N.5
PEK_U02	S2EEN_U09	C.1 C.2 C.3 C.5	Lab2 Lab3 Lab4 Lab5 Lab6 Lab7	N.3 N.4 N.5
PEK_K01	K2ETK_K01	C.1 C.2 C.3 C.4 C.5	Lec15 Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7 Lab8	N.2 N.3