

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Electrical installations		Code 1010311271010311941
Field of study Electrical engineering	Profile of study (general academic, practical) (brak)	Year /Semester 4 / 7
Elective path/specialty Distribution Devices and Electrical	Subject offered in: polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: 1 Project/seminars: 1		No. of credits 5
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 5 100%
Responsible for subject / lecturer: prof. dr hab. Aniela Kamińska-Benmechernene, prof. nadzw. email: anIELa.kaminska@put.poznan.pl tel. 61 665 26 67 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge on electrical engineering, mathematics, physics, electrical metrology, electrical devices and its safety using, ergonomics.
2	Skills	Able to perform mathematical analysis of simple electrical circuits and read electrical wiring schemes.
3	Social competencies	A sense of the need to broaden the competence and willingness to work together in a team.
Assumptions and objectives of the course: Knowledge of electrical installation operation, rules of designing and realization. Purchase of skills to design electrical installation: calculation, feeder selection and protection, protection of humane beings, overvoltage and overcurrent protection, protection coordination, drawing installation schemes. Experiment planning, selection of measurement instrument, realization of test set-up, researches performing and results analyzing.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Knows the rules of operation and realization of electrical installation and the phenomena occurring in these installations. - [K_W04 +++, K_W08 +++, K_W19+++]		
2. Knows the rules of feeder selection and protection, protection of humane beings, overvoltage and overcurrent protection, protection coordination. - [K_W04 +++, K_W08 +++]		
Skills:		
1. Able to perform the drawing of electrical installation schemes and calculation for feeder selection and protection and selection of apparatuses. - [K_U17+++ , K_U11 +++]		
2. Able to perform estimation of hazard assessment occurring in electrical installation and select the methods and measures of their elimination. - [K_U11+++ , K_U21 +++]		
3. Able to plan experiment, measurement instrument select, test set-up realize, perform researches and analyze results. - [K_U02+++ , K_U14+++ , K_U15+++]		
Social competencies:		
1. A sense of need for consultation between specialists of various industries realizing buildings, in which the electrical installations are the part of building. - [K_K03+++]		
2. Able to work in team developing complex electrical installation. - [K_K02 +++, K_K03 +++]		

Assessment methods of study outcomes		
<p>Lecture: Assessment of: ? analyze the phenomena and processes occurring in electrical devices and installation, ? knowledge and understanding of electrical schemes, rules and conditions for selection of installation apparatus.</p> <p>Design exercises: Skills assessment of: ? installation schemes developing, ? calculation performing and apparatus selection. ? estimation of dangers in electrical installation and select the methods and measures of their elimination.</p> <p>Laboratory exercises: Skills assessment of: ? experiment planning, ? experimental set-up and devices selection, ? experiment carry out and the analyzing of results using modern methods and software, ? measurement accuracy analysis.</p> <p>Getting extra points for the activity during seminar, and in particular for: ? design of installation in which the specific conditions occur, ? implementation of the extended experiment, ? use of modern methods to describe measurement results.</p>		
Course description		
<p>Types of electrical installations in building. Installation systems in building: TN-C, TN-S, TT, IT. Installed power loads characteristics. Calculation of load current. Power loading of an installation. Distribution switchboard schemes. Distribution conductors in building. Calculation of short-circuit current. Switching of short-circuit current by Modular Circuit Breakers (MCB) and fuses, let-through energy. Feeder selection due to load current, voltage drop, heating by short-circuit current (let-through energy) and condition of automatic disconnection of the supply. Protection selection and coordination. Selective breaker ? principle of functioning, voltage and current waveforms during circuits switching. Overvoltage protection.</p>		
<p>Basic bibliography: 1. H. Markiewicz, Instalacje elektryczne, WNT, Warszawa 2000 2. A. Kamińska, L. Muszyński, Z. Boruta, R. Radajewski Nowoczesne techniki w projektowaniu energooszczędnych instalacji budynkowych w systemie KNX, Opracowanie w ramach Programu Operacyjnego Innowacyjna Gospodarka (przekazywane studentom nieodpłatnie), 2011 3. PN-HD 60364-6:2008, Instalacje elektryczne niskiego napięcia</p>		
<p>Additional bibliography: 1. Electrical installation handbook, ABB, 4th edition, 2006 2. Schneider Electric, Electrical installation guide, 2007</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. participation in the class lecture	15	
2. participation in the project activities	15	
3. participation in the laboratory exercises	15	
4. participation in the consulting on the lecture, the project and laboratory exercises	15	
5. preparation of installation design in selected building	20	
6. preparation to the laboratory exercises	4	
7. preparation of practical exercises report	16	
8. preparation to the written exam	18	
9. participation in the exam	2	
Student's workload		
Source of workload	hours	ECTS

Total workload	120	5
Contact hours	62	3
Practical activities	66	3