STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Electrical Engineering**		Code **1010134251010311341**
Field of study **Environmental Engineering Extramural First-**	Profile of study (general academic, practical) **(brak)**	Year /Semester **3 / 5**
Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **part-time**	
No. of hours Lecture: **22** Classes: **8** Laboratory: **-** Project/seminars: **-**		No. of credits **4**
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		ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of essential laws of physics and mathematics
2	**Skills**	Ability of using the knowledge in the scope of physics and of the technology of processes in the electrical power engineering system (K_U0x+). The ability of the grade of the quality of the operation and energy consumptions of the technological process.
3	**Social competencies**	He understands aspects and effects of electricians? activity including its influence on environment and the responsibility for making a decision.

Assumptions and objectives of the course:

Meeting standard devices and wirings in stations of water treatment plant and waste water treatment plant, heating central units and air-conditioning stations and achieving their exploitations by abilities in the scope of electrotechnology as well as formulating requirements and mechanical guidelines resulting from technological premises essential for the modernization of exploited installations.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. 1. The student knows the phenomenon and laws ruling the flow of the electric current in installation powering: the electric appliances, devices in heating and air-conditioning stations, water and waste water treatment plants, - [K_W02] - [-]

2. 2. He knows operation of electric devices of lighting, driving pumps and fans and knows developmental trends of systems of technical equipping of buildings in the scope of the electricity - [K_W05] - [-]

3. He knows basic techniques and principles of safe using the electric appliances and knows the rules of shock, surge and lightning protections - [K_W07] - [-]

Skills:

1. . The student is able to apply the essential knowledge in the scope of the electrical engineering necessary for the operation of electrical equipment in accordance to their purpose; - [K_U08, KU_11 - [-]

2. 2. He is able to describe the correctness of operations of basic elements of the system powering lighting devices and electric machines; - [K_U13] - [-]

3. . He can apply the knowledge in the scope of the electrical engineering for designing simple circuits of the installation in stations of water and waste water treatment plant and air-conditioning stations. - [K_U11, K_U14] - [-]

Social competencies:

1. . The student understands the need of long-live learning and of making over in the intelligible way to the information about achievements techniques of the environmental engineering in the field bound with area of electrotechnology - [K_K01] - [-]
2. 2. He has a sense of responsibility in undertakings carried out collectively; - [K_K03] - [-]
3. 3. He understands the consequences of his non-technical operation and its impact on the environment - [K_K02] - [-]

Assessment methods of study outcomes
Lecture:The written test of knowledge-ever seen (18 questions).
Laboratory exercises:The test and awarding a bonus to the increase in the essential knowledge for the realization of put problems in the given area of laboratory tasks, during every classes.
Course description
Structure of the electric supply of buildings and technological installations. Direct and alternating electric current. Single-phase and three-phase current. Kinds and the structure of wirings. Installations in intelligent buildings. Receivers of electricity: engines, heaters. Sources of the light. Devices for connecting circuits and control the receivers. Rectifiers, inverters - adjustment of the rotation speed of engines. Elements of designing the electrical wiring- the plan and the outline of the installation, the main protection, receivers and switchgears; the selection and the coordination of protections. Balance of the demanded power. Surge protection, against electric shock and lightning protection. Measurements: of the voltage, the amperage, the power and the energy and the quality of the energy. Safe exploitation of the electric appliance.
Basic bibliography:
1. 1.Koczyk H., Antoniewicz B., Sroczan E., Nowoczesne wyposażenie techniczne domu jednorodzinnego, PWRiL Poznań 1998 r.
2. Sroczan E., Nowoczesne wyposażenie techniczne domu jednorodzinnego. Instalacje elektryczne. PWRiL Poznań 2004 r.
3. Rottermund H., Strzyżewski J., Elektryczność w twoim domu, WNT
4. Sroczan E. (red.), Laboratorium podstaw elektroenergetyki. Laboratorium Cz. I, Wyd. PP, 2013
Additional bibliography:
1. Markiewicz H., Instalacje elektryczne WNT.
2. Opydo W., Elektronika i elektrotechnika dla wydziałów nieelektrycznych, Wyd. P P

Result of average student's workload

Activity	Time (working hours)
1. Preparation for the laboratory university class	30

Student's workload

Source of workload	hours	ECTS
Total workload	90	4
Contact hours	35	2
Practical activities	30	2