



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electrical Engineering

### Course

Field of study

Environmental Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

18

Laboratory classes

Tutorials

10

Projects/seminars

Other (e.g. online)

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr inż. Robert Wróblewski

email: robert.wroblewski@put.poznan.pl

tel. 61 665 2523

Wydział Inżynierii Środowiska i Energetyki

ul. Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

mgr inż. Jakub Sierchuła

email: jakub.sierchula@put.poznan.pl

tel. 61 665 2276

Wydział Inżynierii Środowiska i Energetyki

ul. Piotrowo 3A 60-965 Poznań

### Prerequisites

Basic knowledge of mathematics, physics and basic electrotechnology. The ability of effective self-education in the field related to the chosen field of study. He is aware of the need to broaden his competences, willingness to cooperate within the team.

### Course objective

getting to know the basic concepts and laws of electrical engineering and typical electrical equipment and installations. Achieving the ability to operate electrical installations safely and getting to know the characteristics of powered equipment.



## Course-related learning outcomes

### Knowledge

The student is familiar with the phenomena and laws governing the flow of electric current in circuits supplying electrical equipment. He knows the phenomena describing the operation of electric lighting devices, driving pumps and fans with variable output; he knows the development trends of technical building equipment systems in the field of electricity. He knows the basic techniques and principles of safe use of electrical equipment and protection against electric shock and surge.

### Skills

The student is able to apply the knowledge of electrical engineering necessary to operate electrical equipment according to its intended use. Student is able to determine the correct functioning of the basic elements of the power supply system for lighting equipment and electrical machines. Student is able to apply the knowledge of electrical engineering to determine the design assumptions of simple electrical installations e.g.: in sewage treatment plants and air conditioning stations.

### Social competences

The student understands the need for continuous learning and communicating in an understandable way about achievements in the field of electrical engineering related to the field of environmental engineering. He is aware of the responsibility in projects implemented as a team. He understands non-technical effects of his activity and its influence on the environment

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

### Lecture:

evaluation of knowledge and skills shown on a written credit,

### Tutorials:

Written test and activity bonus during the classes (assessment of knowledge and skills related to the exercise task).

## Programme content

### Lecture:

Direct, alternating, single-phase and three-phase electric current. Basic dependencies on electric current circuits. Measurements: voltage, current, power and energy and energy quality. Structure of electrical power supply system of buildings and technological installations. Types and structure of electrical installations (installation scheme; arrangement: main protections, receivers and switchgears, selection and coordination of protections, electrical devices for connecting circuits and controlling receivers). Balance of demanded power. Protection: anti-shock, lightning and surge protection. Installations in intelligent facilities. Electric energy receivers: motors, heaters. Characteristics of light sources. Characteristics of inverter drive, motor speed control. Safe operation of electrical equipment.

### Tutorials:



Calculation of electrical circuit parameters. Elements of the design of the receiving electrical installation.

### Teaching methods

Lecture:

multimedia presentation, illustrated with examples shown on the board

Tutorials:

solving tasks at the board

### Bibliography

Basic

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

Additional

1. Markiewicz H., Instalacje elektryczne WNT.
2. Opydo W., Elektronika i elektrotechnika dla wydziałów nieelektrycznych, Wyd. P P
3. Strzyżewski J., Bezpieczny dom rodzinny. Instalacje elektryczne, T. 1, Ofic. Wyd. Polcen

### Breakdown of average student's workload

	Hours	ECTS
Total workload	81	3,0
Classes requiring direct contact with the teacher	40	2,0
Student's own work (literature studies, preparation for tutorials, preparation for tests, ) <sup>1</sup>	38	1,0

<sup>1</sup> delete or add other activities as appropriate