COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electronics and Electrical Engineering [N1IZarz1>EiE]

Course

Field of study
Engineering Management

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
part-time

Requirements
elective

Number of hours

Lecture
10

Laboratory classes
10

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

mgr inż. Adam Gulczyński
adam.gulczynski@put.poznan.pl

dr inż. Tomasz Jarmuda
tomasz.jarmuda@put.poznan.pl

Lecturers

Prerequisites

none

Course objective

Getting to know the basics of electrical engineering and electronics, both from the theoretical and practical side. Acquiring the ability to read electrical diagrams, recognize elements, build simple electrical and electronic systems. Ability to algebraically solve simple electrical systems.

Course-related learning outcomes

Knowledge:
The student lists and describes basic electrical quantities, such as voltage, current, and resistance [P6S_WG_16].
The student classifies and characterizes typical industrial technologies, with special emphasis on technologies for the construction and operation of machines [P6S_WG_17].

Skills:
The student analyzes and distinguishes various design tasks in the field of machine construction and operation, presenting the results of their work [P6S_UW_14].
The student demonstrates the application of selected methods for solving problems related to the construction and operation of machines, presenting specific examples of applications [P6S_UW_15].

Social competences:
The student explains the impact of engineering activities on the environment, identifying key aspects and examples related to their responsibility for decisions made [P6S_KR_01].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

For laboratories: on the basis of the evaluation of the current progress in the implementation of tasks assessed by written work-reports; final grade based on the results of the average of partial grades (for individual classes).
In the scope of lectures: on the basis of answers to questions about the material assimilated in previous lectures, solving problems, written knowledge check based on a test / answers to questions / solving problems Possibility to conduct the test remotely on the university's eKursy platform.

Programme content

Electrical properties of various types of materials: conductors, dielectrics, semiconductors; types of electric charge carriers; basic electrical quantities (potential difference, voltage, current, power, energy, resistance, capacitance, inductance, impedance) and the units used to express their magnitude; structure and essential properties of basic elements used in electrical engineering: resistors, coils, capacitors and physical phenomena on which the functioning of these elements is based; basic laws of electrical engineering: Ohm's law, Kirchhoff's laws I and II; properties of the actual voltage source and methods of combining multiple such sources to obtain a replacement source with different parameters; the effect of temperature on conductors and semiconductors and how to use this property in electrical / electronic devices; basic concepts related to AC circuits: instantaneous values of voltage, current, power, relationships of these quantities; average and effective values of voltage and current; principle of operation of electric relays; vector diagrams as used to describe AC components and circuits; active, reactive and apparent power and the relationships between them; RLC circuits, resonance phenomenon; semiconductors, structure and principle of operation of semiconductor elements: diodes, transistors, thermistors, integrated circuits, photoelectric and luminescent elements; power supply systems, including one- and two-half rectifiers, zener diode stabilizers; a transistor as an amplifier; operational amplifier, logic gates and simple combination circuits, functions of digital elements in complex electronic devices, generator and oscilloscope testing.

Teaching methods

Lecture: multimedia presentation (including: drawings, photos, animations, films) supplemented with examples given on the board, especially computational examples. Taking into account various aspects of the presented issues, including: economic, ecological, legal and social. Presenting a new topic preceded by a reminder of related content, known to students from other subjects.
Laboratory: performing laboratory exercises in teams (preparation of the stand, building measuring systems, carrying out experiments) with the help and supervision of the teacher.

Bibliography

Basic:
1. Bolkowski S.: Elektrotechnika teoretyczna, Wyd. 6, WNT, Warszawa 2001.
2. Kurdziel R.: Podstawy elektrotechniki, WNT, Warszawa 1973.
3. Podstwy elektrotechniki i elektroniki dla nieelektryków, red. J. Smyczek, Wydawnictwo Uczelniane Politechniki Koszalińskiej, 2012.

Additional:
1. Krakowski M.: Elektrotechnika teoretyczna. Tom 1. Obwody liniowe i nieliniowe, PWN, Warszawa 1995.

2. Bolkowski S., Brociek W., Rawa H.: Teoria obwodów elektrycznych. Zadania, WNT, Warszawa 1995.
3. Podstawy elektrotechniki i elektroniki, A. Kloskowski, J. Wawer, Ł. Marcinkowski, Wydawnictwo Politechniki Gdańskiej 2015.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	25	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	35	1,00