



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electrical engineering and electronics

Course

Field of study

Management engineering

Area of study (specialization)

Level of study

First-cycle of study

Form of study

Full-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

polish

Requirements

elective

Number of hours

Lecture

15

Tutorials

Laboratory classes

15

Projects/seminars

Other (e.g. online)

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

Dr. Eng. Wojciech Kowalczyk

e-mail: wojciech.kowalczyk@put.poznan.pl

phone: 61 665 20 43

Responsible for the course/lecturer:

Faculty of Control, Robotics and Electrical

Engineering

ul. Piotrowo 3a, 60-965 Poznań

Prerequisites

In terms of knowledge:

Has basic knowledge of decimal and binary arithmetic, algebra (including Boolean algebra), geometry, differential and integral calculus, complex numbers. Has basic knowledge in physics covering electrical phenomena.



In terms of skills:

Has the ability to understand the technical documentation of devices and their elements.

Has the ability to work individually and in a team; can carry out tasks according to the assumed schedule/study.

He can develop documentation on the implementation of the task, prepare a text containing a discussion of the results and conclusions.

Has the ability to solve systems of algebraic equations.

Has the ability to use Boolean algebra.

In terms of social competences:

Is aware of the need to take care of his and his colleagues' safety in contact with the laboratory/technical/industrial work environment.

Is aware of the social and economic consequences of improper, incompatible with safety rules, unprofessional use of devices and technical systems that may pose a threat to human life.

Course objective

Introduction to the basics of electrical engineering and electronics, both from the theoretical and practical point of view. Learning 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

P6S_WG_16 knows the basic methods, techniques, tools and materials used to solve simple engineering tasks in the field of electrical and electronic devices construction and operation

P6S_WG_17 knows typical industrial technologies and knows the technologies of electrical and electronic devices construction and operation

Skills

P6S_UW_14 is able to identify design tasks and solve simple design tasks in the field of electrical and electronic devices construction and operation

P6S_UW_15 can apply typical methods for solving simple problems in the field of electrical and electronic devices construction and operation

Social competences

P6S_KR_01 is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment, and the associated responsibility for the decisions taken



Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

In the scope of laboratories: based on the assessment of the current progress of the tasks assessed by written reports; final grade based on the results of average partial grades (from individual classes)

In terms of lectures: based on the answers to questions about the material learned in previous lectures, solving exercises, written knowledge check based on the test/answers to questions/solving exercises (you can enter it after passing the laboratories)

Programme content

Electrical properties of various materials: conductors, dielectrics, semiconductors; types of electric charge carriers; basic electrical quantities (potential difference, voltage, current, power, energy, resistance, electrical capacity, inductance, impedance) and units used to express them; construction and properties of basic elements used in electrical engineering: resistors, coils, capacitors and physical phenomena related to them; basic laws of electrical engineering: Ohm's law, I and II Kirchhoff's law; properties of the real voltage source and methods of combining many such sources to obtain a replacement source with various parameters; influence of temperature on conductors and semiconductors and ways of using 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 charts used to describe AC components and circuits; active, reactive and apparent power and relationships between them; RLC circuits, resonance phenomenon; semiconductors, construction and principle of operation of semiconductor components: diodes, transistors, thermistors, integrated circuits, photoelectric and luminescent elements; power supply systems, including one- and two-half rectifier systems, stabilizers with a Zener diode; transistor as an amplifier; logic gates and simple combination systems; selected sequential elements; functions of digital elements in complex electronic devices; seven segment displays based on LEDs and how to control them.

Teaching methods

Lecture - informative, conversational lecture

Laboratory - laboratory method

Bibliography

Basic

1. Podstawy elektrotechniki i elektroniki, A. Kloskowski, J. Wawer, Ł. Marcinkowski, Wydawnictwo Politechniki Gdańskiej 2015
2. Laboratorium elektrotechniki i elektroniki dla kierunku Inżynierii Bezpieczeństwa Pracy, red. E. Leśniewska, Wydawnictwo Politechniki Łódzkiej 2014



3. Podstawy elektrotechniki i elektroniki dla nieelektryków, red. J. Smyczek, Wydawnictwo Uczelniane Politechniki Koszalińskiej, 2012

Additional

Sztuka elektroniki, t. 1 i 2, P. Horowitz, W. Hill, WKŁ, 2018

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory preparation of results and preparation of laboratory reports, preparation for passing) ¹	30	1,0

¹ delete or add other activities as appropriate

