



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Elements of electrical engineering and electronics

Course

Field of study

Chemical Technology

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

III/6

Profile of study

general academic

Course offered in

English

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

Tutorials

Projects/seminars

Other (e.g. online)

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

dr eng. Pawel Jezowski

Responsible for the course/lecturer:

Prerequisites

The student should know the basic issues of physics in the field of electricity (some issues will be recalled during lectures).

The student should be able to implement self-education.

The student should understand the need for further self-learning and for teaching other people (students).

Course objective

Explanation of the basics related to atom structure and bonds and their impact on electric conduction. Mastering basic knowledge about the production and use of electricity (electrical circuits and devices), measurements of electrical quantities, construction and production of semiconductor materials (in particular silicon), principles of operation and application of basic semiconductor components and integrated circuits. Understanding the principles of health and safety at work with electrical devices.

Course-related learning outcomes

Knowledge



1. The student has the necessary knowledge in the fields of electrical engineering and electronics, enabling formulation and mathematical solving of simple tasks related to chemical technology - [K_W05]
2. Student knows the basic principles of operation of electronic control systems used in chemical technology - [K_W06]

Skills

1. The student has the preparation and competencies necessary to work in an industrial environment and knows the principles of occupational health and safety - [K_U10]
2. Student applies basic legal regulations and observes OHS rules related to work performed as part of using electrical devices - [K_U28]
3. Student selects electrical methods and techniques to control the course of technological processes - [K_U32]

Social competences

1. Student is able to properly set priorities for the implementation of the assigned task - [K_K04]
2. Student is able to think and act in an entrepreneurial manner - [K_K06]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment: It consists of periodic written tests of student knowledge that take place periodically to encourage students to systematically study specific and discussed theoretical issues in the field of electrical engineering and electronics. It is possible (after agreeing with the lecturer) to verify the student's knowledge on the basis of prepared individual or team work and to present a topic on one of the proposed issues in the field of electrical engineering and electronics. The subject is considered passed after obtaining more than 50% of points.

Summative assessment: Grade for periodic tests or essay and presentation with the possible consideration of presence and active participation in lectures.

Programme content

A short introduction on the history of electronics. Impact of atom structure, type of bonds and other parameters on electric current conduction. Semiconductor materials (with a discussion of obtaining silicon as one of the main semiconductor materials) and electronic components (diode types and their use, transistors their types and application). Processors, microprocessors, electronic circuits (integrated circuits), switching (logic) circuits. DC electric circuits. Electrical phenomena in the electrostatic and magnetic field. Ways to supply electronic circuits. AC electrical circuits. Power and electricity. Occupational health and safety in electrical engineering. Electrical measurement.

Teaching methods

Presentation, audio-visual aids, experimental shows



Bibliography

Basic

Fundamentals of Electronics 1: Electronic Components and Elementary Functions
(ISBN: 9781786301819)

Fundamentals of Electronics 2: Continuous-time Signals and Systems
(ISBN: 9781119422082)

Fundamental Electrical and Electronic
(ISBN:9780750687379)

Principles W. C. O'Mara, Handbook of Semiconductor Silicon Technology, Noyes Publications
(ISBN: 0815512376)

Additional

Fundamentals of Electronics: Book 1: Electronic Devices and Circuit Applications (Synthesis Lectures on Digital Circuits and Systems)
(ISBN: 9781627055628)

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	35	1,5
Student's own work (literature studies, preparation for tests) ¹	15	0,5

¹ delete or add other activities as appropriate