



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Fundamentals of electronics [S1MwT1>PElektr]

Course

Field of study

Mathematics in Technology

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

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of mathematical analysis, basics of electrical engineering and metrology. Using the laws of electrical engineering to analyze AC and DC circuits. Awareness of need to expand their competences and is ready to work in a team.

Course objective

Getting to know the properties of basic electronic components and circuits used in practice and methodology of their analysis and experimental research.

Course-related learning outcomes

Knowledge

- well structured knowledge of the classification of basic electronic components and methods of processing electrical signals;
- ability to explain the principles and techniques of acquisition and processing of measurement signals

for industrial applications.

Skills

- ability to design and launch electronic systems for simple engineering applications;
- ability to perform simple maintenance work in the area of electronic engineering.

Social competences

- ability to work in a responsible and entrepreneurial manner in the field of electronic engineering.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

Evaluation of knowledge and skills demonstrated on a written test and calculus nature (the written test sheet contains the information necessary to perform calculus tasks). Threshold for passing the test 50%. Rewarding grades from laboratory classes as well as presence and activity during the lecture.

Laboratory

Entry tests and rewarding knowledge necessary to implement problems posed in the area of laboratory tasks. Assessment of skills related to implementation of measurement task. Assessment of reports on the exercises performed. Assessment of knowledge demonstrated on the written test in laboratory classes (test questions and calculation tasks).

Programme content

Lectures

Passive and active elements used in electronic circuits. Properties and application of basic semiconductor elements: rectifier / universal diodes, zener diodes, bipolar and field effect transistors, optoelectronic.

Power supply of electronic circuits. AC and DC voltage amplifiers. The role of negative and positive feedback. Operational amplifiers - properties, parameters and applications. Unstabilized and stabilized power supplies. Fundamentals of signal filtration. Fundamentals of digital technology and simple logical functions. Construction, diagnostics and testing of simple electronic circuits.

Zajęcia laboratoryjne
Laboratory classes are carried out over fifteen 90-minute meetings, in 4 subgroups. The subject of the laboratory classes is divided into four parts

- a) The subject of the first part is: getting to know the measuring instruments and techniques used during the laboratory classes
- b) In the second part, laboratory exercises are performed about basic passive and active electronic components, electronic circuits, paying attention to their practical application.
- c) The subject of the third part is an introduction to design of printed circuit boards using EDA software, presentation of equipment for electronic components assembly work and assembly of a simple, prepared printed circuit board.
- d) The last class includes laboratory exercises concerning the properties of digital electronic circuits: combinational and sequential. The methods of synthesizing simple circuits containing logic gates, multiplexers, flip-flops are presented.

Teaching methods

Lectures are carried out using multimedia presentations illustrated with examples of simulations and the necessary mathematical calculations on the blackboard.

Laboratory exercises are conducted in laboratory groups. During the classes, connection of the measurement system is performed, the indicated measurements are carried out, the measurement results are processed and the report is prepared. Additionally, individual design and assembly of simple printed circuit boards is performed

The applied teaching methods are student-oriented and motivate them to actively participate in the teaching process through discussions and presentation.

Bibliography

Base

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4. J. Zakrzewski, Czujniki i przetworniki pomiarowe, Wyd. Politechniki Śląskiej, Gliwice 2004
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Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	70	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	55	2,00