COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electronics II

Course

Field of study
Mechatronics

Year/Semester
1/1

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
english

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
15

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
prof. DSc. PhD. Eng. Andrzej Milecki

Responsible for the course/lecturer:
MSc. Eng. Roman Regulski

Prerequisites

Electrical engineering, knowledge of basic electronic elements. Ability to design and assemble electronic circuits. Basics of microprocessor controllers. Design of printed circuit boards. Understands the importance of electronics in mechatronic devices.

Course objective

Extending knowledge of electronics. Acquainting with the construction, operation and design of electronic circuits with the use of advanced components and integrated circuits.

Course-related learning outcomes

Knowledge

Extended knowledge of the parameters and characteristics of various electronic components

Knowledge of the non-linearity of selected operational amplifiers, methods of their compensation

Knowledge of the construction and application of measuring amplifiers

Knowledge of amplifiers and power elements

Knowledge of various advanced integrated circuits

Examples of construction of various electronic systems, e.g. drive units

Skills

Is able to design and build an electronic system based on an operational amplifier

He/She can select electronic components and integrated circuits and design a circuit with an amplifier

Is able to select integrated circuits and design a power supply, power amplifier, AC converter, etc.

He/She can design systems cooperating with microprocessors

Social competences

Understands the need for lifelong learning; can inspire and organize the learning process of other people

He/She is aware of the role of electronics in the modern engeneering and its importance for society and the environment

Can define priorities for the implementation of a specific task

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

EXAM: Passed on the basis of an examination consisting of 5 general questions (for a correct answer to each question - 1 point. Grading scale: less than 2.6 points - 2, 2.6 ÷ 3.0 - 3.0, 3.1 ÷ 3.5 points - 3.5, 3.6 ÷ 4.0 points - 4.0, 4.1 ÷ 4.5 points - 4.5, 4.6 ÷ 5.0 points - 5.0 very good)

Laboratory: Credit based on the correct implementation of exercises and reports on each laboratory exercise according to the instructions of the laboratory teacher. Before the exercises, short entrance tests, and after the exercises, a written final test. In order to pass the laboratories, all exercises must be passed (positive grade from the answers and the report).

Programme content

1. Electronic components - an extended overview of the types and their actual parameters

2. High power diodes and transistors, H bridges, voltage stabilizers. Construction of class A and B amplifiers

3. Ideal and real operational amplifiers, noise and distortion, compensation

4. Various circuits with operational amplifiers, including non-linear ones

5. Integrated power amplifiers, examples of motor control systems

6. Amplifiers with processing, low-noise

7. Advanced, sample integrated circuits, eg AC converters

Teaching methods

Lecture with presentations and examples, explanations using the blackboard, on-line catalogs

Bibliography

Basic

1. The Art of Electronics Hardcover , 2015, Paul Horowitz , Winfield Hill

2. Career Paths. Electronics. Student's Book. Evans Virginia, Dooley Jenny, Taylor Carl

Additional

Getting Started in Electronics Spiral-bound . 2000, III Mims, Forrest M

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	35	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	40	1,5

[1] delete or add other activities as appropriate