



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electronics [S1Mech2>PEN1]

Course

Field of study
Mechatronics

Year/Semester
1/1

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
15

Laboratory classes
0

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Physics in the field of the structure of matter and the phenomena of electricity. Basics of electrical engineering. Ability to calculate electrical circuits. Knowledge of properties and parameters of passive elements R, L, C.

Course objective

Familiarization with the structure, operation and characteristics of passive and active electronic components and teaching the basics of selecting components, designing and starting simple electronic systems. Familiarization with selected integrated circuits and their applications. Acquiring basic knowledge about designing electronic circuits.

Course-related learning outcomes

Knowledge:

Basics of properties and parameters of passive electronic components. Basics of electronics assembly. P-N junction, construction and operation of diodes. Diodes: rectifiers, Zener, LED, photodiodes and others.

Diode rectifiers; selection of filter capacitor and Zener diode. Use the voltage regulator type 78xx .

Construction, operation and characteristics of bipolar and unipolar transistors.
Power supply, types and operating systems of transistors.
Construction and operation and basics of designing transistor switches and amplifiers of sinusoidal signals. Heat dissipation - selection of radiators.
FET and MOSFET transistors, their parameters and characteristics, cycles.
Operational amplifier.

Skills:

Can design a diode rectifier, select capacitors, a stabilizing diode and voltage regulator type 78xx.
Can design circuits with different diodes: LED, photodiodes etc.
Can design and build an electronic circuit based on a bipolar transistor and MOSFET.
Can design basic circuits with OA.

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 engineering 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:

PASSING: Passed on the basis of an examination consisting of 3 general questions

Programme content

1. Passive elements R, L, C in electronics. Structure of matter. Semiconductors, p-n junction. Diode characteristics, parameters.
2. Structure of diode rectifiers. Voltage smoothing using a capacitor and its selection. Application of Zener diode and voltage regulators type 78xx. LED diodes. Overview of types of diodes: photodiodes, laser and others.
3. Bipolar transistors: structure, parameters, operation, characteristics. Operating circuits. Overview of types of transistors.
4. Transistor operation principle. Transistor key and class A amplifier. Emitter follower.
5. FET and MOSFET transistors: structure, operation, characteristics. Operating circuits of unipolar transistors.
6. Heat dissipations - radiator
7. Operation a amplifiers

Tutorials
Calculation and selection of components in diode, transistor (bipolar and unipolar) circuits. Simple thyristor circuits. Circuits with OA

Course topics

none

Teaching methods

Lectures and presentations of models and simulations of circuits

Bibliography

Basic:

1. Przewdziecki F. „Elektrotechnika i elektronika”.
2. Platt Ch., Elektronika. Od praktyki do teorii.

Additional:

1. Katalogi firm: Texas Instruments, Analog Devices, Maxim, Farnel

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00