



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electronics

### Course

Field of study

Aviation and cosmonautics

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

PhD (Eng) Jerzy Kupiec

Responsible for the course/lecturer:

Piotrowo Street, 3

60 – 965 Poznan, Poland

Ph: + 48 61 665 2709

E-mail: [jerzy.kupiec@put.poznan.pl](mailto:jerzy.kupiec@put.poznan.pl)

### Prerequisites

The student has basic knowledge of the basics of electrical engineering and electronics, can integrate the obtained information, interpret it, draw conclusions; can connect simple electronic circuits.

The student is aware of the social and economic meaning of electronics.

### Course objective

Getting to know the structure and functioning of basic semiconductor elements and electronic circuits used in electronic devices



## Course-related learning outcomes

### Knowledge

1. Has a basic knowledge of the standardized rules of notation of structures and engineering graphics -
2. Has knowledge in the field of physics, including the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics, necessary to understand specialist lectures in the field of the theory of construction materials and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems.

### Skills

1. Can search in catalogs and manufacturers' websites ready-made machine components to be used in his own projects.
2. Can create a system diagram, select elements and perform basic calculations using ready-made computational packages of mechanical, hydrostatic, electric or hybrid machine drive system.

### Social competences

1. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on its own.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment based on a written credit and laboratory classes (reports + tests).

## Programme content

- Electronics basic concepts - the concept of electronics and microelectronics, electronic circuits, integrated circuits, materials for the construction of electronic circuits, semiconductors, electrical signals and their parameters, physical units, electronic diagrams.
- Diode in rectifiers and stabilizers; basis of operation, structure, characteristics and parameters. Half-period and full-period rectifiers, construction and characteristics of the voltage stabilizer.
- Field and bipolar transistors; structure, characteristics and application.
- Vibration generators; C, LC, RC - conditions for generating vibrations, methods of calculating frequency, generators of sinusoidal and square vibrations, basic parameters.
- Filters; types, characteristics, construction diagrams, rules for determining the cut-off frequency and application.
- Amplifiers in electronic circuits - differentiating, integrating and summing circuits, examples of application.
- Logic circuits - construction and operation of basic logic gates.



-As part of the laboratory classes, students will learn about the issues discussed in the lecture by building, testing and determining the characteristics of electronic circuits in the LTSpice software.

### Teaching methods

1. Lecture with a multimedia presentation - a combination of an information and problem lecture;
2. Laboratory - building systems and testing their operation - experimental method.

### Bibliography

Basic

1. Herner A., Riehl H.J. : Elektrotechnika i elektronika w pojazdach samochodowych. WKiŁ 2006r.
2. Rusek M., Pasiebiński J.: Elementy i układy elektroniczne w pytaniach i odpowiedziach. WNT Warszawa 1997r.
3. Dobrowolski A., Majda E., Jachna Z., Wierzbowski M.: Elektronika ależ to bardzo proste, BTC Legionowo 2013r

Additional

### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	50	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	25	1,0

<sup>1</sup> delete or add other activities as appropriate