



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electronics

Course

Field of study

Aerospace engineering

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

2

Lecturers

Responsible for the course/lecturer:

Jerzy Kupiec

Responsible for the course/lecturer:

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Faculty of Civil and Transport Engineering

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Prerequisites

Knowledge: The student has basic knowledge of the basics of electrical engineering and electronics.

Skills: The student is able to integrate the obtained information, interpret it, draw conclusions; can connect simple electronic circuits.

Social competences: The student is aware of the importance and understands the non-technical aspects and effects of transport activities.

Course objective

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



Course-related learning outcomes

Knowledge

1. has knowledge of physics, covering 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 construction materials theory and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems [K1A_W27]
2. has ordered, theoretically founded specialist knowledge in the field of on-board equipment: as well as on-board and terrestrial electronic communication systems, remote sensing systems, observation systems, satellite navigation systems [K2A_W17]

Skills

1. can draw a diagram and a complex machine element in accordance with the rules of a technical drawing, can create a system diagram, select elements and perform basic calculations of the electrical and electronic system of machines or aviation and space devices [K2A_U06]
2. can use formulas and tables, technical and economic calculations using a spreadsheet, specialized software [K2A_U05]

Social competences

1. is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment, and the related responsibility for decisions made [K2A_K03]
2. understands the need for lifelong learning; can inspire and organize the learning process of other people [K2A_K01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment on the basis of a written test and completed 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 rectifier systems and stabilizers - basics of operation, structure, characteristics and parameters. Half-period and full-period rectifiers, construction and characteristics of the voltage stabilizer.
- Field and bipolar transistors: construction, characteristics and application.
- Vibration generators: C, LC, RC - conditions for generating vibrations, methods of calculating frequencies, generators of sinusoidal and square vibrations, basic parameters.



-Filters: types, characteristics, construction schemes, 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

Informative (conventional) lecture (providing information in a structured way) - may be of a course (introductory) or monographic (specialist) character

Laboratory (experiment) method (students independently conduct experiments)

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

1. Nowicz R., Elektrotechnika i elektronika w zadaniach, Wydaw. PŻ 1993

Breakdown of average student's workload

	Hours	ECTS
Total workload	51	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, prearation for laboratory classes, preparation for tests/exam) ¹	21	1,0

¹ delete or add other activities as appropriate