COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electronics [S1Lot2>Elektron]

Course

Field of study
Aviation

Year/Semester
2/3

Area of study (specialization)
Aircraft Engines and Airframes

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
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Knowledge of applied and physical sciences at the matriculation exam level. Explanations and interpretations of the information provided and the resulting self-education in the field of study. Has the obligation to expand the scope, readiness to work individually and cooperate within a team.

Course objective

Familiarization with physical quantities and basic laws and theorems in the field of electrical engineering and the theory of direct current and single-phase sinusoidal alternating current circuits. Familiarization with analytical methods of calculating electrical circuits and the principles of connecting and conducting measurements. Familiarization with the properties, characteristics and principles of using electronic components - active and passive. Familiarization with basic methods of analyzing analog and digital electronic circuits

Course-related learning outcomes

Knowledge:
1. has basic knowledge of the generation and processing of signals in the form of currents, electric voltages and electromagnetic fields

Skills:
1. is able to properly plan and perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions from them

Social competences:
1. s aware of the importance of knowledge in solving engineering problems and knows examples and understands the causes of faulty engineering projects that have led to serious financial and social losses, or to
a serious loss of health and even life
Methods for verifying learning outcomes and assessment criteria Learning outcomes presented above are verified
as follows:
Lecture:
- assessment of knowledge and skills demonstrated in the written exam in electrical engineering and electronics.
Laboratory exercises:
- testing and rewarding knowledge necessary to solve the problems posed in a given area of laboratory tasks,
- assessment of knowledge and skills related to the implementation of the exercise task,
- assessment of the report on the exercise performed.
Obtaining additional points for activity during classes, and especially for:
- proposing to discuss additional aspects of the issue,
- effectiveness of applying the knowledge acquired when solving the given problem,
- comments related to improving the teaching materials,
- aesthetic care of the tasks developed as part of self-study.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

none

Programme content

The module includes the following program content:
1/ p-n junction,
2/ semiconductor diodes,
3/ transistors,
4/passive elements,
5/ signal amplifiers.

Course topics

The lecture covers the following topics:
1/ principle of operation and parameters of the p-n junction,
2/ basic types of semiconductor diodes,
3/ rectifier systems and power supplies,
4/ transistors: bilar, JFET, MOSFET - parameters and operating systems,
5/ applications of transistors,
6/ passive elements: resistors, capacitors, inductive elements - basic parameters and applications in electronic systems,
7/ operational amplifier: structure, parameters and applications as a signal amplifiers.
The laboratory includes tests of the following semiconductor elements and electronic cicuits:
1/ semiconductor diode and 1-phase rectifier systems,
2/ Zener diode and voltage stabilization systems,
3/ LED diode,
3/ bipolar transistors and MOSFETs and their operating circuits, including: Darlington circuit and differential amplifier,
4/ operational amplifier and signal amplifiers using it.

Teaching methods

Lectures: - lecture with multimedia presentation (including drawings, photos, animations) supplemented by examples given on the board, - initiating discussions during the lecture, - theory presented in connection with
students' current knowledge, - presentation of a new topic preceded by a reminder of related content known to
students from other subjects. Laboratory: - demonstrations, - team work, - detailed review of reports by the laboratory instructor and discussions on comments.

Bibliography

Basic:
1. Bolkowski S., Theory of electric circuits, WNT, Warsaw 2008.
2. Frąckowiak J., Nawrowski R., Zielińska M., Fundamentals of electrical engineering. Laboratory, Poznań University of Technology Publishing House, Poznań 2011.
3. Szabatin J., Śliwa E., Collection of problems in circuit theory. Part 1, Warsaw University of Technology Publishing
House, Warsaw 2015.
4. Horowitz P., W. Hill, The art of electronics. Part 1 and 2, WKŁ, 2014.
5. Górecki P., Operational amplifiers, BTC Publishing House, Warsaw, 2004.
6. Kalisz J., Fundamentals of digital electronics, WKiŁ, Warsaw, 2002.
Supplementary
1. Krakowski M., Theoretical electrical engineering, PWN, Warsaw 1995.
2. Chua L. O., Desoer C. A., Kuh E. S., Linear and nonlinear circuits, McGraw-Hill Inc., New York 1987.
3. Kaźmierkowski M. P., Matysik J. T., Introduction to electronics and power electronics, Oficyna Wyd. PW, Warsaw,
2005.
4. Scherz P., Monk S., Practical Electronics for Inventors, Fourth Edition, Mc Graw Hill, 2016, ISBN-13: 978-
1259587542.

Additional:
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Breakdown of average student's workload

	Hours	ECTS
Total workload	55	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)	25	1,00