COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electrotechnics [S1Lot1>Elektrot]

Course

Field of study
Aviation

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
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Jarosław Jajczyk
jaroslaw.jajczyk@put.poznan.pl

Lecturers

mgr inż. Agnieszka Lewandowska
agnieszka.lewandowska@put.poznan.pl

mgr inż. Damian Głuchy
damian.gluchy@put.poznan.pl

dr inż. Tomasz Jarmuda
tomasz.jarmuda@put.poznan.pl

dr inż. Jarosław Jajczyk
jaroslaw.jajczyk@put.poznan.pl

mgr inż. Robert Pietracho

Prerequisites

Mathematics and physics knowledge at the high school leaving exam level. The ability to understand and interpret the information provided and to conduct effective self-education in the field related to the chosen field of study. Is aware of the need to expand their competences and is ready 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 sinusoidally alternating 1-phase current circuits. Learning about analytical methods for calculating electrical circuits and the principles of connection and measurement. Familiarization with the properties, characteristics and principles of use of electronic components - active and passive. Learning the 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 comprtrnces:
1. is 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: the knowledge acquired during the lecture is verified during the written test or on the Moodle platform, which consists of 25-35 questions (test and open) with different scores. Passing threshold: 50% of points. The issues on the basis of which the questions are developed will be sent to students by e-mail using the university's e-mail system.
Laboratory exercises:
– test and rewarding knowledge necessary to implement the given problems in a given area of laboratory tasks,
– assessment of knowledge and skills related to the implementation of the exercise task,
– evaluation of the report on the exercise performed.
Obtaining additional points for activity during classes, especially for:
– proposing to discuss additional aspects of the issue,
– effectiveness of applying acquired knowledge when solving a given problem,
– comments related to the improvement of teaching materials,
– aesthetic care of the tasks developed as part of self-study.

Programme content

Basic laws of electrical engineering. Direct and sinusoidal alternating current circuits. Powers in electrical circuits.

Course topics

Electrical signals and their classification, basic concepts in the field of electric circuits with lumped parameters, elements of electric circuits, principles of arrowing voltages and currents, laws of electric circuits, methods of analysis of direct and sinusoidally alternating current circuits, circuit theorems, active, reactive and apparent, energy in electrical circuits, resonance of voltages and currents, power and energy measurements in electrical circuits. Solving accounting tasks in the field of analysis of direct current and sinusoidally alternating single-phase electrical circuits.

Teaching methods

Lectures:
– lecture with a multimedia presentation (including drawings, photos, animations) supplemented with examples given on the board,
– initiating discussions during the lecture,
– theory presented in connection with students' current knowledge,

– presenting a new topic preceded by a reminder of related content known to students from other subjects.
Lab:
– demonstrations,
– team work,
– detailed review of reports by the laboratory leader and discussions on comments.

Bibliography

Basic
1. Bolkowski S., Teoria obwodów elektrycznych, WNT, Warszawa 2008.
2. Frąckowiak J., Nawrowski R., Zielińska M., Podstawy elektrotechniki. Laboratorium, Wydawnictwo Politechniki Poznańskiej, Poznań 2011.
3. Szabatin J., Śliwa E., Zbiór zadań z teorii obwodów. Część 1, Wydawnictwo Politechniki Warszawskiej, Warszawa 2015.
4. Horowitz P., W. Hill, Sztuka elektroniki. Część 1 i 2, WKŁ, 2014.
5. Górecki P., Wzmacniacze operacyjne, Wydawnictwo BTC, Warszawa, 2004.
6. Kalisz J., Podstawy elektroniki cyfrowej, WKiŁ, Warszawa, 2002.
Additional:
1. Krakowski M., Elektrotechnika teoretyczna, PWN, Warszawa 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., Wprowadzenie do elektroniki i energoelektroniki, Oficyna Wyd. PW, Warszawa, 2005.
4. Scherz P., Monk S., Practical Electronics for Inventors, Fourth Edition, Mc Graw Hill, 2016, ISBN-13: 978-1259587542.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	0,50