COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electrotechnics

Course

Field of study
Aerospace engineering

Year/Semester
2/3

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
dr inż. Ryszard Mańczak

Responsible for the course/lecturer:
dr inż. Jakub Kowalczyk

Prerequisites

Knowledge: Basic knowledge of physics, chemistry and mathematics.

Skills: The ability to think logically, to use information obtained from literature and the Internet.

Social competence: Understanding the need to learn and acquire new knowledge.

Course objective

Getting to know the theoretical and practical foundations of the operation of DC and AC circuits as well as the construction and operation of selected electrical machines.

Course-related learning outcomes

Knowledge

The student has a basic knowledge of electric drives in machines, including three-phase current, DC and AC motors, frequency and voltage converters.

Skills

The student is able to create a system diagram, select elements and perform basic calculations of the electrical and electronic system of machines or aviation devices.

Social competences

1. The student understands the need for lifelong learning; can inspire and organize the learning process of other people.

2. The student 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.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: colloquium in the last class in the form of a test and open questions on the basics of DC and AC circuits as well as the construction and operation of selected electrical devices.

Laboratory: credit for the last class based on the average of the marks from the reports made after each exercise (all component marks must be positive).

Programme content

Lecture:

1. DC electric circuits (basic concepts, linear and nonlinear elements, Ohm's law, Kirchhoff's laws, methods of circuit solving, work, power, energy).

2. Electric circuits of alternating current (basic concepts, generating alternating current, Ohm's law and Kirchhoff's laws, vector and time graphs, work, power, energy).

3. Transformers - structure and operation.

4. Electric motors - structure and operation.

Lab:

1. Introduction, health and safety. Basics of electrical measurements.

2. Investigation of DC circuits with linear and nonlinear elements.

3. Investigation of branched DC circuits.

4. R, L, C elements in sinusoidal alternating current circuits.

5. Measurement of power and energy in single-phase systems.

6. Testing a single-phase transformer.

7. Electric motors.

Teaching methods

Laboratory (experiment) method (students independently conduct experiments).

Problem lecture ("internal dialogue" of the lecturer with the student: understanding the problem, gathering premises, solving it).

Bibliography

Basic

1. Opydo W: Elektrotechnika i elektronika dla studentów wydziałów nieelektrycznych. Wydawnictwo Politechniki Poznańskiej, Poznań, 2012

2. Opydo W., Kulesza K., Twardosz G.: Urządzenia elektryczne i elektroniczne. Przewodnik do ćwiczeń laboratoryjnych. Wydawnictwo Politechniki Poznańskiej, Poznań, 2002.

Additional

1. Osiowski J., Szabatin J.: Podstawy teorii obwodów. WNT, Warszawa, 1998.

Breakdown of average student's workload

	Hours	ECTS
Total workload	65	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	35	1,0

[1] delete or add other activities as appropriate