



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electrotechnics

### 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:

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Faculty of Civil and Transport Engineering

ul. Piotrowo 3 60-965 Poznań

Responsible for the course/lecturer:

### 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



1. Has a basic knowledge of electric drives in machines, including three-phase current, AC and DC motors, frequency and voltage converters. [K2A\_W11]

2. has knowledge 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 structural materials theory and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems [K2A\_W27]

#### 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 the language of mathematics (differential and integral calculus) to describe simple engineering problems [K2A\_U11]

#### Social competences

1. Understands the need for lifelong learning; can inspire and organize the learning process of other people [K2A\_K01]

2. 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 [K2A\_K03]

#### 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 in 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

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. Opydo W: Elektrotechnika i elektronika dla studentów wydziałów nielektrycznych. 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. Osowski J., Szabatin J.: Podstawy teorii obwodów. WNT, Warszawa, 1998.
2. ELEKTROTECHNIKA. Podręcznik. Bolkowski S., WSiP, 2019

### Breakdown of average student's workload

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

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