



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Fundamentals of electricity and electronics

### Course

Field of study

Year/Semester

Power Engineering

1/1

Area of study (specialization)

Profile of study

Level of study

Course offered in

First-cycle studies

Polish

Form of study

Requirements

full-time

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

0

0

Tutorials

Projects/seminars

0

0

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr inż. Krzysztof Budnik

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Faculty of Control, Robotics and Electrical  
Engineering

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### Prerequisites

Students starting this subject should have knowledge in mathematics, physics at high school level.

### Course objective

Introduction of physical quantities and basic laws and theorems in the field of electric engineering and electronics in direct current circuits and alternating current circuits one-phase. Introduction of analytical methods of calculations for electric circuits and rules of connection.

### Course-related learning outcomes

Knowledge



Is able to characterize electrical systems, describe and explain the laws and methods of their analysis for DC and AC circuits.

#### Skills

Is able to recognize and select methods of analysis and testing of electrical circuits.

#### Social competences

Understands the need for continuous training. He can work in a team.

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired as part of the lecture is verified during the written credit of the last lecture. The pass consists of open-ended scoring questions depending on the level of difficulty. Passing threshold: 50% of points. Issues to be credited are sent to the staroste of the year by e-mail using the university's e-mail system 2-3 weeks before the date of crediting and discussed during the lecture preceding the credit.

#### Programme content

Electric signals and classification, basic definitions in field of electrical engineering, elements of electric circuits, arrow convention for the voltage and the current, electric circuits laws, methods of analysis of direct current circuits and alternating current circuits (Kirchhoff's laws, Mesh-Current Method, Node-Voltage Method), circuits theorems: Norton's theorem, Thevenin's theorem, Tellegen's theorem), real power, reactive power and complex power, energy in electric circuits, maximum power transfer theorem, magnetic coupled circuits, resonance effect, measurements of power and energy in electric circuits Solving accounting tasks in field of analysis of direct current circuits, alternating current circuits.

#### Teaching methods

The lecture with multimedia presentation (including drawings, photos, animations, films) supplemented with examples given on the board, taking into account various aspects of the issues presented, including: economic, ecological, legal, social and practical examples known to students in everyday life. Presenting a new topic preceded by a reminder of the content of the previous lecture. Presenting material in connection with other objects.

#### Bibliography

##### Basic

1. Bolkowski S.: Teoria obwodów elektrycznych, WNT, Warszawa 1998.
2. Kurdziel R.: Podstawy elektrotechniki, WNT, Warszawa 1973.
3. Krakowski M.: Elektrotechnika teoretyczna, PWN, Warszawa 1973.

##### Additional

1. Chua L.O., Desoer C.A., Kuh E.S.: Linear and nonlinear circuits, McGraw-Hill Inc., New York 1987.



2. Rawa H., Bolkowski S., Brociek W.: Teoria obwodów elektrycznych. Zadania., PWN, Warszawa 2019.
3. Czarnywojtek P., Kozłowski J., Machczyński W.: Zbiór zadań z podstaw elektrotechniki, Wydawnictwo Uczelni PWSZ w Kaliszu, Kalisz 2007.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	95	4,0
Classes requiring direct contact with the teacher	50	2,0
Student's own work (literature studies, preparation for tests) <sup>1</sup>	45	2,0

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