



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Fundamentals of electricity and electronics [S1Energ2>PEiE1]

### Course

Field of study

Power Engineering

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

30

Laboratory classes

0

Other

0

Tutorials

15

Projects/seminars

0

### Number of credit points

4,00

### Coordinators

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### Lecturers

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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

none

### 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 and discussed during the lecture preceding the credit.

The skills acquired during the auditorium exercises are verified on the basis of a final test, consisting of 3-4 tasks with equal points, and on the basis of activity during classes. Passing threshold: 50% of points.

## Programme content

Theoretical foundations and basic methods of analysis of direct and alternating current circuits.

## Course topics

Lecture: 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.

Tutorials: Solving accounting tasks in the field of analysis of DC electrical circuits. Determination of equivalent resistance, Kirchhoff's law method, superposition principle/method, matching the receiver to the source for maximum power, mesh current and nodal potential method, Thevenin and Norton theorem/method, determination of active power and current flow.

## Teaching methods

Lecture: 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.

Tutorials: Solving tasks on the basics of electrical engineering on the blackboard, discussions and comments on how to solve tasks, and independent work with literature.

## 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	107	4,00
Classes requiring direct contact with the teacher	47	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	60	2,00