COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electrical engineering I [S1Elmob1>ET1]

Course

Field of study
Electromobility

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 (e.g. online)
0

Tutorials
45

Projects/seminars
0

Number of credit points

6,00

Coordinators

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Lecturers

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Prerequisites

Knowledge of mathematics and physics at the high school level. Ability to understand and interpret the transmitted messages and effective self-education in the field related to the chosen field of study.

Course objective

Introduction to physical quantities and basic laws and theorems in the field of direct current electric circuits and sinusoidal alternating. Knowledge of analytical methods for calculating electrical circuits in steady state.

Course-related learning outcomes

Knowledge:
The student has knowledge about electrical components and systems.
Knows the basic quantities and laws regarding electric and magnetic fields.
He knows the methods of electrical circuits analysis (DC circuits, single and three-phase alternating current and magnetically coupled circuits).

Skills:
Is able to apply knowledge of the theory of electrical circuits necessary to determine the parameters and signals of electrical circuits such as voltages, currents, impedances, powers, energies etc.
He can obtain information from literature and the Internet, work individually, solve problems in the field of electrical circuit theory.

Social competences:
Is able to think and work in an entrepreneurial manner in the area of the basics of electrical engineering

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Knowledge acquired during the lecture is verified during an exam consisting of 5-10 (open) equally scored questions. Passing threshold: 50% of points. Final issues on the basis of which questions are prepared will be sent to students by e-mail using the university e-mail system or through the eKursy system.
The skills acquired during the classes are verified on the basis of the final test, consisting of 3-4 equally scored tasks and on the basis of activity during the classes. The pass threshold: 50% points.
The skills acquired during the laboratory classes are verified on the basis of a colloquium consisting of 3-4 equally scored tasks and on the basis of activity during the classes. The pass threshold: 50% points.

Programme content

Laws and methods of electric circuit theory in the steady-state range for direct current and single-phase alternating current circuits

Course topics

The lecture: Basic quantities and laws of electric and magnetic field (magnetic and electric flux induction and density, Faraday electromagnetic induction phenomenon), environment and electrical signals and their classification, basic concepts of concentrated and distributed electrical circuits, circuit elements, principles of determination the voltage and current directions, laws of electrical circuits, methods of analysis of DC and sinusoidal alternating current circuits (Kirchhoff"s law method, mesh currents, nodal potentials), peripheral theorems (including Thevenin and Norton), active, reactive and apparent power, reactive power compensation, energy in electrical circuits, matching the receiver to the source for maximum power, magnetically coupled circuits, voltage and current resonance, power and energy measurements in electrical circuits. Methods of analysis of DC and 1-phase alternating sinusoidal current circuits in steady state.
Exercises: determination of total resistance and impedance, Kirchhoff"s law method, superposition principle / method, matching the receiver to the source for maximum power, method of mesh currents and nodal potentials, Thevenin and Norton theorem / method, determination of active, reactive and apparent power, compensation of reactive power , voltage and current resonance, magnetically coupled circuits.

Teaching methods

Lecture: multimedia presentation, illustrated with examples given on the board, initiating discussions during the lecture. Additional materials are placed in the eKursy system.

Auditorium exercises: solving tasks related to the basics of electrical engineering on the board, discussions and comments on how to solve tasks, and self-performance of tasks in the eKursy system.

Bibliography

Basic
1. Bolkowski S., Teoria obwodów elektrycznych, WNT, Warszawa 2015 (any issued)
2. Krakowski M., Obwody liniowe i nieliniowe, PWN, Warszawa 1999
3 Kurdziel R., Podstawy elektrotechniki, WNT, Warszawa 1973
Additional
1. Bolkowski S., Brociek W., Rawa H., Teoria obwodów elektrycznych. Zadania., WNT, 2015

2. Czarnywojtek P., Kozłowski J., Machczyński W., Zbiór zadań z podstaw elektrotechniki. Obwody liniowe prądu stałego i sinusoidalnego, WPWSZ, 2007
3. Szabatin J., Śliwa E., Zbiór zadań z teorii obwodów, WPW, 2008
4. Cichocki A., Zbiór zadań z teorii obwodów, WPW, 1978
5. Cichocki A., Mikołajuk K., Osowski S., Trzaska Z., Zbiór zadań z teorii obwodów, WPW, 1981

Breakdown of average student's workload

	Hours	ECTS
Total workload	152	6,00
Classes requiring direct contact with the teacher	77	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	75	3,00