



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

general academic

Level of study

Course offered in

First-cycle studies

polish

Form of study

Requirements

part-time

compulsory

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

20

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

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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. Getting to know analytical methods of calculations for electric circuits.

Course-related learning outcomes

Knowledge

Is able to characterize the basic electrical and electronic components and systems.



He knows the electrical quantities and the laws of DC and AC circuits and the methods of their analysis.

Has ordered knowledge of the theory of electrical and electronic circuits.

Skills

Is able to obtain information from literature and other sources; is able to integrate the obtained information, interpret it and make conclusions.

He can recognize and select methods of analysis and testing of electrical circuits.

Can analyze electric circuits on his own and improve his competences through self-education.

Social competences

Understands the need for continuous training.

Is aware of the impact of the operation of electrical systems on the environment.

He can work in a team.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired in the course of the lecture is verified during the course of the final lecture.

Credits consist of test and open questions with different scores depending on the level of difficulty.

Passing threshold: 50% of points. Issues to be completed are sent to the starost of the year by e-mail using the university's e-mail system 2-3 weeks before the date of the final test and discussed during the lecture preceding the final test.

Programme content

Basic concepts of the basics of electrical engineering, circuit elements, rules of voltage and current arrows, electrical signals, their classification, laws of electrical circuits, methods of analysis of DC and sinusoidal current circuits (the method of Kirchhoff's laws, loop currents, nodal potentials), circuit theorems, Norton, Tellegen, on reciprocity and compensation), active, reactive and apparent power, energy in electrical circuits, matching the receiver to the source for maximum power, magnetically coupled circuits, voltage and current resonance effect, power and energy measurements in electrical circuits. Basic electronic components and their characteristics.

Teaching methods

The lecture with blackboard or 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 2015.
2. Kurdziel R.: Podstawy elektrotechniki, WNT, Warszawa 1973.
3. Krakowski M., Elektrotechnika teoretyczna, tom 1 – Teoria obwodów (tom 2 - Pole elektromagnetyczne), PWN, Warszawa 1999, (1995, 1991, 1973).
4. Bartkowiak R. A., Electric circuit analysis, John Wiley & Sons, New York 1985.
5. Horowitz P., Hill W., Sztuka elektroniki. Część 1 i 2, WKŁ, Warszawa, 2014.

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. Rutkowski J., Circuit theory, The Publishing House of the Silesian University of Technology, Gliwice 2006.
4. Jajczyk J., Stein Z., Zielińska M.: The problems of reactive power compensation in low-voltage network of an industrial plant provided with asymmetric receivers Poznań University of Technology. Academic Journals Electrical Engineering Issue 64 ISSN 1897-0737 V Published by Poznań University of Technology(2010). pp. 17-27.

Breakdown of average student's workload

	Hours	ECTS
Total workload	70	3,0
Classes requiring direct contact with the teacher	20	1,0
Student's own work (literature studies, preparation to pass the course) ¹	50	2,0

¹ delete or add other activities as appropriate