



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electrotechnics and electronics [S1IChiP1>EiE]

Course

Field of study

Chemical and Process Engineering

Year/Semester

2/4

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

0

Projects/seminars

0

Number of credit points

2,00

Coordinators

dr inż. Łukasz Putz

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Lecturers

Prerequisites

Has basic knowledge at the academic level in mathematics and physics. Has the ability to use his knowledge to analyze phenomena in electricity and magnetism.

Course objective

Acquiring basic knowledge and skills in the field of electrical engineering (in particular the theory of circuits - direct and sinusoidal alternating current), electrical machines and electronics. Understanding the theoretical and practical issues related to the construction, safe service and operation of electrical equipment.

Course-related learning outcomes

Knowledge:

has knowledge of electrical and electronic systems, knows the laws and methods of analyzing dc and ac electrical requirements, single and multi-phase. knows the methods of testing electrical and electronic circuits. [k_w06, k_w07]

Skills:

able to apply knowledge of electrical engineering and electronics, necessary to determine the parameters and signals of electrical circuits such as voltages, currents, impedances, powers, energies, etc. [k_u02]

can obtain information from literature and the internet, work individually, solve basic problems in the field of electrics and electronics. [k_u01]

Social competences:

is able to think and act in an entrepreneurial manner in the area of the basics of electrical engineering.

understands various aspects and effects of an engineer's activities. [k_k02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified during the final colloquium consisting of 50 single- or multiple-choice questions. Passing threshold: 50% of points. The credit issues on the basis of which the questions are developed are placed after each lecture on the eKursy platform. In addition, you can earn bonus points as part of activity in classes throughout the semester.

Programme content

Laws and methods of electric circuit theory in the steady-state range for direct current and alternating current circuits, issues related to electrical machines, basic electronic components and systems.

Course topics

Lecture:

Basic quantities and laws regarding the electric and magnetic field (Lorentz force, flow law, Biot-Savart law, Faraday electromagnetic induction phenomenon, Maxwell equations), electric signals and their classification, basic concepts of electric circuits with concentrated and distributed parameters, elements and laws of electric circuits, methods of analysis of direct and sinusoidal alternating current circuits (Kirchhoff's law, loop currents, nodal potentials), active, reactive and apparent power, reactive power compensation, energy in electrical circuits, resonance of voltages and currents, power and energy measurements in electrical circuits. Methods for analyzing DC and AC electric circuits. Basic information about construction, principle of operation and applications of transformers and AC motors. Basic electronic components and systems, e.g. diodes, thyristors, diacs, triacs, transistors, logic gates and rectifiers systems, filtering systems.

Teaching methods

Multimedia presentation, illustrated with examples on the board, initiating discussions during the lecture. Additional materials posted on the eKursy platform.

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, Wydawnictwo Politechniki Poznańskiej, Poznań 2015.
3. Horowitz P., Hill W.: Sztuka elektroniki, Wydawnictwo Komunikacji i Łączności, Warszawa 2015.
4. Cysewska-Sobusiak A.: Podstawy metrologii i inżynierii pomiarowej, Wydawnictwo Politechniki Poznańskiej, Poznań 2010.

Additional:

1. Bolkowski S.: Teoria obwodów elektrycznych, Wydawnictwo Naukowo Techniczne, Warszawa 2017.
2. Cieśliński K., Syrzycki A.: Zbiór zadań z elektrotechniki ogólnej, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2007.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	40	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00