COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electrical and electronic engineering

Course

Field of study
Management and production engineering

Year/Semester
3/5

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
16	12	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

Basic knowledge of mathematics and physics in the field of electricity and magnetism. The ability to use a mathematical apparatus to analyze simple electrical and electronic circuits.

Course objective

Getting to know the theoretical and practical issues related to the use of laws in electrical and magnetic circuits. Acquiring practical skills in the field of measurements of electrical quantities with their mathematical development and interpretation. Getting to know the basics of operation and safe use of electrical devices and electronic systems.

Course-related learning outcomes

Knowledge

1. Knows theoretical and practical basics of AC and DC electric circuits as well as electric and electronic elements and devices.

2. Knows theoretical and practical basics of electrical and electronic measuring instruments.

3. Knows issues related to the quality of electricity in electrical installations.

Skills

1. Solving simple electric circuits of direct and alternating current.

2. Connecting and servicing electric and electronic systems as well as measuring electric quantities in these systems.

3. Selecting electrical and/or electronic equipment to the needs resulting from the functions of the designed installation.

Social competences

1. Awareness of the social consequences of the practical application of the acquired knowledge, skills and related responsibility.

2. Can cooperate in a group.

3. Can define priorities related to the use of technical devices and take into account non-technical aspects.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

The knowledge acquired during the lecture is verified during an exam consisting of a few/dozen questions (various types: single-choice and multiple-choice tests as well as descriptive ones) of a problem and application nature. Credit for at least 50% of points is required. Additionally, rewarding activity during lectures.

Laboratory classes:

Assessment of knowledge and skills related to the preparation for classes and the implementation of the exercise task. Assessment of the reports from the exercises performed. Colloquium on the knowledge and skills acquired during the laboratory exercises. Practical test in the field of the ability to correctly connect electrical circuits and perform measurements of electrical quantities. The final grade is determined as the weighted average of the partial grades obtained.

Programme content

Lecture:

Basic quantities and phenomena concerning electric and magnetic fields, electric signals and their classification, problems in the field of electric circuits with concentrated and distributed parameters (elements, rules and laws occurring in circuits), methods of analyzing direct and sinusoidal current circuits (Kirchhoff's law method, loop currents, nodal potentials), circuit theorems (including Thevenin and Norton), active, reactive and apparent power, power factor, reactive power compensation, energy in electric circuits, matching the receiver to the source for maximum power, voltage and current resonance, measurements power and energy in electric circuits, problems of electric energy quality, electric semiconductor light sources.

Laboratory classes:

Getting acquainted with measuring equipment and methods of making measurements, learning the correct connection of electrical circuits and proper connection of measuring devices to the circuits, practical verification of Thevenin and Norton theorem, testing linear and nonlinear elements in DC circuits, testing elements RLC in sinusoidal alternating current circuits, testing of semiconductor rectifying and filtering systems.

Teaching methods

Lecture:

A multimedia presentation extended with examples presented on the board, initiating discussions and engaging students in solving simple accounting tasks, additional materials posted on the Moodle platform.

Laboratory classes:

Practical exercises in connecting electrical and electronic circuits, performing experiments, working in teams, discussion, additional materials posted on the Moodle platform.

Bibliography

Basic

1. Bolkowski S.: "Elektrotechnika", WSiP, Warszawa 2019.

2. Chwaleba A., Moeschke B., Płoszajski G.: "Elektronika", WSiP, Warszawa 2014.

3. Frąckowiak J., Nawrowski R., Zielińska M.: "Teoria obwodów. Laboratorium", Wyd. Politechniki Poznańskiej, Poznań 2017.

4. Opydo W.: "Elektrotechnika i elektronika dla studentów wydziałów nieelektrycznych", Wyd. Politechniki Poznańskiej, Poznań 2012.

5. Opydo W., Kulesza K., Twardosz G.: "Urządzenia elektryczne i elektroniczne. Przewodnik do ćwiczeń laboratoryjnych", Wyd. Politechniki Poznańskiej, Poznań 2015.

6. Pilawski M., Winek T.: "Pracownia elektryczna", WSiP, Warszawa 2020.

Additional

1. Bolkowski S.: "Teoria obwodów elektrycznych", WNT, Warszawa 2017.

2. Frąckowiak J., Nawrowski R., Zielińska M.: "Podstawy elektrotechniki. Laboratorium", Wyd. Politechniki Poznańskiej, Poznań 2011.

3. Horowitz P., Hill W.: "Sztuka elektroniki", WKiŁ, Warszawa 2018.

4. Orlik W.: "Egzamin kwalifikacyjny elektryka w pytaniach i odpowiedziach", Wyd. KaBe, Krosno 2018.

5. Praca zbiorowa (red. Strojny J.): "Vademecum elektryka", SEP COSiW, Warszawa 2016.

6. Putz Ł.: "Badania i analiza wpływu wybranych układów sterująco-zasilających systemów elektroluminescencyjnych na parametry energii elektrycznej", Rozprawa doktorska, Politechnika Poznańska, Poznań 2018.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	30	1,5
Student's own work (literature studies, preparation for laboratory classes, preparation of reports on laboratory exercises, preparation for tests and exam)[1]	45	1,5

[1] delete or add other activities as appropriate