COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electrical engineering and electronics

Course

Field of study

Mechanical Engineering/Faculty of Mechanical Engineering

Year/Semester

2/4

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

16

Laboratory classes

6

Other (e.g. online)

Tutorials

6

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

Dr hab.Eng. Grażyna Jastrzębska Associate Professor

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Responsible for the course/lecturer:

Prerequisites

Basic knowledge of physics and mathematics (core curriculum for high schools, basic level), the ability to solve elementary problems in physics based on knowledge, the ability to obtain useful information. Understanding the necessity to expand one's competences and to cooperate in a team.

Course objective

1. Providing students with basic knowledge of physics to the extent specified by the curriculum content appropriate to the field of study,

2. Developing students' skills in solving simple problems and performing simple experiments as well as analyzing results based on acquired knowledge, preparing test reports,

3. Developing teamwork skills for students.

Course-related learning outcomes

Knowledge

1. After classes, every student knows the mathematical apparatus necessary to describe the basic laws of electrical engineering and electronics and solve problems related to these issues,

2. Has basic knowledge in the field of electrical engineering, electronics, allowing to understand the principles of operation of measuring devices and research equipment.

3. Has basic knowledge in metrology, knows and understands the methods of measuring physical quantities and results analysis, and has the ability to draw conclusions.

Skills

After completing the course in Electrical Engineering and Electronics, the Student:

1. Is able to obtain information from literature, databases and other sources (e.g. laboratory tests), analyze and interpret them, draw conclusions, also in the case of laboratory tests, justify opinions.

2. Can work independently and in a team.

3. Is able to identify a technical problem and then propose its solution.

Social competences

1. Is able to work responsibly on the assigned task alone and in a team.

2. Is aware of and understands the importance of non-technical aspects and effects of engineering activities, including its impact on the society and the environment, and the associated responsibility for decisions made.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The basis for assessing the knowledge and skills of the lecture is to demonstrate it on the written exam.

In addition, when issuing the final grade, both from the lecture and the laboratory, the students' activity during classes is taken into account, which means:

continuous assessment (rewarding activity and quality of perception during classes),

control of skill growth in the use of known principles and methods,

effectiveness of applying the acquired knowledge while solving a given problem,

assessment of the report on the laboratory exercise performed,

ability to cooperate within a team that practically performs a task,

comments related to the improvement of teaching materials,

prepared reports,

independence in the selection of supplementary bibliography items.

Programme content

Update 2020. Educational methods used: Lecture, Exercises and Laboratory.

1. Direct current, circuit solving methods, laws applicable in direct current circuits (Ohm, Kirchhoff), connection configurations, linear and nonlinear elements, work and power.

2. Sinusoidal alternating current formation, RLC elements (vector chart), series and parallel resonance, resonance frequency, goodness, reactive power compensation, power improvement factor, impedance triangle and power triangle,

3. Transformer, construction, structural solutions, principle of operation, Replacement diagram, no-load condition, short circuit, load, characteristics, efficiency, energy efficiency.

4. Basic electronic components of diodes, transistors, thyristor, hallotron, thermistor, varistor.

5. Selected electronic systems; power supplies, amplifiers, frequency duplicators, vibration generators.

Teaching methods

1. Lecture with multimedia presentation (drawings, photos, animations and illustrations of own research). A reference to content known to students in other subjects.

2. Accounting exercises. Improving mathematical methods. Interpretation of results.

3. Laboratory exercises: dissemination of practical methods, familiarization with meters, readings, scale, units, preparation of results, also graphical.

Bibliography

Basic

1. Doległo Marian: Podstawy elektrotechniki i elektroniki, 2016,

2. Koszmider Andrzej L.: Podstawy elektrotechniki i elektroniki dla studentów kierunków nieelektrycznych inżynierskich, 2019.

3. Praca zbiorowa Podstawy pomiarów, Oficyna Wydawnicza politechniki Warszawskiej, 2019.

4.Bolkowski Stanisław, Brociek Wiesław, Rawa Henryk Teoria obwodów elektrycznych. Zadania

Wydawnictwo: Wydawnictwo Naukowe PWN 2017.

Additional

1. Poradnik elektrotechnika, wyd. REA 2018

2. Bolkowski Stanisław: Elektrotechnika. Podręcznik. Wydawnictwa Szkolne i Pedagogiczne. 2018.

3. Jastrzębska Grażyna, Nawrowski Ryszard Zbiór zadań z Podstaw Elektrotechniki, Wydawnictwo Politechniki Poznańskiej. 2000.

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	4,0
Classes requiring direct contact with the teacher	46	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation)[1]	44	2,0

[1] delete or add other activities as appropriate