



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electrical engineering and electronics

### Course

Field of study

Management and production engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

PhD Dorota Bugała

Responsible for the course/lecturer:

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Faculty of Control, Robotics and Electrical  
Engineering

Piotrowo Street 3A, 60-965 Poznań, room 647

### Prerequisites

Student should have basic knowledge of physics, chemistry and mathematics, as well as the ability to effectively self-educate in the field related to the selected field of study, including on the basis of information obtained from literature and internet sources.

### Course objective

The aim of the course is to learn the basics of operation and practical use of devices, electrical machines as well as electronic components and systems.

### Course-related learning outcomes

Knowledge



Student has basic knowledge of electrical engineering and electronics, enabling orientation in the area of design and analysis of electric drive systems and machine control.

#### Skills

Student is able to use the knowledge of physics and technology, supplemented with information obtained from literature and other sources, to explain and describe and interpret physical, operation of technical devices and processes.

Student is able to determine the purpose of the electronic circuit and the tasks it should perform on the basis of the diagram.

#### Social competences

Student understands the relationship between the human resource management process and the technical and non-technical aspects of its activities, including responsibility for decisions.

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the course is verified during the exam. The exam consists of open-ended questions and calculation tasks, with different scores. Passing threshold: 50%.

#### Programme content

The knowledge acquired during laboratory classes is verified on the basis of cards, as well as individual reports prepared for each laboratory exercise. 50% credit threshold.

#### Teaching methods

Lecture: Electric circuits of direct and alternating current, single-phase and three-phase. Power and energy of electricity. Methods of solving electrical circuits. Measuring instruments and electrical measurements. Transformers and electrical machines. Power system. Methods of protection against electric shock. Uncontrolled, semi-controlled and controlled semiconductor elements. Rectifier circuits, filters and signal amplifiers. Integrated circuits. Electromagnetic Compatibility. Control systems in renewable energy sources.

Laboratory:

Implementation of exercises:

1. Research on DC circuits containing linear and non-linear elements.
2. RLC elements in sinusoidal alternating current circuits
3. Research on straightening and filtering systems.
4. Research on photovoltaic cells.
5. Measurement of power and energy in single-phase circuits.



6. Examination of a single-phase transformer.

### Bibliography

#### Basic

Opydo W.: Elektrotechnika i elektronika dla studentów wydziałów nieelektrycznych. Wyd. Politechniki Poznańskiej, Poznań, 2005.

Opydo W., Kulesza K., Twardosz G.: Urządzenia elektryczne i elektroniczne. Przewodnik do ćwiczeń laboratoryjnych. Wyd. Politechniki Poznańskiej, Poznań, 2005.

Bolkowski S.: Elektrotechnika. WSiP. Warszawa. 2005.

#### Additional

Horowitz P., Hill W.: Sztuka elektroniki. Tom I i II. WKiŁ. Warszawa. 2005.

Praca zbiorowa: Vademecum elektryka. COSiW. SEP. Warszawa. 2005.

Bolkowski S., Brociek W., Rawa M.: Teoria obwodów elektrycznych Zadania. WNT. Warszawa. 2005.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	58	2
Student's own work (literature studies, preparation for laboratory classes, preparation for cards / exam) <sup>1</sup>	42	2

<sup>1</sup> delete or add other activities as appropriate