COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electronics and power electronics

Course

Field of study

Electrical engineering

Year/Semester

2/3

Area of study (specialization)

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Prerequisites

Knowledge in the field of mathematics, physics and circuit theory at the level of the first year of study. Ability to understand and interpret the transmitted messages and effective self-education in the field related to the chosen field of study.

Course objective

Familiarization with the construction, parameters and applications of basic electronic components. Getting to know the principles of operation of analog and digital electronic circuits. Acquiring the ability to design electronic circuits at the basic level.

Course-related learning outcomes

Knowledge

1. Knows and understands the basic laws of electrical engineering, properties of elements of electrical circuits, has detailed knowledge of the theory of electrical circuits (for steady and transient states), knows and understands the theory of long line [K1_W04].

2. Has basic knowledge about the life cycle of microprocessor devices, systems and systems and their applications in selected industries [K1_W07].

3. Knows the structure and operation of electronic, optoelectronic and simple analog and digital electronic and power electronic devices, understands the processes occurring in their life cycle [K1_W014].

Skills

1. Is able to use a foreign language at B2 level of the European System of the Description of Language Education, as well as read and understand catalog cards, application notes, standards and technical documentation as well as manuals for electrical equipment [K1_U01].

2. Is able to design and manufacture, in accordance with the given specification and using appropriate methods, techniques, tools and materials, typical electrical systems intended for various applications [K1_U03].

Social competences

Is aware of the need to initiate actions for the public interest, understands the various aspects and effects of electrical engineer activities, including environmental impact, and the associated responsibility for decisions [K1_K02].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment of knowledge and skills demonstrated during the written test-problem exam - based on the number of points obtained.

Programme content

Properties and characteristics of basic electronic components and devices: passive components, semiconductor diodes, bipolar and field effect transistors and their operating systems and applications. Semiconductor optoelectronic devices - properties and examples of applications. Feedback in analog circuits. The issue of closed system stability. Operational amplifiers - ideal and real and their: properties, parameters and applications. Power amplifiers: distribution, properties and applications. Electronic generators: conditions of vibration generation, types and applications of generators. Linear systems - basic properties. Analog filters - types, parameters and design principles. AC adapter - structure and parameters. Fundamentals of digital technology: binary number recording system, logical states and logical operations, logical functors, truth table, digital combination and sequential blocks. Basic applications of digital circuits. Basic chip systems of TTL and CMOS families - construction and parameters. Semiconductor memories - general classification and basic parameters of selected types of memory.

Teaching methods

Lecture with multimedia presentation (diagrams, formulas, definitions, etc.) supplemented by the content given on the board.

Bibliography

Basic

1. Z. Kulka, M. Nadachowski, Analogowe układy scalone, WKŁ, W-wa, 1980.

2. J. Kalisz, Podstawy elektroniki cyfrowej, WKiŁ, W-wa, 2002.

3. P. Górecki, Wzmacniacze operacyjne, Wydawnictwo BTC, W-wa, 2004.

4. P. Horowitz, W. Hill, Sztuka elektroniki. Część 1 i 2, WKŁ, 2014.

Additional

1. M.P. Kaźmierkowski, J.T. Matysik, Wprowadzenie do elektroniki i energoelektroniki, Oficyna Wyd. PW, W-wa, 2005.

2. P. Scherz, S. Monk, Practical Electronics for Inventors, Fourth Edition, Mc Graw Hill, 2016.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	50	2,0
Student's own work (literature studies, preparation for exam) [1]	25	1,0

[1] delete or add other activities as appropriate