COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electronics [S1AiR1E>Elektr2]

Course

Field of study
Automatic Control and Robotics

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
english

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
15

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

1 Knowledge Basic knowledge of mathematics, physics and circuit theory. [K1_W01 (P6S_WG), K1_W02 (P6S_WG), K1_W03 (P6S_WG), K1_W05 (P6S_WG)] 2 Skills Ability to use the literature, the ability to solve linear equations, the operation of complex numbers and partial equations, the ability to observe and draw conclusions. [K1_U01 (P6S_UW), K1_U02 (P6S_UU)] 3 Social competencies Ability to work in a team, attention to upgrade their skills. [K1_K01 (P6S_KK), K1_K02 (P6S_KR)]

Course objective

Understanding the basics of electronic components and systems with power electronics. Acquiring the ability to analyze complex and design simple electronic circuits.

Course-related learning outcomes

Knowledge:
Knows and understands to an advanced degree the theory and methods in the principles of basic electronic components operation: analogue and digital and selected electronic circuits and systems [K1_W12 (P6S_WG)].
Skills:

Can interpret with understanding the design technical documentation and simple technological diagrams of automation and robotics systems [K1_U2 (P6S_UW)].
Is able to build, commission and test a simple electronic and electromechanical system [K1_U15 (P6S_UW)].
Be able to design simple mechanical components, electrical and electronic systems for various applications (taking into account material properties) [K1_U25 (P6S_UW)].
Social competences:
Is ready to critically assess his/her knowledge; understands the need for and knows the possibilities of continuous training - improving professional, personal and social competence, is able to inspire and organize the learning process of others [K1_K1 (P6S_KK)].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

none

Programme content

Introduction to transforming power using electronic circuits.
Power electronic elements, power electronics key theory.
Network chargers.
A simple controlled rectifier.
DC / DC voltage conversion:
- voltage converters,
- voltage boosters,
- reduction / boosting converters,
- complex multi-stage DC converters.

The idea of converting DC voltage into alternating voltage wave theory.
Single and multi-phase AC voltage converters.
Theory of modulation.
Applications of power electronics
- DC power supplies, including energy ones,
- industrial inverters.

Teaching methods

written test, evaluation of laboratory exercises reports

Bibliography

1. Ned Mohan, Tore M. Undeland, William P. Robins, POWER ELECTRONICS, Converters, Applications and Design, 3-rd edition, Wiley, 2003, 802 pp.
2. Adrian Ioinovici, Power Electronics and Energy Conversion Systems, Volume 1 Fundamentals and Hard-switching Converters, Wiley, 2013
3. M. P. Kazmierkowski, R. Krishnan and F. Blaabjerg (Eds), Control in Power Electronics , Academic Press - USA, 2002, (in English), Author of 4 Chapters 250 pages.

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	4,00
Classes requiring direct contact with the teacher	60	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	60	2,00