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

dr inż. Dariusz Janiszewski
dariusz.janiszewski@put.poznan.pl

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.

Course topics

none

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	0	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