POZNAN UNIVERSITY OF TECHNOLOGY

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electronics [S1AiR1E>Elektr1]

Course

Field of study
Automatic Control and Robotics

Year/Semester
2/3

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
45

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

Knowledge: 1. The student has a basic knowledge of the principles of measuring electrical quantities, knows and understands the methods of measuring electrical quantities, knows the calculation methods and IT tools necessary to analyze the results of the experiment. - [K1_W11 (P6S_WG)] Skills: 1. Student is able to use properly selected methods and measuring instruments and measure appropriate signals and on their basis determine the characteristics of electrical systems and obtain information about their essential properties. - [K1_U15 (P6S_UW)] 2. The student is able to develop the documentation and present a presentation of the results regarding the implementation of the laboratory task. - [K1_U03 (P6S_UK)] 3. The student is able to work individually and in a team; he / she can estimate the time needed to complete the assigned task. - [K1_U02 (P6S_UO)] Social competencies: 1. Student understands the non-technical aspects and effects of engineering activities, including its impact on the environment and the related responsibility for decisions. - [K_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:

lecture: exam after 2nd semester

Programme content

Introduction to electronics.
Passive electronic components.
Diodes and their applications.
Field and bipolar transistors.
Integrated electronic analog and digital systems of small and medium scale integration.
Operational amplifiers.
Applications of operational amplifiers for analog signal processing.
Analog regulators and filters.
Electronic systems: power supplies, voltage and current stabilizers, signal generators.
Optoelectronic components.
Elements of hybrid technology: non-contact switches, sample-and-hold systems, A / C and C / A converters.
Switching capacitance technology.
Disturbances and noises in electronic circuits.
Selected problems of industrial electronics

Course topics

Teaching methods

Lectures: multimedia presentations, blackboard examples
Laboratory: investigation on real and simulated setups

Bibliography

1. John Watson , Master Electronics, Palgrave, 1996
2. Anant Agarwal, Jeffrey Lang: Foundations of Analog and Digital Electronic Circuits. (A Volume in the Morgan Kaufmann Series in Computer Architecture and Design Series), Elsevier, 2005
3. Ulrich Tietze, Christoph Schenk, Eberhard Gamm, Electronic Circuits: Handbook for Design and Application, Springer 2008
4. Paul Horowitz, Winfield Hill, Art of Electronics, Cambridge University Press, 2015

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	5,00
Classes requiring direct contact with the teacher	75	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	75	2,50