Digital microsystems - course description

General information

Course name	Digital microsystems
Course ID	06.2-WE-AutP-DMicros-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Automatic Control and Robotics
Education profile	academic
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2019/2020

Course information

Semester	5
ECTS credits to win	3
Course type	optional
Teaching language	english
Author of syllabus	

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	15	1	-	-	Credit with grade
Laboratory	30	2	-	-	Credit with grade

Aim of the course

- To provide fundamental knowledge in digital microsystems, hardware/software co-design, integration of analog and digital technologies.
- To develop skills in design and programming of digital microsystems.

Prerequisites

Foundations of discrete systems, Computer system architecture, Foundations of digital and microprocessor engineering, Discrete process control, Programming with basics of algorithmic.

Scope

General information: digital microsystem characteristics, structure and working. Review of producers and systems.

Design: Classical design and hardware/software co-design of hybrid systems. Modelling, verification, implementation languages – ANSI C, VHDL.

System decomposition: algorithms of decomposition, CAE tools for decomposition.

Communication: ways for data transmission between hardware and software modules, memory sharing.

Software packages: POLIS, ATMEL System Designer, Aldec A-HDL.

Analog interface: analog signals acquisition, analog signal shaping, A/D and D/A converters, pulse-width modulation, real time clock, supervision systems.

Teaching methods

Lecture, laboratory exercises.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Is open to technological novelties in the area of digital microsystems		• a pass - oral, descriptive, test and other	• Lecture
Can suggest functionality description method for hardware-software hybrid systems		• a pass - oral, descriptive, test and other	• Lecture
Can indicate the application areas of digital microsystems in control systems		• a pass - oral, descriptive, test and other	• Lecture
Can handle selected tools supporting digital microsystem design		• an ongoing monitoring during classes • carrying out laboratory reports	• Laboratory
Can design a simple hardware-software system		• an ongoing monitoring during classes • carrying out laboratory reports	• Laboratory

Outcome description	Outcome symbols	Methods of verification	The class form
Can say and characterize basic concepts related to digital microsystems		• a pass - oral, descriptive, test and other	• Lecture

Assignment conditions

Lecture – the passing condition is to obtain a positive mark from the test conducted at least once persemester.

Laboratory – the passing condition is to obtain positive marks from all laboratory exercises to be planned during the semester.

Calculation of the final grade: lecture 50% + laboratory 50%

Recommended reading

1. DeMicheli G.: Readings in Hardware/Software Codesign, Morgan Kaufmann, 2001

2. Plassche R.: CMOS Integrated Analog-To-Digital and Digital-To-Analog Converters, Kluwer Academic Pub, 2003

3. Vahid F.: Digital Design, Wiley, 2006

4. Zwolinski M.: Digital System Design with VHDL, 2nd Edition, Prentice-Hall, 2003

Further reading

Notes

Modified by dr hab. inż. Wojciech Paszke, prof. UZ (last modification: 03-05-2020 21:13)