

Microprocessor Systems - course description

General information	
Course name	Microprocessor Systems
Course ID	06.5-WE-ELEKTP-MS-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Electrical Engineering
Education profile	academic
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2021/2022

Course information	
Semester	5
ECTS credits to win	5
Course type	optional
Teaching language	english
Author of syllabus	<ul style="list-style-type: none">dr hab. inż. Janusz Kaczmarek, prof. UZ

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	30	2	-	-	Credit with grade
Laboratory	30	2	-	-	Credit with grade
Project	15	1	-	-	Credit with grade

Aim of the course

- To familiarize students with the architecture of microprocessor systems
- Shaping basic skills in hardware-software design of microprocessor systems
- Shaping skills in the design of microprocessor devices using EDA programs

Prerequisites

- Electronics
- Microprocessor techniques
- Principles of programming

Scope

Architecture of the microprocessor system.

Interfacing techniques for microprocessor systems. Bus structures. Address, data and control bus connections. Bus timing. Address decoders. Static and dynamic parameters of memory circuits. Interfacing with systems of different logical levels. Interfacing with analog circuits.

Programmable peripheral circuits of 82xx series: 8255 peripheral interface adapter, 8254 interval timer, 8259 interrupt controller, 8257 DMA controller, 8250 communications interface adapter.

User interface in microprocessor systems. Impedance keyboards. Numerical, alphanumeric, text and graphic displays. Specialized programmable controllers for displays and keyboards.

Local serial interfaces: SPI, I2C, 1-Wire, SMBus, Microwire.

Methods of designing and running microprocessor systems. Formulation of requirements. Hardware and software integrity. Development of technical documentation of hardware and software. Design of microprocessor systems using microcontrollers. Solutions of practical design problems.

Characteristics of selected architectures of microprocessor systems. 16 and 32 bit microcontrollers. Signal processors.

USB interface characteristics. Working with USB in HOST and DEVICE modes.

Teaching methods

Lecture: conventional lecture

Laboratory: laboratory exercises, group work

Project: project method, discussions and presentations

Learning outcomes and methods of their verification

Outcome description	Outcome symbols	Methods of verification	The class form
Student has basic skills in programming and running of microprocessor devices.		<ul style="list-style-type: none">• an ongoing monitoring during classes• carrying out laboratory reports	<ul style="list-style-type: none">• Laboratory

Outcome description	Outcome symbols	Methods of verification	The class form
Student knows the architecture of the microprocessor system.		<ul style="list-style-type: none"> a multiple choice and open questions test 	<ul style="list-style-type: none"> Lecture
Student can design microprocessor apparatus		<ul style="list-style-type: none"> a multiple choice and open questions test a project carrying out laboratory reports 	<ul style="list-style-type: none"> Lecture Laboratory Project
Student knows the problems of the interfacing technique of peripherals in microprocessor systems.		<ul style="list-style-type: none"> a multiple choice and open questions test a project carrying out laboratory reports 	<ul style="list-style-type: none"> Lecture Laboratory Project

Assignment conditions

Lecture – the passing condition is to obtain a positive mark from the final test.

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

Project - the project documentation and oral presentation

Calculation of the final grade: lecture 35% + laboratory 35% + project 30%

Recommended reading

1. Ryszard Krzyżanowski: Układy mikroprocesorowe, Wydawnictwo Naukowe PWN, Warszawa, 2017 (in Polish).
2. Badźmirowski K., Pieńkos J., Myzik I., Piotrowski A.: Microprocessor circuits and systems, part 1 i 2, WNT, Warszawa, 1990 (in Polish)
3. Coffron J.W., Long W.E.: Practical interfacing techniques for microprocessor systems, Prentice Hall, 1983
4. Hadam P.: Designing microprocessor systems, Wydawnictwo BTC, Warszawa, 2004 (in Polish)
5. Mazidi M.A., Mazidi J.: The 8051 Microcontroller and Embedded Systems, Prentice Hall, 1999
6. Bogusz J.: Local serial interfaces in digital systems, Wydawnictwo BTC, Warszawa, 2004 (in Polish)

Further reading

Notes

Modified by dr hab. inż. Paweł Szcześniak, prof. UZ (last modification: 08-07-2021 21:49)

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