

Microprocessor techniques - opis przedmiotu

Informacje ogólne	
Nazwa przedmiotu	Microprocessor techniques
Kod przedmiotu	06.5-WE-ELEKTP-MicTech-Er
Wydział	Wydział Nauk Inżynieryjno-Technicznych
Kierunek	Elektrotechnika
Profil	ogólnoakademicki
Rodzaj studiów	Program Erasmus pierwszego stopnia
Semestr rozpoczęcia	semestr zimowy 2022/2023

Informacje o przedmiocie	
Semestr	4
Liczba punktów ECTS do zdobycia	5
Typ przedmiotu	obowiązkowy
Język nauczania	angielski
Sylabus opracował	<ul style="list-style-type: none">dr inż. Mirosław Kozioł

Formy zajęć					
Forma zajęć	Liczba godzin w semestrze (stacjonarne)	Liczba godzin w tygodniu (stacjonarne)	Liczba godzin w semestrze (niestacjonarne)	Liczba godzin w tygodniu (niestacjonarne)	Forma zaliczenia
Wykład	30	2	-	-	Zaliczenie na ocenę
Laboratorium	30	2	-	-	Zaliczenie na ocenę

Cel przedmiotu

- To provide knowledge about basic elements of microprocessor system and their mutual cooperation.
- To provide knowledge about the various methods of microprocessor system expansion with additional peripherals and methods of peripherals' handling by the central processor unit.
- To provide knowledge about the architecture of an exemplary microcontroller.
- To develop and shape the skills in the software design for microprocessor systems.

Wymagania wstępne

By entering this course, student should know the following issues:

- basic laws of electrical circuits (e.g. Ohm's law, Kirchoff's laws),
- fundamental information about semiconductors (transistor and diode),
- fundamentals of digital electronics (logic gates, flip-flops, counters, three-state buffer),
- operational amplifier basics (buffer, inverting and noninverting configuration, summing amplifier),
- analog-to-digital and digital-to-analog converters,
- fundamentals of programing in the C language.

Zakres tematyczny

Microprocessor system and its basic components. The role of the tri-state buffers in accessing the data bus. Microprocessor vs. microcontroller. Basic architectures of microprocessor systems (von Neuman, harvard and modified harvard architecture).

Instructions. Instruction set. Execution of the instruction by the central processor unit of the microprocessor system. Basic addressing modes. Basic groups of instructions in the instruction set.

Memories in microprocessor systems. Basic memory types. Basic memory parameters. Exemplary timing charts during read and write operations. Examples of memory chips used in microprocessor systems based on microcontrollers.

Interfacing peripherals to the system bus. Isolated and memory mapped input-output devices. Address decoder design on the basis of middle scale digital logic circuits and SPLDs with examples.

Handling of peripherals. Polling. Interrupt system.

Transmission of information between microprocessor systems. Transmission of information with and without acknowledgement. Synchronous and asynchronous transmission. Parallel and serial transmission. Serial interfaces (RS-232C, RS-485).

MCS-51 family of microcontrollers as an example of single-chip microcomputer. The most significant features of their architecture. Functional blocks. Interfacing of external program and data memory. Available addressing modes. Instruction set. Embedded peripheral systems, i.e. timer-counters and serial interface. Interrupts. Parallel ports. Programming examples of embedded peripherals in assembler and C.

Basic user interface in microprocessor system. Keyboard. LED and LCD displays.

Metody kształcenia

- Lecture: conventional/traditional lecture with elements of discussion.
- Laboratory: laboratory exercises, work in groups with elements of discussion.

Efekty uczenia się i metody weryfikacji osiągnięcia efektów uczenia się

Opis efektu	Symbole efektów	Metody weryfikacji	Forma zajęć
Student can name and explain methods for servicing of peripherals in microprocessor system.		• kolokwium	• Wykład
Student can name and explain various methods for extending of microprocessor systems by additional peripherals.		• kolokwium	• Wykład
Student can name basic sub-components of microprocessor system, describe their functional purpose and co-operation.		• kolokwium	• Wykład
Student can write a program for a microprocessor system based on a microcontroller.		• bieżąca kontrola na zajęciach • wykonanie sprawozdań laboratoryjnych	• Laboratorium
Student knows the exemplary microcontroller architecture.		• bieżąca kontrola na zajęciach • sprawdzian	• Laboratorium

Warunki zaliczenia

Lecture: to receive a final passing grade student has to receive positive grade from written tests conducted at least once a semester.

Laboratory: to receive a final passing grade student has to receive positive grades in all laboratory exercises provided for in the laboratory syllabus.

Calculation of the final grade = lecture 45% + laboratory 55%

Literatura podstawowa

1. Godse A.P., Godse D.A.: *Microprocessor, Microcontroler & Applications*, Technical Publications Pune, 2008.
2. Deshmukh A.V.: *Microcontrollers. Theory and Applications*. Tata McGraw-Hill, 2007.
3. Huang H-W.: *Embedded System Design with the C8051*, Cengage Learning, 2009.
4. James M.: *Microcontroller Cookbook. PIC & 8051*, Newnes, 2001.

Literatura uzupełniająca

Uwagi

Zmodyfikowane przez dr inż. Mirosław Kozioł (ostatnia modyfikacja: 07-04-2022 19:46)

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