



Subject card

Subject name and code	Microcontrollers and Distributed Microsystems - laboratory, PG_00047586						
Field of study	Automatic Control, Cybernetics and Robotics						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2022/2023		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Metrology and Optoelectronics -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Zbigniew Czaja				
	Teachers		dr inż. Michał Kowalewski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		2.0		18.0	50
Subject objectives	Getting to know the PIC18, the AVR and the MCS51 microcontrollers families and the bases related to the configuration and control their peripherals. Acquisition of skills of the IDE software for these families of microcontrollers (creating projects, assembling, compiling, software simulation, programming of microcontrollers). Skill of writing simple programs to handle peripherals of microcontrollers in an assembly language and a C language.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment		Student uses IDE software for compilation, program simulation and programming of microcontrollers.		[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	[K6_U21] can individually carry out an analysis of a managing and controlling problem and is able to individually design, tune and operate automatic regulation and control systems, and use computers to control and monitor dynamic systems		Student describes the principle of operation and control of microcontrollers. Student analyzes program codes written in an assembler and a C language written for microcontrollers.		[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study		The student can write programs in an assembly language and a C language for microcontrollers. Student uses the IDE software for microcontrollers.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		

Subject contents	1. Practicing of the IDE MPLAB 8 environment to activating of programs written in the assembler for the PIC18F452 microcontroller of Microchip 2. Realization of the software in the assembler for the PIC18F452 3. Using of the MPLAB C18 language to writing of programs for the PIC18F452 4. Project and implementation of the program in the MPLAB C18 language for the PIC18F452 5. Realization of the software in the assembler for the ATmega16 microcontroller of Atmel 6. Writing of the program in the assembler for the ATmega16 7. Using of the C language to writing of the programs for the ATmega16 8. Writing in the C language the program for the ATmega16 9. Creating of programs in the assembler for the P89C51RC microcontroller of Philips 10. Realization in the assembler of own program for the P89C51RC 11. Writing of the software with using of the C language for the P89C51RC 12. To write the program in the C language for the P89C51RC		
Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical exercise	50.0%	100.0%
Recommended reading	Basic literature	Czaja Z.:Instrukcje do ćwiczeń laboratoryjnych, http://www.pg.gda.pl/~zbczaja , Gdańsk 2014.	
	Supplementary literature	Baranowski R.: Mikrokontrolery AVR ATmega w praktyce, Wyd. BTC, Warszawa 2005. Bogusz J.: Lokalne interfejsy szeregowo w systemach cyfrowych, Wyd. BTC, Warszawa 2004. Hadam P.: Projektowanie systemów mikroprocesorowych, Wyd. BTC, Warszawa 2004. Bogusz J.: Lokalne interfejsy szeregowo w systemach cyfrowych, Wyd. BTC, Warszawa 2004. Baranowski R.: Mikrokontrolery AVR ATmega w praktyce, Wyd. BTC, Warszawa 2005.	
	eResources addresses	Adresy na platformie eNauczanie: Mikrosterowniki i mikrosystemy rozproszone - laboratorium 2023 - Moodle ID: 29000 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29000	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		