Subject card

Subject name and code	Programming of Microcontrollers, PG_00039370
Field of study	Automation, Robotics and Control Systems

Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
Education level	second-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Department of Controlled Electric Drives -> Faculty of Electrical and Control Engineering

Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Marcin Morawiec
	Teachers	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	0.0	0.0	10.0	20
	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	20	20.0	60.0	100

Subject objectives	The aim of the course is to extend the students' knowledge on topics related to programming interfaces with the ARM core microcontroller

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U04	The student has the ability to program and self-study knowledge	[SU1] Assessment of task fulfilment
	K7_U07	The student is able to use the software tools in engineering solutions	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject
	K7_W11	The student can use programming tools for the synthesis of control systems	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	K7_W06	The student is able to design and program a device with a control system	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects

Subject contents	LECTURE Overview of microcontrollers available on the market. Overview of ATMEL's most popular microcontrollers, Intel, Freescale Semiconductor, Infineon, Analog Devices, STMicroelectronics, Hitachi. Discussion of the basic principles of programming in C ++. Discussion of the basic functions provided by microcontroller manufacturers. Discussion of microcontroller programming rules. SEMINAR Configuration and software for ZLA3 interface with ARM microcontroller.
Prerequisites and co-requisites	Ability to program in C / C ++

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test	60.0%	50.0%
	Final project	60.0%	50.0%

Recommended reading	Basic literature	1. Pełka R.: "Microcontrollers - architecture, programing, applications". Wydawnictwa Komunikacji i Łączności, Warszawa 2003. 2. Baranowski R.: "AVR ATmega microcontrollers in practice", BTC, Warszawa 2006. 3. Doliński J.: "AVR microcontrollers in practice". BTC, Warszawa, 2004.
	Supplementary literature	1. Paprocki K.: STM32 Microcontrollers in practice. BTC, Legionowo 2009. 2. Majewski J., Zbysiński P.: FPGA in examples, BTC, Legionowo 2007. 3. Galewski M., STM32: Exercises and applications in C, BTC, s. 360, 2011.
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. Programming environments 2. USART Communication 3. A/C transducer 4. Microkontroller interrupts

Work placement	Not applicable