



Subject card

Subject name and code	Microcontroller programming, PG_00059839						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	February 2025	Academic year of realisation of subject			2025/2026		
Education level	second-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			exam		
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	15.0	0.0	0.0	15.0	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	15.0		5.0		50
Subject objectives	The aim of the course is to discuss selected microcontrollers with ARM core. Discussion of the ARM architecture and the possibility of using it in automation systems. Deepening the skills of programming in the C language by developing control functions. The programming of peripheral devices of the interface with the STM32 processor by the student allows the student to develop programming skills of modern electronic devices.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U04] has the ability for self-directed learning in order to improve his/her professional qualifications, and is able to identify directions for further learning						
	[K7_W06] has an extended knowledge of the design of automation components and devices, control and decision support systems control and decision support systems and complex mechatronic systems						

Subject contents	<p>1.ARM architecture</p> <p>2. ARM architecture.</p> <p>3.I/O Ports</p> <p>4. Programming in C and operations on bits</p> <p>5. Microcontroller interfaces (serial, parallel)</p> <p>6. A/C and D/A converter</p> <p>7. A/C and C/A converter continued.</p> <p>8. Interrupts, Timers, Clocks, etc.</p> <p>9. Overview of sample programs</p> <p>10. Discussion of sample programs cont.</p>											
Prerequisites and co-requisites	Basic programming skill in C/C++											
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 1025 794 1055">Subject passing criteria</th> <th data-bbox="799 1025 1137 1055">Passing threshold</th> <th data-bbox="1142 1025 1481 1055">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1061 794 1090">Laboratory</td> <td data-bbox="799 1061 1137 1090">60.0%</td> <td data-bbox="1142 1061 1481 1090">75.0%</td> </tr> <tr> <td data-bbox="456 1097 794 1126">Lecture</td> <td data-bbox="799 1097 1137 1126">50.0%</td> <td data-bbox="1142 1097 1481 1126">25.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Laboratory	60.0%	75.0%	Lecture	50.0%	25.0%
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Laboratory	60.0%	75.0%										
Lecture	50.0%	25.0%										
Recommended reading	Basic literature	<p>1. Pełka R.: "Mikrokontrolery - architektura, programowanie, zastosowania". Wydawnictwa Komunikacji i Łączności, Warszawa 2003.</p> <p>2. Baranowski R.: "Mikrokontrolery AVR ATmega w praktyce", BTC, Warszawa 2006.</p> <p>3. Doliński J.: "Mikrokontrolery AVR w praktyce". BTC, Warszawa, 2004.</p> <p>4. Paprocki K. "Mikrokontrolery STM32 w praktyce", Wydawnictwo BTC 2009.</p> <p>5. www.arm.com</p> <p>6. www.st.com</p> <p>7. Yiu J.: The Definitive Guide to ARM® Cortex®-M3 and Cortex®-M4 Processors, Third Edition 2013.</p>										

	Supplementary literature	1. www.st.com 2. www.arm.com 3. http://stm32f4-discovery.com 4. https://my.st.com
	eResources addresses	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed	1. Software I/O ports 2. Timers, clocks, PWM software 3. A/C converter 4. USART serial communication 5. Interrupt controller	
Work placement	Not applicable	

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