



Subject card

Subject name and code	Design of automatic control systems with electric motors, PG_00059856						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
Education level	first-cycle studies	Subject group					
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			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	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	30.0	0.0	45
	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	45	10.0	45.0	100		
Subject objectives	The aim of the course is to familiarize with automatic control systems used in electric micromachines such as DC motors, servo drives, hybrid motors.						
Learning outcomes	Course outcome	Subject outcome		Method of verification			
	[K6_U04] has the ability to self-educate, among other things, in order to improve professional qualifications	The student will have the ability to self-educate in order to improve qualifications		[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task			
	[K6_W11] knows the hazards arising from devices, installations, systems and technical systems, basic principles of occupational health and safety, taking into account the role of control and security systems in controlling automation and robotics facilities	The student will become familiar with the principles of occupational health and safety, including control systems in automation and robotics facilities		[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation			
	[K6_W07] has basic knowledge related to control and automation systems	The student will have knowledge of control and automation systems		[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects			
	[K6_W06] knows the structure of computers and microprocessors and the tasks of operating systems, has basic knowledge of the basics of computer software, drivers, microprocessor technology, design of simple algorithms and the operation of information networks	The student will have knowledge of the basic control systems of electric micromachines, will be able to implement the control system in a microprocessor controller		[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects			
	[K6_K05] can think and act in an entrepreneurial way	The student will improve the skills of creative and entrepreneurial thinking		[SK1] Assessment of group work skills [SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work			

Subject contents	<p>1. Introduction to electric drive</p> <p>2. Overview of converter systems used in micro and servo drives</p> <p>3. Converter drive automation including microdrives</p> <p>4. Design of a system with a microdrive controlled by a microcontroller (electronics design)</p> <p>5. Implementation of the control system in a system with a microcontroller</p> <p>6. Functional tests in the laboratory</p>											
Prerequisites and co-requisites	Basic knowledge of the electric drive											
Assessment methods and criteria	<table border="1" data-bbox="448 781 1489 884"> <thead> <tr> <th data-bbox="448 781 794 815">Subject passing criteria</th> <th data-bbox="794 781 1141 815">Passing threshold</th> <th data-bbox="1141 781 1489 815">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 815 794 848">Project</td> <td data-bbox="794 815 1141 848">75.0%</td> <td data-bbox="1141 815 1489 848">85.0%</td> </tr> <tr> <td data-bbox="448 848 794 884">Lecture</td> <td data-bbox="794 848 1141 884">50.0%</td> <td data-bbox="1141 848 1489 884">15.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Project	75.0%	85.0%	Lecture	50.0%	15.0%
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Recommended reading	<p>Basic literature</p> <p>Supplementary literature</p> <p>eResources addresses</p>	<p>Dębowski A., Automatyka napędu Elektrycznego, Wydawnictwo Naukowe PWN, 2017.</p> <p>Gibilisco S., Schematy elektroniczne i elektryczne. Przewodnik dla początkujących, Wydawnictwo Helion, 2021.</p> <p>https://forbot.pl/blog/kurs-arduino-silniki-pwm-serwomechanizm-zewnetrzne-biblioteki-id3913</p> <p>www.st.com</p>										
Example issues/ example questions/ tasks being completed	Design of the control system of the selected servo (with a servo drive, DC motor, stepper motor, hybrid motor), PCB design, simulation of the control system in PLECS, software design for STM32 or other.											
Work placement	Not applicable											