



## Subject card

Subject name and code	Designing of Printed Electronic Circuits, PG_00053421						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2023/2024		
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	4	Language of instruction			Polish		
Semester of study	7	ECTS credits			3.0		
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 inż. Krzysztof Blecharz				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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		5.0		40.0	75
Subject objectives	The aim of the course is to provide students with knowledge of the design and construction of the Printed Circuit Board (PCB) and to acquire skills for students to independently design and make simple electronic circuits and printed circuit boards.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W10] has basic knowledge related to mechatronics and robotics systems	The student can explain selected issues regarding electric drives used in robotics.			[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 can write a functional control program for a specific microcontroller model.			[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions	The student can find and correctly interpret information provided by manufacturers of electronic components to prepare an electronic circuit design.			[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information		
	[K6_U03] can prepare and present a presentation on the problems and results of an engineering task	The student can prepare complete documentation of the design of an electronic circuit board (PCB).			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information		
Subject contents	Independent design of the electronic system with complete technical documentation of printed circuit board. Design, manufacture, and commission an electronic device.						
Prerequisites and co-requisites	Basic knowledge of electronics and power electronics is required.						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Laboratory	50.0%			80.0%		
	Lecture	50.0%			20.0%		

Recommended reading	Basic literature	Clyde F. Coombs; Happy Holden:Printed Circuits Handbook, Seventh Edition, 2016, McGraw-Hill Education
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Felba J: Montaż w elektronice, Oficyna Wydawnicza Politechniki Wrocławskiej, 2010</li> <li>2. D. Brooks:Signal Integrity Issues and Printed Circuit Board Design, Prentice Hall, 2003.</li> <li>3. <i>The hitchhiker's guide to PCB design : things you wish you knew yesterday and will need to know tomorrow.</i> Rochester, NY: EMA Design Automation, Inc.</li> </ol>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>Development of a project, execution, and commissioning of an electronic device. Students can choose from a list of proposals for electronic circuits. It is possible to implement individual designs of electronic systems solutions in consultation with the teacher.</p> <p>Stages of creating printed circuit designs.</p> <p>The most common design mistakes.</p>	
Work placement	Not applicable	