



## Subject card

Subject name and code	Introductory CDIO Project, PG_00049763						
Field of study	Power Engineering, Power Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group		Optional subject group 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	1		Language of instruction		English		
Semester of study	2		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 inż. Piotr Kołodziejek				
	Teachers		dr inż. Piotr Kołodziejek				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	45.0	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		6.0		49.0	100
Subject objectives	The aim of this course is to make the students familiar with the team work to design and construct simple electronic circuits. Also, how to write technical and engineering documentation taking in consideration electrical engineering, electronics, CAD and PCB design and computer simulation problems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U01] can obtain information from literature and other sources, organize, interpret it and draw and formulate conclusions; has the ability to self-educate, interprets the results of completed engineering tasks, is able to design simple energy systems and their systems		Student can obtain information from technical literature on the construction and design of simple electronic circuits. The obtained information can integrate, interpret and get conclusions. Student can find data in catalog cards and in software documentation. Student can elaborate and present documentation of the prepared project.		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	[K6_K02] is able to work in a group taking different roles in it, can think and act in an entrepreneurial way, is aware of responsibility for their own work and responsibility for teamwork		Student can work individually and in team, can estimate the time needed for the entrusted task.		[SK2] Assessment of progress of work		

Subject contents	Design of complete prototype of Simple electronic circuit (DC-DC converter) with control based on %%% integrated circuit. The project is divided into the following stages: <ul style="list-style-type: none"><li>• Get familiar with laboratory equipment (oscilloscope, multimeters, DC power supply, assembly and soldering tools)</li><li>• DC-DC converter computer simulation,</li><li>• Design of control system based on IC timer 555 type,</li><li>• Selection of electronics elements,</li><li>• Design of magnetic coil using simulation software,</li><li>• Draw of mechanical elements for coil winding utilizing 3D CAD software,</li><li>• Assembling of electronics circuit using general, universal board,</li><li>• The initial testing stage of assembled circuit with the possibility to correct connection structure, changing the electronics elements etc.,</li><li>• Designing of the printed circuit board PCB utilizing CSD software,</li><li>• Manufacturing of PCB board,</li><li>• Assembling the electronic elements on PCB board (soldering and connection tests)</li><li>• Starting the operation stage of the assembled electronic circuit</li><li>• Measurements of the assembled circuit (using of multimeters, oscilloscope),</li><li>• Project documentation (final report),</li><li>• Presenting the project with the final results.</li></ul>		
Prerequisites and co-requisites	<ul style="list-style-type: none"><li>• Basic English and elementary computer software skills (Word, Excel, etc.)</li></ul>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	60.0%	100.0%
Recommended reading	Basic literature	1. Manual of electronic circuits simulation software LT Spice <a href="http://www.linear.com/designtools/software/">http://www.linear.com/designtools/software/</a> 2. Manual of printed circuit board design software EAGLE Light Edition <a href="http://www.cadsoftusa.com/">http://www.cadsoftusa.com/</a> 3. Manual of magnetic elements simulation software FEMM: David Meeker Finite Element Method Magnetics. User's Manual.	
	Supplementary literature	1. By Chen, Wai-Ka, Electrical Engineering Handbook, Elsevier, 2005.	
	eResources addresses	Adresy na platformie eNauczanie: Introductory CDIO Project 2023/2024 - Moodle ID: 36457 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=36457">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=36457</a>	
Example issues/ example questions/ tasks being completed	Design, assembling and constructing, perform and run laboratory tests of DC-DC converter, documentation preparation and presenting the delivering of multimedia presentation.		
Work placement	Not applicable		