



## Subject card

Subject name and code	Power conversion in autonomous systems, E:41046W0						
Field of study	Space and Satellite Technologies						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			English		
Semester of study	1	ECTS credits			2.0		
Learning profile		Assessment form			assessment		
Conducting unit	Department of Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Piotr Musznicki				
	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		0.0		0.0	30
Subject objectives	To familiarise students theoretically and practically with issues of power conversion in autonomous systems.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_W06	Student has the knowledge on how the newest power electronic converters in autonomous systems are built and how they operate, what are the requirements for selecting power systems for specific applications, especially for working with batteries and photovoltaic panels, and how the use of converters influences the quality of energy and the environment.			[SW1] Assessment of factual knowledge		
	[K7_K02] Understands the non-technical aspects of activities in the field of space and satellite technologies, including their social consequences and impact on the state of the environment. Expresses opinions on the development of technology and related risks.	He understands non-technical aspects of issues related to power converters in autonomous systems.			[SK2] Assessment of progress of work		
	K7_U09	He is able to use in practice his knowledge on power converters in autonomous systems.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
Subject contents	Introduction of autonomous systems. Modern semiconductor devices (GaN, SiC), consolidation. DC / DC topologies (unidirectional - bidirectional). Operation and control of: resonant converter LLC, dual active bridge converter and three-phase + multi-level inverter. Control systems of power electronic systems. Battery charging / discharging systems; Introduction of simulation software. The simulation of coveter DC/DC/AC. Sensitive study. Optimal components selection. Analysis of normal and fault operation.						
Prerequisites and co-requisites	-						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	grades from laboratory reports	50.0%			50.0%		
	test at the last lecture	50.0%			50.0%		

Recommended reading	Basic literature	Students will receive a reading list at the beginning of the semester.
	Supplementary literature	-
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	-	
Work placement	Not applicable	