



Subject card

Subject name and code	Introduction to Advanced Electrical Drives, PG_00038331						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	February 2023		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		Polish		
Semester of study	2		ECTS credits		2.0		
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		prof. dr hab. inż. Marcin Morawiec				
	Teachers		prof. dr hab. inż. Marcin Morawiec dr inż. Piotr Kołodziejek				
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		15.0	50
Subject objectives	The aim of the course is to discuss issues related to advanced drive technology, such as advanced control of electric drives and the construction of converter systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_K04		The student is able to independently take an appropriate response in health-threatening situations.		[SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work		
	K7_K06		The student is able to assess the quality of the applied engineering solution.		[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work		
	K7_W10		The student has expanded knowledge of the control of alternating current electrical machines.		[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
Subject contents	1. UAR automatic regulation system. Selection of controller settings in the electric drive.2. Construction, properties and control of the BLDC motor.3. Construction, properties and control of the PMSM engine.4. Scalar and vector control of a squirrel-cage induction motor.5. Nonlinear control - input-output linearization.6. Sliding steering and backstepping.7. Construction, properties and control of polyphase motors.						
Prerequisites and co-requisites	Basic knowledge of the construction and control of electrical machines.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Laboratory		60.0%		80.0%		
	Lecture		60.0%		20.0%		

Recommended reading	Basic literature	<p>1. Deskur J., Kaczmarek T., Zawirski K., "Automatyka napędu elektrycznego", Wydawnictwo Politechniki Poznańskiej, 978-83-7775-160-2, 2012</p> <p>2. Grzesiak L., Kaszewski A., Ufnalski B., Sterowanie napędów elektrycznych, Wydawnictwo Naukowe PWN, 2023.</p> <p>3. Krzemiński Z., Cyfrowe sterowanie maszynami asynchronicznymi, https://eia.pg.edu.pl/documents/184045/282792/monografia.pdf</p>
	Supplementary literature	Brak
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>1. BLDC motor control2. PMSM motor control3. Vector and scalar control4. Control with multiscalar variable</p>	
Work placement	Not applicable	