GDAŃSK UNIVERSITY OF TECHNOLOGY

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