GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Control of servomotors, PG_00054495		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
Education level	first-cycle studies	Subject group	
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	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 hab. inż. Elżbieta Bogalecka	

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

Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6411

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	2.0	18.0	50

Subject objectives

The aim of the course is to discuss the control and programming structures of servo motors with permanent magnet synchronous motors, reluctance motors, stepper motors and servo drives.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W09	knows the methods of producing and transmitting energy	[SW2] Assessment of knowledge contained in presentation
K6_U05	has extended knowledge of servo drive systems, control, and diagnostics methods	[SU1] Assessment of task fulfilment
K6_U09	can select the servo drive to the actuators	[SU1] Assessment of task fulfilment
K6_K05	is able to apply the principles of occupational health and safety	[SK4] Assessment of communication skills, including language correctness
K6_K01	has aware of training due to the emerging new solutions in the field of servo drive controllers	[SK5] Assessment of ability to solve problems that arise in practice
K6_U10	is able to design electrical installations in which he will use servomechanisms	[SU1] Assessment of task fulfilment

Subject contents

Overview of servo systems. Permanent magnet synchronous motor. Reluctance motor. Stepper motor. Servo drive. Overview of the control systems of each mentioned machine. Structure of the control system. PMSM engine control system. Selection of PID controller settings in a system with a servo. Overview of the CNC milling machine and 3D printer system. Position and speed sensors used in servos. Overview of design methods. Overview of the principles of functional safety. Safety functions. Siemens servo drives in practice.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Credit for the lecture	50.0%	20.0%
Reports from the laboratory exercises	60.0%	80.0%

Recommended reading	Basic literature	Janusz Kwaśniewski, Ireneusz Dominik, Krzysztof Lalik oraz Mateusz Kozek, Serwonapędy Siemens w praktyce inżynierskiej, Wydawnictwo BTC, 2020. Szelerski Marek Wiktor, Automatyka przemysłowa w praktyce, Wydawnictwo Kabe, 2016.
	Supplementary literature	Lech Grzesiak, Arkadiusz Kaszewski, Bartłomiej Ufnalski, Sterowanie napędów elektrycznych, PWN, Warszawa, 1, 2021.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. PMSM motor position control system 2. Discuss the principles of functional safety 3. Discuss the principle of stepper motor control 4. Discuss sensors for measuring speed and position used in servos	
Work placement	Not applicable	