GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Control System Structures, PG_00038290		
Field of study	Automation, Robotics and Control Systems		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
Education level	second-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	e-learning
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Controlled Electric Drives -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Elżbieta Bogalecka	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	10.0	0.0	10.0	0.0	0.0	20

E-learning hours included: 20.0

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	20	9.0	71.0	100

Subject objectives

goal is to be able to choose the structure of the control system depending of the requirements for control quality, design and study of the control system properties

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_K06	Based on the theoretical knowledge and simulation studies acquired, the student is able to assess the quality of the control system and evaluate the implementation possibilities on the physical object.	[SK5] Assessment of ability to solve problems that arise in practice
K7_W14	Student is able to build a model of a given control object in the form of transmittance or a system of differential equations and build a simulation model and implement the structure of a complex control system, taking into account constraints and parametric uncertainty	[SW3] Assessment of knowledge contained in written work and projects
K7_U07	The student can determine the requirements for the quality of control for a given object and control purpose. The student can propose a control structure that will meet the requirements	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment

Subject contents

Classification of control systems. Formulating control problem. Modeling of control systems including actuator, sensors and restrictions. Structures of control systems: multiloop, open vs. closed control, with feedback from the output and from the state variables, with reference model, with disturbance compensation, sliding control. Robust control, design rules, parametric sensitivity. Principles for design of complex control structures. Selected unconventional controllers. Digital implementation of control algorithm. Control systems of selected objects: with important delay and weak damped.

Prerequisites and co-requisites

Basic knowledge of control theory, metrology, microprocessor technology, matematics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	50.0%	50.0%
Laboratory reports	60.0%	50.0%

Recommended reading	Basic literature	1. Kaczorek T., Dzieliński, Dąbrowski, Łopatka: Podstawy teorii sterowania,PWN 2009. 2. Tatjewski P.: Sterowanie zaawansowane obiektów przemysłowych. Struktury i Algorytmy. Warszawa. 3. Bubnicki: Teoria i algorytmy sterowania, PWN, 2005.
	Supplementary literature	1. Bodgan Wilamowski; J. David Irwin: Control and mechatronics, CRC Press, Taylor&Francis Group, 2011. 2. Bogdan M. Wilamowski; J. David Irwin: Intelligent systems, CRC Press, Taylor&Francis Group, 2011.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Explain the control system structure based on MRAS method, 2 . Applications of the sliding control method. 3. How is the open loop control system based on "input shaping" designed	
Work placement	Not applicable	