GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Control Theory, PG_00038190		
Field of study	Automation, Robotics and Control Systems		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Control Systems Engineering -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Robert Piotrowski	
	Teachers	dr hab. inż. Robert Piotrowski	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	10.0	10.0	0.0	0.0	50

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	50	5.0	70.0	125

Subject objectives

The aim of the course is to present the current achievements of the control theory for the different categories of control systems, e.g.: continuous - discrete, linear - nonlinear, deterministic - stochastic. It will be present the results of modern control theory and the most important results of control theory.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U07] is able to use analytical, simulation and experimental methods to formulate and solve engineering tasks and simple research problems in the field of automation and robotics	1. The student selects the control algorithm to the control task. 2. The student examines the control systems by simulation tests.	[SU4] Assessment of ability to use methods and tools
[K7_W06] has an extended knowledge of the design of automation components and devices, control and decision support systems control and decision support systems and complex mechatronic systems	1. The student knows the classical and modern control methods. 2. The student designs and analyzes the effect of the selected control systems.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

Course content – lecture
Recapitulation of the subjects: Control Engineering Foundations, Dynamic Systems, Continuous Processes Control. Control systems and and its basic features. Stability analyses od linear systems. Stability criteria Lyapunov"s methods of stability analysis of control systems - linear and nonlinear systems State space control design - poles placement methods State feedback control systems with observers Optimal control - Linear Quadratic Control (LQC), Dynamic Programming Noisy systems - robust control methods.

Prerequisites and co-requisites

Not required

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	0.0%	70.0%
Laboratory	0.0%	30.0%

Recommended reading	Basic literature	1. Byrski, W. Obserwacja i sterowanie w systemach dynamicznych. Uczelniane Wydawnictwa Naukowo Dydaktyczne AGH, 2007. 2. Bubnicki, A.: Teoria i algorytmy sterowania. PWN, 2005. 3. Leigh J.R. Control theory. Wiley, 2004. 4. Nise N.S. Control System Engineering. 3th edition. John Wiley & Sons, 2000.
	Supplementary literature	1. Ogata K. Modern Control Engineering. 4th edition. Prentice Hall, 2002. 2. Hendricks, E., Jannerup, O., Sorensen, P.H. (2008). Linear Systems Control, Deterministic and Stochastic Methods. Springer – Verlag.
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Check the observability and controllability of the system represented by A, B and C, using the Kalman test. 2. Provide an overview of the linear, non-stationary continuous system using state space model and name its individual components.	
Practical activites within the subject	Not applicable	

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