

GDAŃSK UNIVERSITY

Subject card

Subject name and code	Automatic Control & Robotics, PG_00046326								
Field of study	Electronics and Telecommunications, Informatics, Automatic Control, Cybernetics and Robotics								
Date of commencement of studies	October 2022		Academic year of realisation of subject			2022/2023			
Education level	second-cycle studies		Subject group			Obligatory subject group in the field of study			
Mode of study	Full-time studies		Mode of delivery			at the university			
Year of study	1		Language of instruction			English			
Semester of study	1		ECTS credits			5.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Department of Automatic Control -> Faculty of Electronics, Telecommunications and Informatics							ics	
Name and surname	Subject supervisor		dr inż. Piotr Kaczmarek						
of lecturer (lecturers)	Teachers		dr inż. Piotr Kaczmarek						
			dr inż. Marek Tatara						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
of instruction	Number of study hours	30.0	0.0	10.0	0.0		0.0	40	
	E-learning hours inclu	uded: 0.0							
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	I didacticParticipation in consultation hours		n Iours	Self-study		SUM	
	Number of study hours	40		17.0		68.0		125	
Subject objectives	Introduction of the methods of dynamic systems analysis and the synthesis of basic control systems using feedback.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K7_W03] Knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum.		Student is able to design feedback systems			[SW1] Assessment of factual knowledge			
	[K7_U06] can analyse the operation of components, circuits and systems related to the field of study; measure their parameters; examine technical specifications; interpret obtained results and draw conclusions		Student is able to model dynamic systems			[SU4] Assessment of ability to use methods and tools			

Subject contents	1. Introduction to automatic control systems. Feedback systems. Basic functional elements of the closed control system (regulation).						
	2. Mathematical models of continuous time dynamic systems. Linearization of nonlinear models.						
	3. Linear models: transfer functions and description in the state space.						
	4. Stability of linear control systems. Algebraic stability criteria (Routh-Hurwitz criterion).						
	5. Transient processes in control systems and static control accuracy (fixed errors). First and second order dynamic members.						
	6. Quality control indicators in time domain.						
	7. Basic limitations of the synthesis of automatic control systems. Impact of feedback on control system properties.						
	8. Root lines as a tool for analyzing dynamic systems with feedback.						
	9. Principle of proportional control and dynamic compensation (accelerating and decelerating elements).						
	10. Frequency characteristics of linear dynamic systems. Nyquist criterion for stability of feedback systems. Control quality indicators in the frequency domain.						
	11. Basics of control system synthesis based on frequency methods - the principle of correction of frequency characteristics of an open system.						
	12. The use of software supporting the design of control systems						
Prerequisites and co-requisites	Advanced knowledge of mathematics and physics						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Implementation of a computer task	55.0%	50.0%				
	Written test	55.0%	50.0%				
Recommended reading	Basic literature	J. Nowakowski "Podstawy Automatyki" tom 1, Skrypt PG					
		F. Golnaraghi, B. C. Kuo "Automatic Control Systems" Willey 2010					
	Supplementary literature K. Ogata "Modern Control Engineering"						
	eResources addresses Adress na platformie eNauczanie:						
	2022/2023_ZIMA Automatic Control & Robotics - Moodle ID: 2 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=2688						
Example issues/ example questions/ tasks being completed							
Work placement	Not applicable						