



Subject card

Subject name and code	Dynamic Systems, PG_00038123						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	first-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Katedra Inteligentnych Systemów Sterowania i Wspomagania Decyzji -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Robert Piotrowski				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	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		3.0		17.0	50
Subject objectives	Presentation of contemporary forms of description of dynamic systems and methods of analysis of their properties. Different categories of systems, methods of describing them, ways of studying their properties will be presented.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U08] can design and build systems and devices in the field related to mechatronics and robotics systems		Students will be able to analyse dynamic systems.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W10] has basic knowledge related to mechatronics and robotics systems		The student is able to develop a model of a dynamic system and carry out its analysis.		[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	1. Signals and systems. 2. Interchangeability of the form of description of dynamical systems. 3. Discretisation of models in the form of differential equations and based on the operator transmittance. 4. System responses. 5. stability of the system.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Written pass		50.0%		70.0%		
	Exercises		50.0%		30.0%		

Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Buck J.R., Daniel M.M., Singer A.C. (2002). Computer Explorations in Signals and Systems Using MATLAB®. 2nd edition, Prentice-Hall, New Jersey. 2. Byrski W. (2007). Obserwacja i sterowanie w systemach dynamicznych. Uczelniane Wydawnictwa Naukowo Dydaktyczne Akademii Górniczo Hutniczej, Kraków. 3. Czemplik A. (2021). Dynamika układów. Wprowadzenie do modelowania, analizy i symulacji. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław. 4. Heij Ch., Ran A., van Schagen F. (2000). Introduction to Mathematical Systems Theory. Linear Systems, Identification and Control. Birkhäuser Verlag. 5. Karris S.T. (2003). Signals and Systems with MATLAB® Applications. Second Edition. Orchard Publications, Fremont, California. 6. Oppenheim A.V., Willsky A.S., Nawab S.H. (1997). Signals and Systems. 2nd edition, Prentice-Hall, New Jersey. 7. Wojciechowski J. (2008). Sygnały i systemy. Wydawnictwa Komunikacji i Łączności, Warszawa.
	Supplementary literature	Mitkowski W. (2019). Zarys teorii sterowania. Uczelniane Wydawnictwa Naukowo Dydaktyczne Akademii Górniczo Hutniczej, Kraków.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Find a description in state space (equations of state and equation of output) and draw a diagram using an iterative method. 2. Check analytically that the system satisfies the additivity condition. 	
Work placement	Not applicable	