



Subject card

Subject name and code	Fundamentals of Control Systems, PG_00060646						
Field of study	Transport and Logistics						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2024/2025		
Education level	first-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	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Mohammad Ghaemi				
	Teachers		dr inż. Joanna Grochowalska dr hab. inż. Marek Dzida prof. dr hab. inż. Roman Śmierzchalski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	15.0	0.0	0.0	60
	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	60		6.0		59.0	125
Subject objectives	The objective is to learn the fundamentals of control theory and the structures and elements of basic automation systems, as well as general information about control system design.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W04] has well established knowledge in the field of computer science, electronics, automation and control, information technology and computer graphics, useful for understanding the possibilities of applying them in transport		The student possesses organized knowledge in the field of simple automatic control systems, which is necessary for understanding their potential applications in transportation systems.		[SW1] Assessment of factual knowledge		
	[K6_U05] can formulate a simple engineering task and its specification in the field of design, maintenance and operation of transport means and systems		The student is capable of formulating a simple engineering problem and its specification in the field of design and application of automatic control systems.		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	1. Introduction and basic concepts		
	2. Classification of control systems		
	3. Modeling of dynamic systems and description of elements of automatic control systems		
	4. Types of mathematical models of dynamic systems: differential equation, transmittance, block diagram, linearization		
	5. Transition function and time characteristics		
	6.Feedback		
	7.Analysis of time-domain and frequency-domain control systems		
	8.Stability of linear control systems		
	9. Controllers		
Prerequisites and co-requisites	Pre-requisite subjects:		
	1. Mathematics		
	2. Physics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lab. reports	51.0%	30.0%
	Colloquium for credit from lecture	56.0%	40.0%
	Colloquium for credit from exercises	51.0%	30.0%
Recommended reading	Basic literature	Nise N. S., Control System Engineering , 8th Edition, John Wiley & Sons Inc., 2019.	
	Supplementary literature	<p>- Bubnicki Z., Teoria i algorytmy sterowania, Wydawnictwo Naukowe PWN, Warszawa, 2019.</p> <p>- Domachowski Z., Automatyka i robotyka podstawy, Wydawnictwo PG, Gdańsk, 2003.</p> <p>- Friedland B., Control System Design, McGraw Hill Co., 1986.</p> <p>- Kaczorek T., Podstawy teorii sterowania, Wydawnictwo Naukowe PWN, Warszawa, 2020.</p> <p>- Ogata K., Modern Control Engineering, 4th edition, Prentice-Hall, 2009.</p> <p>- Perycz S., Podstawy automatyki, skrypt dla Instytutu Okrętowego PG, Gdańsk, 1983.</p> <p>- Próchnicki W., Dzida M., Zbiór zadań z podstaw automatyki, skrypt dla studentów Wydziału Oceanotechniki i Okrętownictwa PG, Gdańsk, 1993.</p> <p>- Raven, F. H., Automatic control engineering, McGraw Hill Co., 1986.</p>	

	eResources addresses	Adresy na platformie eNauczenie: Podstawy Automatyki (PG_00060646),zima_2024/2025 - Moodle ID: 41272 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=41272
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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