



## Subject card

Subject name and code	Automation and Robotics, PG_00060459						
Field of study	Mechanical and Naval Engineering						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2025/2026		
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	Part-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 Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Mohammad Ghaemi				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	18.0	9.0	9.0	0.0	0.0	36
	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	36		8.0		81.0	125
Subject objectives	The aim is to get acquainted with the basis of control theory and with the structures and elements of basic automation systems, as well as general information on the design of control systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W06] possesses knowledge on automatics and robotics of mechanical systems		The student possesses knowledge in the field of basic control systems of mechanical control systems, including their operation, characteristics, parameters, and behaviour in both steady-state and transient states.		[SW1] Assessment of factual knowledge		
	[K6_U05] is able to plant an experiment within the range of measuring the basic operating parameters of mechanical devices using a specialized equipment, interpret the results and reach the correct conclusions		The student is able to plan an experiment in the field of identification of basic control systems, using specialized equipment, conduct an interpretation of the results, and draw appropriate conclusions.		[SU4] Assessment of ability to use methods and tools		

Subject contents	1. Introduction and basic concepts		
	2. Classification of control systems		
	3. Modeling of mechanical dynamical systems and description of their elements		
	4. Types of mathematical models of dynamical systems: differential equation, transfer function, block diagram, linearization		
	5. Transition function and time characteristics		
	6. Feedback closed-loop control system		
	7. Analysis of control systems in the plot of time and in the plot of frequency		
	8. Stability of linear control systems		
	9. Controllers		
Prerequisites and co-requisites	Prerequesties:  1. Mathematics  2. Physics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exercises	50.0%	25.0%
	Lecture	50.0%	50.0%
	Laboratory	50.0%	25.0%
Recommended reading	Basic literature	Nise N. S., <a href="#">Control System Engineering</a> , 8th Edition, John Wiley & Sons Inc., 2019.	
	Supplementary literature	- Friedland B., <a href="#">Control System Design</a> , McGraw Hill Co., 1986.  - Ogata K., Modern Control Engineering, 4th edition, Prentice-Hall, 2009.  - Raven, F. H., Automatic control engineering, McGraw Hill Co., 1986.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		