



## 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 Śmierczalski					
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	<p>1. Introduction and basic concepts</p> <p>2. Classification of control systems</p> <p>3. Modeling of dynamic systems and description of elements of automatic control systems</p> <p>4. Types of mathematical models of dynamic systems: differential equation, transmittance, block diagram, linearization</p> <p>5. Transition function and time characteristics</p> <p>6. Feedback</p> <p>7. Analysis of time-domain and frequency-domain control systems</p> <p>8. Stability of linear control systems</p> <p>9. Controllers</p>														
Prerequisites and co-requisites	<p>Pre-requisite subjects:</p> <p>1. Mathematics</p> <p>2. Physics</p>														
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="453 1061 794 1093">Subject passing criteria</th> <th data-bbox="799 1061 1141 1093">Passing threshold</th> <th data-bbox="1145 1061 1492 1093">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 1099 794 1131">Lab. reports</td> <td data-bbox="799 1099 1141 1131">51.0%</td> <td data-bbox="1145 1099 1492 1131">30.0%</td> </tr> <tr> <td data-bbox="453 1137 794 1169">Colloquium for credit from lecture</td> <td data-bbox="799 1137 1141 1169">56.0%</td> <td data-bbox="1145 1137 1492 1169">40.0%</td> </tr> <tr> <td data-bbox="453 1176 794 1218">Colloquium for credit from exercises</td> <td data-bbox="799 1176 1141 1218">51.0%</td> <td data-bbox="1145 1176 1492 1218">30.0%</td> </tr> </tbody> </table>			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%
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Recommended reading	Basic literature	Nise N. S., <a href="#">Control System Engineering</a> , 8th Edition, John Wiley & Sons Inc., 2019.													
	Supplementary literature	<p>- Bubnicki Z., <a href="#">Teoria i algorytmy sterowania</a>, Wydawnictwo Naukowe PWN, Warszawa, 2019.</p> <p>- Domachowski Z., <a href="#">Automatyka i robotyka podstawy</a>, Wydawnictwo PG, Gdańsk, 2003.</p> <p>- Friedland B., <a href="#">Control System Design</a>, McGraw Hill Co., 1986.</p> <p>- Kaczorek T., <a href="#">Podstawy teorii sterowania</a>, Wydawnictwo Naukowe PWN, Warszawa, 2020.</p> <p>- Ogata K., <a href="#">Modern Control Engineering</a>, 4th edition, Prentice-Hall, 2009.</p> <p>- Perycz S., <a href="#">Podstawy automatyki</a>, skrypt dla Instytutu Okrętowego PG, Gdańsk, 1983.</p> <p>- Próchnicki W., Dzida M., <a href="#">Zbiór zadań z podstaw automatyki</a>, skrypt dla studentów Wydziału Oceanotechniki i Okrętownictwa PG, Gdańsk, 1993.</p> <p>- Raven, F. H., <a href="#">Automatic control engineering</a>, McGraw Hill Co., 1986.</p>													

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

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