

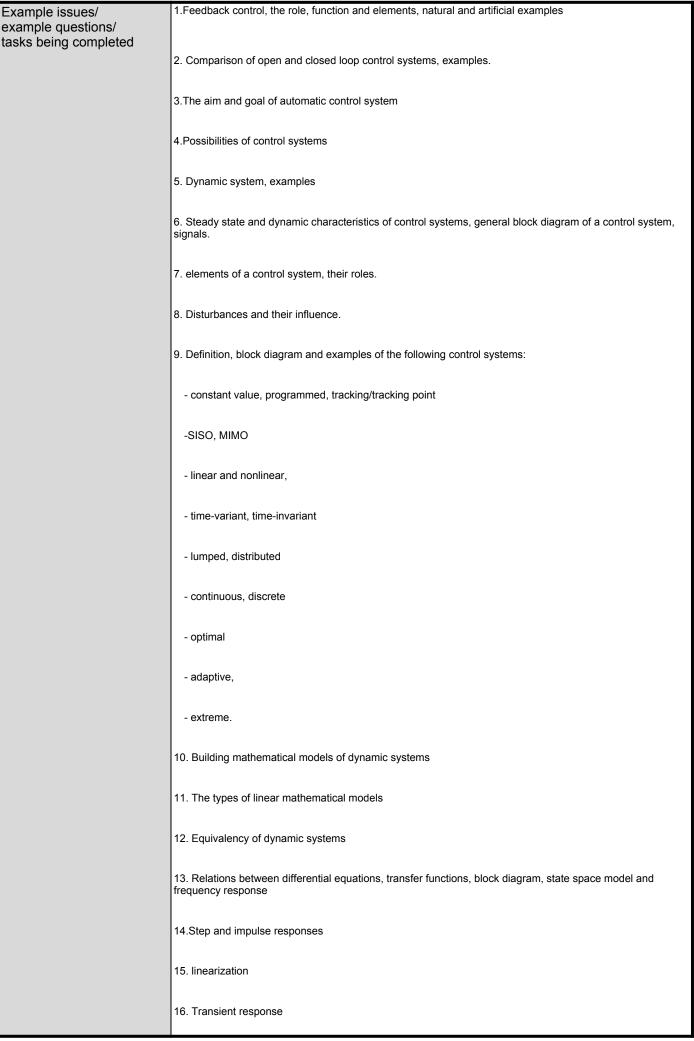
## Subject card

Subject name and code	Fundamentals of Automatics, PG_00042102							
Field of study	Power Engineering, Power Engineering							
Date of commencement of studies	October 2022		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	3		Language of instruction			English		
Semester of study	5		ECTS credits			6.0		
Learning profile	general academic profile		Assessment form			exam		
Conducting unit	Department of Control and Power Engineering -> Faculty of Ocean Engineering and Ship Technology				nology			
Name and surname	Subject supervisor	dr inż. Mohammad Ghaemi						
of lecturer (lecturers)	Teachers							
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
of instruction	Number of study hours	30.0	15.0	30.0	0.0		0.0	75
	E-learning hours inclu	uded: 0.0	•		•		•	
Learning activity and number of study hours	Learning activity	Participation in classes include plan		Participation in consultation hours		Self-study		SUM
	Number of study hours	75		10.0		65.0		150
Subject objectives	Gaining the knowledge about fundamental concepts of control systems and robotics including system modeling and representation, analysis and synthesis, as well as technical solutions. Ability of implementation and application of control systems in industrial and engineering processes and systems.							
Learning outcomes	Course out	come	Subject outcome			Method of verification		
						[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	developmental energy pri technologies, rules for the op selection and operation of heat tec and energy devices and im		He knows the basic concepts and principles of analysis, synthesis, operation and evaluation of simple technical automation systems, important for power engineering systems.			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
Prerequisites	<ol> <li>Introduction and principal definitions</li> <li>Classification of control systems</li> <li>Modelling of dynamic systems and description of elements of control systems</li> <li>Mathematical model presentation: differential equation, transfer function, block diagram, state and observation equations; model transformation</li> <li>Transient function and time characteristics</li> <li>Feedback control</li> <li>Analisis of control systems in time and frequency domains</li> <li>Stability</li> <li>Controllers and principles of their selection and design</li> <li>Quality of control systems</li> <li>Discrete control systems</li> <li>Mathematics</li> </ol>							
and co-requisites	Physics     Technical mechanics							

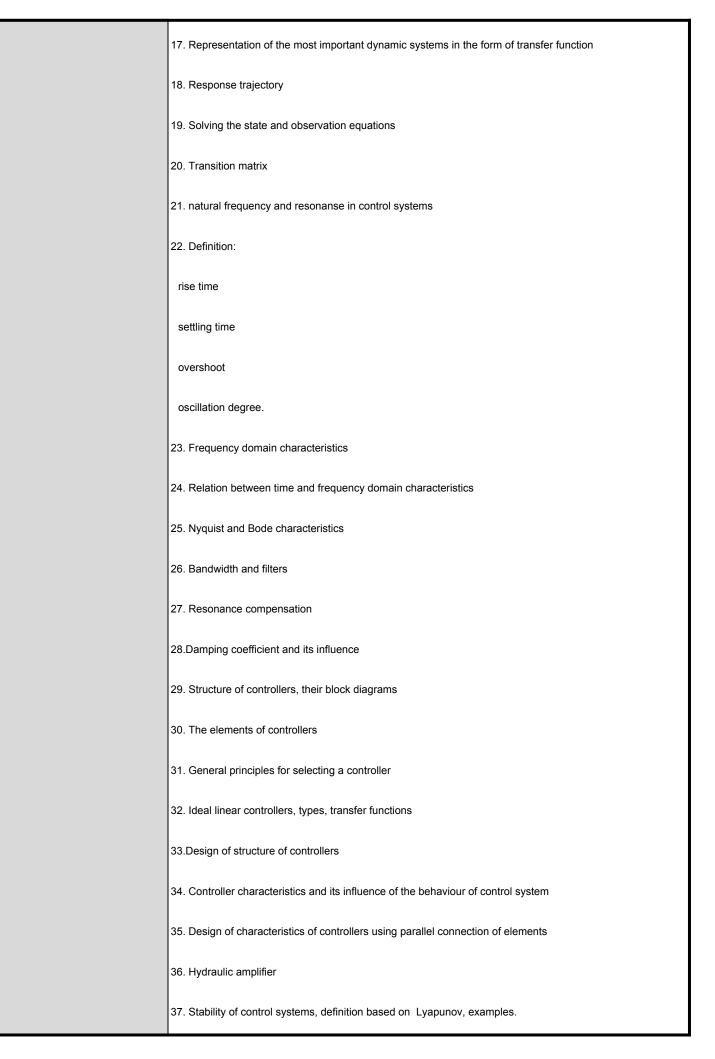
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Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade	
and criteria	Lab.	51.0%	30.0%	
	class tests	51.0%	20.0%	
	Written colloquiums, oral egzamination	56.0%	50.0%	
Recommended reading	Basic literature	1. Domachowski Z., Automatyka i robotyka – podstawy, Wydawnictwo PG, Gdańsk, 2003. 2. Nise N. S., Control system engineering, John Whiley & Sons Inc., 2000. 3. Próchnicki W., Dzida M., Zbiór zadań z podstaw automatyki, skrypt dla studentów Wydziału Oceanotechniki i Okrętownictwa PG, Gdańsk, 1993.		
	Supplementary literature	1. Friedland B., Control System Design, McGraw Hill Co., 1986. 2. Bubnicki Z., Teoria i algorytmy sterowania, Wydawnictwo Naukowe PWN, Warszawa, 2002. 3. Kaczorek T., Teoria sterowania i systemów, Wydawnictwo Naukowe PWN, Warszawa, 1999. 4. Ogata K., Modern Control Engineering, 4th edition, Prentice Hall, 2002. 5. Perycz S., Podstawy automatyki, skrypt dla Instytutu Okrętowego PG, Gdańsk, 1983. 6. Raven, F. H., Automatic control engineering, McGraw Hill Co., 1986.		
	eResources addresses	Adresy na platformie eNauczanie:		

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	38. Stability of control systems
	39. How stability is affected by the conditions
	40. Characteristic equation of a control system
	41.Stability checking based on the roots of characteristic equation
	42. The reason for which we use stability criteria
	43. Routh-Hurwitz stability criterion
	44. Nyquista stability criterion
	45. Stability margins
	46.Steady-state error, way of calculation
	47. Relation between the controller parameters and steady state error
	48. Optimization of control system
	49. Quality of control system
	50 General information about discrete control systems
Work placement	Not applicable

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