

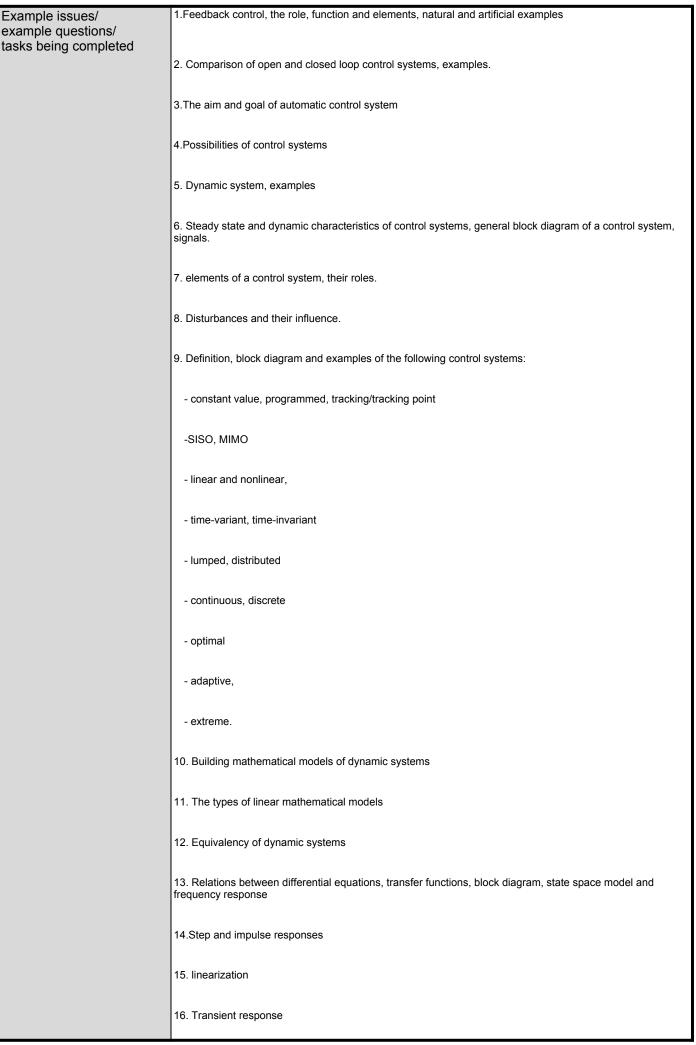
Subject card

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					inology			
Name and surname	· · · · · · · · · · · · · · · · · · ·			inż. Mohammad Ghaemi					
of lecturer (lecturers)	Teachers								
Lesson types and methods	Lesson type	Lecture	Tutorial	Tutorial Laboratory Proje		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			
			including the necessary rules for the selection of related devices			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge			
[K6_W06] knows developmental er technologies, rule selection and ope and energy device installations, basi energy systems of issues regarding energy devices a environmental eff technologies use using renewable		or the control of the control of heat cand crinciples of ration, basic reliability of diagnostics, so fenergy nethods of	principles of ana operation and event technical automatimportant for powers systems. s of pasic tity of stics, ergy s of				[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
Prerequisites	1. Introduction and principal definitions 2. Classification of control systems 3. Modelling of dynamic systems and description of elements of control systems 4. Mathematical model presentation: differential equation, transfer function, block diagram, state and observation equations; model transformation 5. Transient function and time characteristics 6. Feedback control 7. Analisis of control systems in time and frequency domains 8. Stability 9. Controllers and principles of their selection and design 10. Quality of control systems 11. Discrete control systems Preceding subjects: 1. Mathematics								
and co-requisites	Physics Technical mechanics								

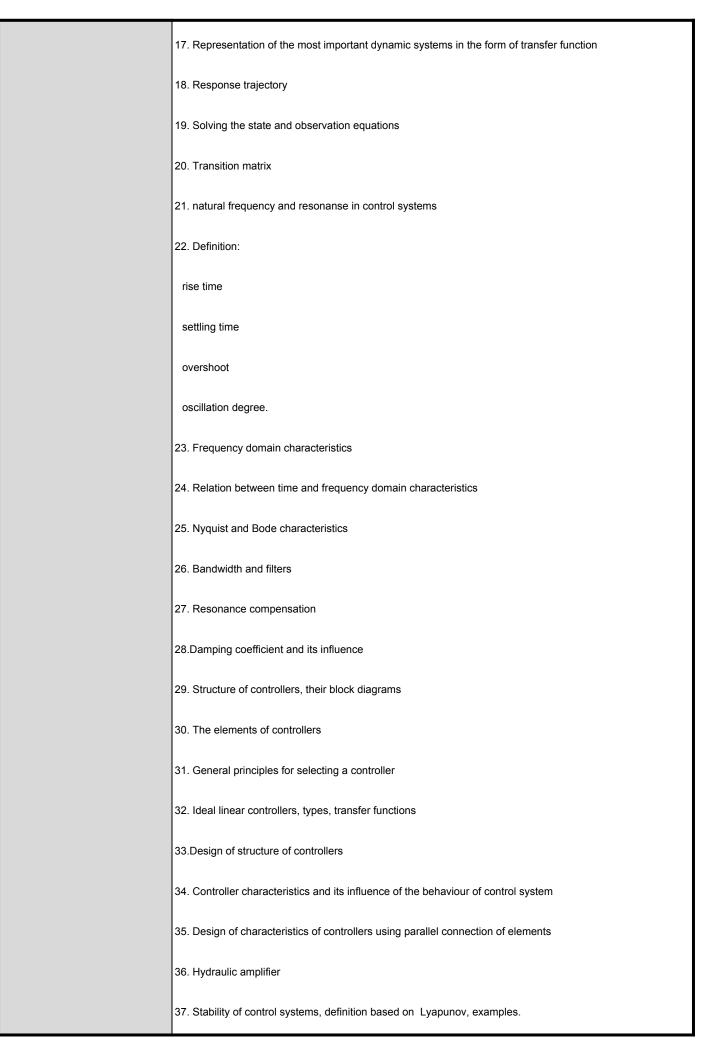
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Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade	
and criteria	Lab.	51.0%	30.0%	
	class tests	51.0%	20.0%	
	Written colloquiums, oral egzamination	56.0%	50.0%	
Recommended reading	Basic literature	1. Domachowski 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, Wydawnictw Naukowe PWN, Warszawa, 2002. 3. Kaczorek T., Teoria sterowania i systemów, Wydawnictw 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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