GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Control theory of transport systems, PG_00056229		
Field of study	Transport and Logistics		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Zakład Wyposażenia Okrętu -> Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Konrad Marszałkowski	
	Teachers	dr inż. Konrad Marszałkowski	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	0.0	30.0	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	5.0	35.0	100

Subject objectives

The aim of the course is to familiarize students with the basic and most important principles of regulation, control and monitoring of energy systems used in transport. The course will also discuss issues related to the measurement techniques of electrical and non-electric quantities.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W08] has knowledge regarding the principles of sustainable development	The student describes the features of sustainable development; can relate them to the design and operation of the transport system.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects
[K6_W04] has a basic knowledge in IT, electronics, automation and control, computer graphics useful to understand the possibilities of their application in transport	The student lists the requirements for controlling ship actuator components and presents the method of automatic regulation of these components. The student explains the role and principles of operation of measuring elements in a ship's power plant. The student presents the role and principles of operation of elements of automatic control systems.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects
[K6_W03] has a basic knowledge on hydromechanics, thermodynamics, machine construction, ecology, materials science and electronics necessary to understand the construction and operation principles of means of marine transport	The student lists the criteria for the selection and scope of ship automation, taking into account the technical, economic and ecological aspects of ship propulsion.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge

Subject contents

1.Automation of ship power plants.2. Dynamics of the ship's propulsion system.3. Logic control, switching systems and relays. Gate logic.4. Programmable controllers and their programming.5. Control of the ship's propulsion system: servomechanisms, control valves.6. Angular speed controllers, remote control of the drive system, control of multi-propulsor and multi-engine drive systems.7. Measuring transducers, types and classification. 8. Position and displacement transducers. Angular velocity transducers.9. Force, pressure and temperature transducers.10. Flow and level transmitters for liquids and gases.11. Control of ship power plant components, regulation of cooling water and lubricant temperature.12. Fuel system adjustment.13. Engine start and stop control.14. Start-up and control of a ship power plant. 15. Protection of the marine environment, the role of hydrogen in maritime transport.

Prerequisites and co-requisites		
Assessment methods and criteria		

Subject passing criteria	Passing threshold	Percentage of the final grade
	100.0%	30.0%
	60.0%	70.0%

Recommended reading	Basic literature	1. Domachowski Z., Ghaemi M. (2007). Okrętowe układy automatyki. Gdańsk. Wydawnictwo Politechniki Gdańskiej. 2. Lisowski J. (1981). Statek jako obiekt sterowania automatycznego. Gdańsk. Wydawnictwo Morskie. 3. Sołdek J. (1985). Automatyzacja statków. Gdańsk. Wydawnictwo Morskie.
	Supplementary literature	1. Wojnowski W.: Okrętowe siłownie spalinowe. Morski Instytut Rybacki. Gdynia 1991. Część II. 2. Zb. Pietrzykowski: Maritime Intelligent Transport Systems. Springer, Berlin, Heidelberg, 2010
	eResources addresses	Adresy na platformie eNauczanie: Teoria sterowania systemów transportowych (PG_00056229), W, S, TiL, ZIMA 24/25 - Moodle ID: 41323 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=41323
Example issues/ example questions/ tasks being completed	1. Regulator, block structure, application2. Methods of measuring linear and angular displacements3. Preparing the marine piston engine for startup4. Servomechanism - principle of operation	
Work placement	Not applicable	

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