



Subject card

Subject name and code	Automatic guidance and control systems of means of transport, PG_00057106						
Field of study	Transport and Logistics						
Date of commencement of studies	February 2022	Academic year of realisation of subject	2022/2023				
Education level	second-cycle studies	Subject group	Optional subject group 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	4.0				
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	prof. dr hab. inż. Wiesław Tarełko					
	Teachers	dr inż. Jakub Kowalski prof. dr hab. inż. Wiesław Tarełko					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	30.0	0.0	45
	E-learning hours included: 0.0						
	Automatyczne systemy naprowadzania i sterowania środkami transportu - Moodle ID: 29965 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29965						
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	45	10.0	45.0	100		
Subject objectives	The main objectives of the course: - providing students with basic knowledge about modern automation, guidance, navigation and control systems of transport systems - preparing students to design a selected system of automation, guidance, navigation or control of transport systems						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W04] The student has basic knowledge of IT and telecommunication systems in transport and in the area of control in transport systems	The student enumerates the basic components of the automation, guidance, navigation and control system of transport systems. The student presents the general characteristics of the selected transport system, lists its basic components and the tasks they perform.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K7_W09] The student has a structured and expanded knowledge of the design and operation of systems and infrastructure as well as new technologies in multimodal transport	The student presents examples of applications of sensors and actuators in automation, guidance and control systems used in transport systems. The student describes the principle of operation of individual components constituting the structure of the system of automation, guidance and control of transport systems. The student presents the definition of the guidance and control system of transport systems, as well as presents their classification according to selected criteria.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K7_W01] The student has an extended and deepened knowledge of some areas of mathematics, used to formulate, solve and verify complex problems in transport	The student has knowledge in the field of triangulation and trilateration used to determine the position of the transport unit in space The student has knowledge in the field of electro-magnetic wave theory as well as mechanical waves, enabling the determination of the bearing to the transport unit as well as the distance from reference points	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K7_U03] The student is able to make a detailed analysis of the results obtained, and to develop them in the form of a technical report or presentation, also in English	The student draws a basic block diagram of the automation, guidance or control system of the transport system The student selects the components ensuring the implementation of the given function of the automation, guidance or control system of the transport system The student designs the guidance or control system of the transport system	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools

Subject contents	<p>Automation of transport systems (control system vs. automation; automation vs. autonomization; levels of automation in transportation; what is an automated transport system?)</p> <p>'Intelligence' of transport units - Intelligent Transport Systems</p> <p>Selected examples of automation of transport units</p> <p>Guidance system and its components</p> <p>GPS - satellite navigation system</p> <p>INS - inertial navigation system</p> <p>INS/GPS/LIDAR navigation system</p> <p>Distance measurement by means of electromagnetic and sound waves</p> <p>Bearing measurement using mechatronic gyroscopic systems</p> <p>Navigation of unmanned transport units</p> <p>Artificial intelligence methods in transport navigation</p>											
Prerequisites and co-requisites												
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Example issues/ example questions/ tasks being completed	Przykład pytań: Na czym polega ich zasada działania INS?; Wymień i omów podstawowe elementy systemu naprowadzania statku kontenerowego w porcie; Elementy inteligencji statku autonomicznego.
Work placement	Not applicable