



Subject card

Subject name and code	Automation of Ocean Engineering Systems and Devices, PG_00045075						
Field of study	Ocean Engineering, Ocean Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
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			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Faculty of Ocean Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Konrad Marszałkowski					
	Teachers	dr inż. Konrad Marszałkowski mgr inż. Damian Jakowski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	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	45	4.0		31.0		80
Subject objectives	The aim of the course is to develop students' skills and knowledge in respect to basic information about the functions, methods and principles of operation of systems, subsystems and automation devices used on merchant ships.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U05] can formulate a simple engineering task and its specification within the range of design, construction and operation of ocean technology objects and systems	The student is able to formulate a simple engineering task and its specification in the field of design, production, and operation of systems and devices used in ship automation systems, especially for power plants.			[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W05] has an organized knowledge on design, construction and operation of ocean technology objects and systems	The student has an organized knowledge of the design, construction, and operation of systems and devices used in ship automation systems, especially in the field of power plants.			[SW1] Assessment of factual knowledge		
	[K6_W04] has a basic knowledge in IT, electronics, automation and control, computer graphics useful to understand the possibilities of their application in ocean technology	The student has basic knowledge in the field of automation and control to understand the possibilities of their application on ships.			[SW1] Assessment of factual knowledge		

Subject contents	<p>1- Introduction</p> <ul style="list-style-type: none"> - Economy of automation of ship power plant, - Automation of ship power plant based on the Classification Society Rules, - Software, - Current trends in automation of ship systems. <p>2. Logic control</p> <ul style="list-style-type: none"> - Relays and transmitters, on/off systems, - Boolean algebra, logic gates, ladder diagram, - The elements of logic control systems, <p>3. Dynamics of ship propulsion system</p> <p>4. Ship propulsion system control</p> <ul style="list-style-type: none"> - Servomechanisms and servomotors, their static and dynamic characteristics, - Control valves, valve control systems, - Governors, - Remote control of ship propulsion system, - Control systems of multi-engine and/or multi-screw propulsion systems. <p>5. Measuring elements, sensors, transducers and transformers</p> <ul style="list-style-type: none"> - Types and classification, - Characteristics of measuring elements, - Sensors and transformers for linear and angular displacements measuring, - Sensors and transformers for angular velocity measuring, - Sensors and transformers for load and force measuring, - Sensors and transformers for pressure measuring, - Sensors and transformers for temperature measuring, - Sensors and transformers for flow rate measuring, - Sensors and transformers for liquid-level measuring. <p>6. Control of subsystems of ship propulsion plant</p> <ul style="list-style-type: none"> - Control of scavenging air parameters, - Control of jacket cooling water parameters, - Control of lubricating oil parameters, - Control of fuel system, - Control of start/stop processes of diesel engine, - Control of reverse system, - Safety, alarm and signalization systems. <p>7. Control system of gen-sets</p>								
Prerequisites and co-requisites	<p>Preceding subjects:</p> <ol style="list-style-type: none"> 1. Ship power plants, 2. Principles of control systems, 3. Principles of ship automation. 								
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Subject passing criteria</th> <th style="width: 33%;">Passing threshold</th> <th style="width: 33%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>1 colloquium</td> <td>56.0%</td> <td>100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	1 colloquium	56.0%	100.0%
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Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Hugh J., Integration and Automation of Manufacturing Systems (Robots, PLC, CNC), 2001. 2. Lisowski J., Statek jako obiekt sterowania automatycznego, Wydaw. Morskie, Gdańsk, 1981. 3. Shell R. L., Hall E. L., Handbook of Industrial Automation, ed., University of Cincinnati, Ohio, Marcel Dekker Inc., New York, 2000. 4. Soldek J., Automatykacja statków, Wyd. Morskie, Gdańsk, 1985. 							
	Supplementary literature	<ol style="list-style-type: none"> 1. Domachowski Z., Ghaemi M. H., Okrętowe układy automatyki, Wydawnictwo Politechniki Gdańskiej, 2007. 2. Gajek J., Układy sterowania okrętowych śrub nastawnych produkcji krajowej. Zeszyt Naukowy PG nr 56, 1991. 3. McCloy D., Harris M., Robotics, an Introduction, Open University Press Robotics Series, ed. By P. G. Davey, 1986. 4. Puchaczewski Z., Próchniaki W., Sopiński M., Model matematyczny dynamiki regulacji dwusilnikowego zespołu napędowego statku, Zeszyt Naukowy PG, nr 54, Gdańsk, 1989. 							

	eResources addresses	Adresy na platformie eNauczenie: Automatyzacja systemów i urządzeń oceanotechnicznych, W, OCE, sem 05, zimowy 22/23 - Moodle ID: 26088 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=26088
Example issues/ example questions/ tasks being completed	.	
Work placement	Not applicable	