



## Subject card

Subject name and code	Hydraulics and Pneumatics, PG_00060560						
Field of study	Naval Architecture and Offshore Structures						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2025/2026		
Education level	first-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	4	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Daniel Piątek					
	Teachers	dr inż. Daniel Piątek					
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	15.0	0.0	0.0	60
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 5036 Hydraulika i pneumatyka, PG_00060560 (kurs zespolony W + L + C) OikM sem 4 (letni) 2025/26 <a href="https://enauczanie.pg.edu.pl/2025/course/view.php?id=5036">https://enauczanie.pg.edu.pl/2025/course/view.php?id=5036</a>						
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	6.0		59.0		125
Subject objectives	Learning the principles and functioning of fluid drives of machines, widely used in the drive and control of ship and ocean engineering equipment						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W05] has an organized knowledge on design, construction and operation of ocean technology objects and systems	the student knows the principles of operation of marine fluid drives: pneumatic and hydraulic			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K6_U03] can use computer-aided design, production and operation tools for ocean technology objects and systems	The student uses typical engineering software: spreadsheets, CAD systems, etc. to design drive systems			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	[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 perform calculations of typical drive systems and select their components			[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	Course content – lecture Basic properties of fluid drive and control, rotating and displacement machines; working fluids; viscous fluid flows; drive and control elements; hydrostatic transmission; classification and graphic symbols of hydraulic system elements; pressure and flow rate control valves; hydraulic pumps and motors used in hydrostatic drives; throttling control of hydraulic motor speed in individual and group systems.		
	Course content – exercises Selecting the optimal system structure - drawing hydraulic diagrams. Calculation of the main hydraulic system components: pump and hydraulic motor. Selection of hydraulic system control components: valves and distributors. Using hydraulics manufacturer catalogs.		
	Course content – laboratory Testing the flow and energy characteristics of the basic elements of the hydraulic system: line pipe, relief valve, throttle valve, hydraulic pump.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory - report	60.0%	25.0%
	lecture - test	60.0%	50.0%
	exercises - test	60.0%	25.0%
Recommended reading	Basic literature	1. Stryczek St.: Napęd hydrostatyczny, tom I Elementy, WNT W - wa. 2003  2. Stryczek St.: Napęd hydrostatyczny, tom II Układy, WNT W - wa. 2003  3. Szejnach, W: Napęd i sterowanie pneumatyczne. PWN, W-wa, 2022  4. Szydelski Zb.: Napęd i sterowanie hydrauliczne, WKŁ WNT W - wa. 1999	
	Supplementary literature	1. Pizoń A.: Elektrohydrauliczne analogowe i cyfrowe układy automatyki, WNT WNT W - wa. 1995  2. Garbacik A.: Studium projektowania układów hydraulicznych, Ossolineum, Wrocław, W - wa. Kraków, 1997  3. Palczak E.: Dynamika elementów i układów hydraulicznych, Ossolineum, Wrocław, W - wa. Kraków, 1997  4. Paszota Z.: Aspects énergétiques des transmissions hydrostatiques, W.P.G. Gdańsk 2002.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>- Required fluid system structure (pneumatic or hydraulic);</li> <li>- Types and types of hydraulic systems;</li> <li>- Main applications of hydraulics and pneumatics in ocean engineering;</li> </ul> <ul style="list-style-type: none"> <li>- Perform calculations and select a pump and hydraulic motor for the receiver p with parameters M [Nm] and n [rpm] from the catalog;</li> <li>- For the specified hydraulic pump/motor assembly with parameters Q [dm<sup>3</sup>/min] and p [MPa], select a relief valve and control valve (0/1 and throttle) from the catalog;</li> </ul>		
Practical activities within the subject	Not applicable		

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