



## Subject card

Subject name and code	Hydraulics and Pneumatics, PG_00055392						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2023	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	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Mechanics and Mechatronics -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Paweł Śliwiński				
	Teachers		dr hab. inż. Paweł Śliwiński				
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		3.0		27.0	75
Subject objectives	Knowledge of physical phenomena, principles of design and operation of hydraulic and pneumatic drive and control systems						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W08] possesses knowledge including the methodology of designing machine parts, mechanical devices, selection of construction materials, manufacturing and operation, with the lifetime cycle		Student has knowledge of the design of basic hydraulic and pneumatic systems.		[SW1] Assessment of factual knowledge		
	[K6_U07] is able to design a typical construction of a mechanical device, component or a testing station using appropriate methods and tools, adhering to the set usage criteria		Student is able to design and analyse basic hydraulic and pneumatic systems.		[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
Subject contents	LECTURE:  Structure of hydraulic and pneumatic drive and control. Properties of hydraulic fluids and air. Pressure losses and their calculation. Flow through clearances. Basic elements of hydraulic and pneumatic systems: pumps, motors, cylinders, valves, filters, compressed air units. Basic calculations of hydraulic and pneumatic drive systems.  LABORATORY:  Practical knowledge of structure and operation of hydraulic and pneumatic components. Assembly of basic units.						

Prerequisites and co-requisites	Physics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test after lecture	56.0%	66.0%
	laboratory	56.0%	34.0%
Recommended reading	Basic literature	1. Osiecki A.: Hydrostatyczny napęd maszyn. WNT, Warszawa 1998 2. Szejnach W.: Napęd i sterowanie pneumatyczne. WNT, Warszawa 1997 3. Balawender A. et al: Laboratorium napędów hydraulicznych. Część 1. Podstawy hydrauliki. Gdańsk 1996 4. Niegoda J., Pomierski W.: Sterowanie pneumatyczne. Ćwiczenia laboratoryjne. Skrypt PG, Gdańsk 1998	
	Supplementary literature	1. Dindorf R.: Napędy płynowe. Podstawy teoretyczne i metody obliczania napędów hydraulicznych i pneumatycznych. Wydawnictwo Politechniki Świętokrzyskiej. Kielce 2009	
	eResources addresses	Adresy na platformie eNauczanie: Hydraulika i pneumatyka, PG_00055392, MiBM, sem. 4, 2025 - Moodle ID: 44385 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44385">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44385</a>	
Example issues/ example questions/ tasks being completed	1. Influence of fluid parameters on flow phenomena in pipes and throttling elements. 2. Influence of pipe and throttling element parameters (elbow, valve, etc.) on pressure drop. 3. Is pressure drop in a pipe or any installation element desirable or not and why? 4. Throttling motor speed control. What does motor speed depend on? Pump operating pressure and pressure in motor connections. 5. Volumetric motor speed control. What does motor speed depend on? Pump operating pressure and pressure in motor connections. 6. Draw a pneumatic system with two actuators A and B, where actuator A is single-acting and B is double-acting. Both actuators start moving simultaneously when the START button is pressed and both return simultaneously when both reach the extreme extended position.		
Work placement	Not applicable		

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