



Subject card

Subject name and code	Hydraulics and pneumatics, PG_00055062						
Field of study	Management and Production Engineering						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2027/2028		
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	Division of Machine Design and Medical Engineering -> Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Paweł Śliwiński					
	Teachers						
Lesson types	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	26.0	75		
Subject objectives	Acquainting with physical phenomena, the basics of design and operation of hydraulic and pneumatic drive and control systems						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W04] has basic knowledge in the field of automation, robotics and control of production processes, has elementary knowledge of electrical and electronic applications in the production system, has basic knowledge of thermodynamics and fluid mechanics as well as the selection and design of hydraulic and pneumatic systems	Student has knowledge of the design of basic hydraulic and pneumatic systems.			[SW1] Assessment of factual knowledge		
	[K6_K01] feels the need for self-realization by learning throughout life, is looking for modern and innovative solutions in their actions, is able to think creatively and act in an entrepreneurial way	Student is able to creatively seek methods of solving a technical problem in the area of construction of basic hydraulic and pneumatic systems.			[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work		
[K6_U02] has the ability of self-learning and expanding knowledge in a specialized field of engineering production	Student is able to independently educate himself/herself in the field of hydraulic and pneumatic systems.			[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information			

Subject contents	<p>Course content – lecture LECTURE: Structure of hydraulic and pneumatic drive and control. Properties of working fluid and air pressure losses in the institution and their calculation. Flows through the slots. Basic elements and hydrostatic and pneumatic systems of machines: pumps, motors, actuators, valves, filters, accumulators, compressed air units. Special electrohydraulic and electropneumatic machine automation systems. TUTORIALS: Basic calculations of hydraulic and pneumatic drive systems. LABORATORIES: Practical familiarization with the structure and operation of hydraulic and pneumatic elements as well as self-assembly of basic systems.</p>		
Prerequisites and co-requisites	Physics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture pass	56.0%	66.0%
	Laboratory pass	56.0%	34.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Osiecki A.: Hydrostatyczny napęd maszyn. WNT, Warszawa 1998 2. Szejnach W.: Napęd i sterowanie pneumatyczne. WNT, Warszawa 1997 3. Baławender A. i inni: Laboratorium napędów hydraulicznych. Część 1. Podstawy hydrauliki. Gdańsk 1996 4. Niegoda J., Pomierski W.: Sterowanie pneumatyczne. Ćwiczenia laboratoryjne. Skrypt PG, Gdańsk 1998 	
	Supplementary literature	Dindorf R.: Napędy płynowe. Podstawy teoretyczne i metody obliczania napędów hydraulicznych i pneumatycznych. Wydawnictwo Politechniki Świętokrzyskiej. Kielce 2009	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 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. 		
Practical activities within the subject	Not applicable		

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