GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Hydraulics and Pneumatics, PG_00040191		
Field of study	Hydraulics and Pneumatics		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
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	3	Language of instruction	Polish none
Semester of study	5	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Division of Fluid-Flow Machinery -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Jerzy Głuch	
	Teachers	dr inż. Stanisław Głuch prof. dr hab. inż. Jerzy Głuch	

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	9.0	46.0	100

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_W08	The student is able to design a hydraulic machine	[SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym
K6_U07	The student is able to design a hydraulic system	[SU4] Ocena umiejętności korzystania z metod i narzędzi [SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu

Subject contents

LECTURE:Structure of hydraulic and pneumatic drive and control. Properties of working fluid and air. System pressure losses 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. 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.

Prerequisites and co-requisites

Physics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory reports	100.0%	50.0%
lecture test	60.0%	50.0%

Recommended reading

Basic literature	J.A. Sullivan. Fluid Power Theory and Application. J.E. Johnson. Hydraulics for Engineering Technology A. Esposito. Fluid Power with Applications
Supplementary literature	R. Dindorf, P. Woś. Development of Hydraulic Power Systems
eResources addresses	

Example issues/ example questions/ tasks being completed	1. Influence of liquid parameters on flow phenomena in pipes and throttling elements. 2. Influence of the parameters of the pipe and throttling element (elbow, valve, etc.) on the pressure drop. 3. Is the pressure drop in the pipe or any part of the system desirable or not and why? 4. Describe the flow through a flat slit, basic relationships5. Engine speed control using a throttle valve. What does engine speed depend on? Pump operating pressure and motor port pressure. 6. Motor speed control by changing the pump and/or motor displacement setpoint. What does engine speed depend on? Pump operating pressure and motor port pressure. 7. Draw a pneumatic system with two cylinders A and B, where cylinder A is single-acting and B is double-acting. Both actuators start moving simultaneously after pressing the START button and both return simultaneously when they both take the extreme extended position.
Practical activites within the subject	Not applicable

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