GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Hydraulics and pneumatics, PG_00055062		
Field of study	Management and Production Engineering		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2022/2023
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	Zakład Hydrauliki i Pneumatyki -> Institute of Mechanics and Machine Design -> 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	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	Knows the basics of hydrostatic and pneumatic drives	[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	Knows the basics of hydrostatic and pneumatic drives	[SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work
[K6_U02] has the ability of self-learning and expanding knowledge in a specialized field of engineering production	Knows the basics of hydrostatic and pneumatic drives	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools

Subject contents	LECTURE: Hydraulic and pneumatic drive and control structure. Properties of liquids and air. Pressure losses in the installation and their calculation. Flows in cracks. Basic hydraulic and pneumatic elements: pumps, motors, actuators, valves, filters, accumulators, compressed air units. Basic hydrostatic and pneumatic systems. LABORATORIES: Practical familiarization with the construction and operation of hydraulic and pneumatic elements, self-assembly of basic systems, experimental determination of the characteristics of hydraulic elements.
Prerequisites and co-requisites	Physics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory pass	56.0%	35.0%
exam	56.0%	65.0%

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. 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	1. Dindorf R.: Napędy płynowe. Podstawy teoretyczne i metody obliczania napędów hydraulicznych i pneumatycznych.Wydawnictwo Politechniki Świętokrzyskiej. Kielce 2009 2. Stryczek S.: Napęd hydrostatyczny. PWN, Warszawa 2016
eResources addresses	Adresy na platformie eNauczanie: Hydraulika i pneumatyka, ZiIP, sem. 4, PG_00055062 - Moodle ID: 29409 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29409

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 relationships 5. Throttle speed control of the hydraulic motor. What does engine speed depend on? Pump operating pressure and motor port pressure. 6. Volumetric speed control of the hydraulic motor. 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.
Work placement	Not applicable