GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Basis of drives and hydraulic control systems, PG_00050152		
Field of study	Mechanical Engineering		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Załuski	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	30

E-learning hours included: 0.0

Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17817

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	30	8.0	62.0	100

Subject objectives

The aim of the course is to present the students with the construction and principle of operation of hydraulic systems used in industry and working machines.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U05] is able to plant an experiment within the range of measuring the basic operating parameters of mechanical devices using a specialized equipment, interpret the results and reach the correct conclusions	The student is able to build a measuring station and make basic measurements of pressures, flow rates and temperatures for pumps, hydraulic motors and valves. He/she can determine the characteristics of valves, pumps and motors.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information
[K6_W06] possesses elementary knowledge on automatics and robotics of mechanical systems	The student has an elementary knowledge of modern electrohydraulic systems with proportional and servo control.	[SW1] Assessment of factual knowledge
[K6_W08] possesses basic knowledge including the methodology of designing machine parts, mechanical devices, selection of construction materials, manufacturing and operation, with the lifetime cycle	The student, on the basis of the acquired knowledge, is able to design a schematic diagram of a hydraulic system of medium complexity, complying with the specified design requirements.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects

<table>
<tr><td>Subject contents</td><td>1. Basic knowledge of hydraulic systems 2. Functional principles and characteristics of throttling valves, bypass valves, reduction valves and flow regulators3. Working fluid contaminations. Possible locations of filters in hydraulic systems4. Pump construction used in hydrostatic drives. Pump selection for the system5. Throttle and volumetric systems6. Variable displacement pumps with constant pressure, constant flow and constant power controllers7. Principle of operation of load sensing systems8. Systems with a flow divider9. Validity of the use of counterbalance valves, controlled check valves and non-return throttling valves in systems with actuators10. Construction of hydraulic power units11. Accumulators in hydraulic systems .12. Systems with multiple consumers 13. Pump characteristics determination. Diagram, measured parameters, sample characteristics14. The most frequent failures in hydraulic systems. Ways of detection (on the basis of the description and diagram) 15. Hydraulic fittings. Fittings, connectors, fittings of flexible pipes. Seals16. Analysis of diagrams</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of basic mechanics, mechanical engineering and fluid mechanics</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>tests</td><td>56.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>• Osiecki A.: Hydrostatyczny napęd maszyn
• Stryczek S.: Napęd hydrostatyczny. Tom I elementy, Tom II układy</td></tr><tr><td>Supplementary literature</td><td>• Company catalogues: Bosch Rexroth, Hawe, Parker, Ponar Wadowice
• Vademecum Hydrauliki Rexroth
• Sobczyk P.,Hydraulika siłowa. Zbiór zadań z rozwiązaniami</td></tr><tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>• Determining the efficiency of a positive displacement pump
• Load sensing system operating principle
• Hydraulic diagram analysis</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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