GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Design of hydraulic systems, PG_00064928		
Field of study	Mechanical Engineering		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2027/2028
Education level	second-cycle studies	Subject group	Specialty 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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Mechanics and Mechatronics -> 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	9.0	0.0	9.0	9.0	0.0	27

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	27	5.0	43.0	75

Subject objectives

The study of hydraulic systems design

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U11] communicates and justifies opinions on specialized topics in a manner understandable to diverse audiences, including the use of modern techniques, including information technology	The student is able to communicate and justify opinions on hydrostatic drive systems and their design in a way that is understandable to a diverse audience, also using modern design techniques, including IT.	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K7_W02] demonstrates a structured and theoretically grounded knowledge of the key topics in Mechanical Engineering enabling the analysis and modelling of mechanical systems, processes and devices	The student demonstrates structured and theoretically based knowledge covering key issues in the field of hydraulic system design, enabling the analysis and design of hydrostatic systems, processes and drives.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K7_W04] demonstrates knowledge covering selected topics of advanced specific knowledge, in particular methods, techniques, tools specific to Mechanics and Mechanical Engineering processes, systems and equipment	The student demonstrates knowledge covering selected issues in the field of advanced detailed knowledge, in particular in the field of methods, techniques, tools appropriate to processes, systems and devices in the field of designing hydrostatic drive systems for machines.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Course content – lecture
1. Energy efficiency of the system. Thermal calculations. Selection of the tank. Selection of the cooler.
2. Design of power pack. Development of the technical documentation of the project.
3. Circuits with power recuperation.
4. Hydraulic accumulators and their selection for the hydraulic system.
5. Proportional valves and their selection for the hydraulic system.
6. Servovalve and its selection for the hydraulic system.
7. Load Sensing systems.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of the basics of hydraulics from the first cycle studies.</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>Practical exercise</td><td>56.0%</td><td>20.0%</td></tr>
<tr><td>Written exam</td><td>56.0%</td><td>60.0%</td></tr>
<tr><td>Project</td><td>56.0%</td><td>20.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. A. Osiecki, Hydrostatic drive of machines, WNT, Warszawa 1998. 2. Z. Szydelski, Drive and hydraulic control, WKŁ Warszawa 1999. 3. S. Stryczek, Hydrostatic drive, PWN Warszawa 1990. 4. P. Sobczyk, Hydraulics and pneumatics. Collection of tasks with solutions. PWN 2021.</td></tr>
<tr><td>Supplementary literature</td><td>Hydraulics and pneumatics - science and technic monthly magazine. Pneumatics - science and technic monthly magazine.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>The heat balance of the system. Systems with proportional valves. Systems with servo valves.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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