



## Subject card

Subject name and code	Design of hydraulic systems, PG_00064928						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2025	Academic year of realisation of subject			2025/2026		
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						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Paweł Śliwiński				
	Teachers						
Lesson types and methods of instruction	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		

Subject contents	<p>1. Energy efficiency of the system. Thermal calculations. Selection of the tank. Selection of the cooler.</p> <p>2. Design of power pack. Development of the technical documentation of the project.</p> <p>3. Circuits with power recuperation.</p> <p>4. Hydraulic accumulators and their selection for the hydraulic system.</p> <p>5. Proportional valves and their selection for the hydraulic system.</p> <p>6. Servovalve and its selection for the hydraulic system.</p> <p>7. Load Sensing systems.</p>														
Prerequisites and co-requisites	Knowledge of the basics of hydraulics from the first cycle studies.														
Assessment methods and criteria	<table border="1" data-bbox="451 707 1487 837"> <thead> <tr> <th data-bbox="451 707 794 734">Subject passing criteria</th> <th data-bbox="794 707 1142 734">Passing threshold</th> <th data-bbox="1142 707 1487 734">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 734 794 768">Practical exercise</td> <td data-bbox="794 734 1142 768">56.0%</td> <td data-bbox="1142 734 1487 768">20.0%</td> </tr> <tr> <td data-bbox="451 768 794 801">Written exam</td> <td data-bbox="794 768 1142 801">56.0%</td> <td data-bbox="1142 768 1487 801">60.0%</td> </tr> <tr> <td data-bbox="451 801 794 837">Project</td> <td data-bbox="794 801 1142 837">56.0%</td> <td data-bbox="1142 801 1487 837">20.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Practical exercise	56.0%	20.0%	Written exam	56.0%	60.0%	Project	56.0%	20.0%
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Written exam	56.0%	60.0%													
Project	56.0%	20.0%													
Recommended reading	Basic literature	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.													
	Supplementary literature	Hydraulics and pneumatics - science and technic monthly magazine. Pneumatics - science and technic monthly magazine.													
	eResources addresses	Adresy na platformie eNauczanie:													
Example issues/ example questions/ tasks being completed	The heat balance of the system. Systems with proportional valves. Systems with servo valves.														
Work placement	Not applicable														

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