



## Subject card

Subject name and code	Design of hydraulic systems, PG_00064833						
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	Full-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	15.0	0.0	15.0	15.0	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		5.0		25.0	75
Subject objectives	The study of hydraulic systems design						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[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 of machines.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[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.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[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.		[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task		

Subject contents	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.		
Prerequisites and co-requisites	Knowledge of the basics of hydraulics from the first cycle studies.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	56.0%	20.0%
	Written exam	56.0%	60.0%
	Practical exercise	56.0%	20.0%
Recommended reading	Basic literature	1. A. Osiecki, Hydrostatic drive of machines, WNT, Warszawa 1998. 2. Z. Szydeliski, 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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