



Subject card

Subject name and code	Modelling of hydraulic systems, PG_00057402						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group			Optional 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		6.0		24.0	75
Subject objectives	The study of hydraulic systems design						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K7_U05] is able to plan and conduct the experimental research determining the parameters of a device or system, assesses the usability and correctly selects methods and tools, is able to interpret the results and estimate the measurement errors and is able to apply computer systems to simulate the operation of a machine or technology					[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task	
	[K7_W05] possesses profound knowledge on the operation of complex systems and mechanical devices, including process equipment					[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects	
	[K7_W08] possesses widened knowledge within the range of design methods of hydraulic systems, heating and fluid-flow machines and transport devices					[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects	

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"> <thead> <tr> <th data-bbox="453 710 794 741">Subject passing criteria</th> <th data-bbox="799 710 1141 741">Passing threshold</th> <th data-bbox="1145 710 1492 741">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 748 794 779">Written exam</td> <td data-bbox="799 748 1141 779">56.0%</td> <td data-bbox="1145 748 1492 779">60.0%</td> </tr> <tr> <td data-bbox="453 786 794 817">Practical exercise</td> <td data-bbox="799 786 1141 817">56.0%</td> <td data-bbox="1145 786 1492 817">20.0%</td> </tr> <tr> <td data-bbox="453 824 794 855">Project</td> <td data-bbox="799 824 1141 855">56.0%</td> <td data-bbox="1145 824 1492 855">20.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Written exam	56.0%	60.0%	Practical exercise	56.0%	20.0%	Project	56.0%	20.0%
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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														