



Subject card

Subject name and code	Modelling of hydraulic systems, PG_00057464						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2022	Academic year of realisation of subject				2022/2023	
Education level	second-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	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		dr hab. inż. Paweł Śliwiński dr inż. Marcin Bąk				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	10.0	10.0	0.0	30
	E-learning hours included: 0.0						
Modelowanie układów hydraulicznych - niestacjonarne - Moodle ID: 24538 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=24538							
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		6.0		39.0	75
Subject objectives	Learning about modeling of hydraulic systems						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[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_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 [SU5] Assessment of ability to present the results of task	
[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 hydraulic system.</p> <p>2. Circuits with power recuperation.</p> <p>3. Proportional valves and their selection for the hydraulic system.</p> <p>4. Servovalve and its selection for the hydraulic system.</p> <p>5. Load Sensing systems.</p>		
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
	Laboratory exercise and project	56.0%	25.0%
	Written exam	56.0%	75.0%
Recommended reading	Basic literature	<p>1. A. Osiecki, Hydrostatic drive of machines, WNT, Warszawa 1998.</p> <p>2. Z. Szydelski, Drive and hydraulic control, WKŁ Warszawa 1999.</p> <p>3. S. Stryczek, Hydrostatic drive, PWN Warszawa 1990.</p> <p>4. A. Pizoń, Hydrauliczne i elektrohydrauliczne układy sterowania i regulacji. WNT, W-wa 1987.</p> <p>5. H. Exner, R. Freitag, H. Geis, R. Lang, J. Oppolzer, P. Schwab, E. Sumpf, U. Ostendorff, M. Reik. Vademecum hydrauliki - Tom 1. Hydraulika. Podstawy, elementy konstrukcyjne i podzespoły. Rexroth Bosch Group</p> <p>6. H. Dorr, R. Ewald, J. Hutter, D. Kretz, F. Liedhegener, M. Reik, A. Schmitt. Vademecum hydrauliki - Tom 2. Technika hydraulicznego sterowania zaworami proporcjonalnymi i serwozaworami. Rexroth Bosch Group</p> <p>7. P. Drexler, H. Faatz, F. Feicht, H. Geis, Morlok, E. Wiesmann; A. Krielen, N. Achten, M. Reik. Vademecum hydrauliki - Tom 3. Projektowanie i konstruowanie układów hydraulicznych. Rexroth Bosch Group</p>	
	Supplementary literature	<p>1. Hydraulics and pneumatics - science and technic monthly magazine.</p> <p>2. Napędy i Sterowanie - science and technic monthly magazine.</p>	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>The heat balance of the system.</p> <p>Systems with power recuperation.</p> <p>Systems with proportional valves.</p> <p>Systems with servo valves.</p>		
Work placement	Not applicable		