GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Automobiles hydrotronics, PG_00005422						
Field of study	Mechatronics, Mechatronics						
Date of commencement of studies	October 2020		Academic year of realisation of subject	2022/2023			
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery	at the university			
Year of study	3		Language of instruction	Polish			
Semester of study	6		ECTS credits	2.0			
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 inż. Paweł Załuski					
	Teachers	dr inż. Paweł Załuski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=11602						
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	0.0	0.0	30		
Subject objectives	The aim of the course is to acquaint students with the application of hydraulic and electro-hydraulic drive and control systems and programmable systems in car construction, especially steering, braking and suspension systems.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U05	The student is able to make calculations and solve design tasks related to mechatronic equipment in the field of steering, braking and suspension systems used in automobiles.	[SU3] Assessment of ability to use knowledge gained from the subject
K6_W10	The student has knowledge of hydraulic drive and control in the construction of cars. The student explains the use of hydraulic assistance in steering gears with kinematic, hydraulic and electric feedback and programmable steering systems. The student is able to design and select elements of a full hydraulic steering gear. The student describes the structure of the elements and operation of a hydraulic braking system with a brake force booster and corrector. The student calculates operating parameters of hydraulic braking system. The student understands the operation of a braking system equipped with ABS valves and the operation of ESP. The student will describe the construction of the hydraulic and pneumohydraulic elements of the suspension system with height and lateral tilt corrector in automobiles.	[SW1] Assessment of factual knowledge
K6_W11	The student has basic knowledge of operation and exploitation of mechatronic devices in application to electrohydraulic steering, braking and suspension systems in automotive engineering.	[SW1] Assessment of factual knowledge

Subject contents

Development of automotive hydraulics. Application of hydraulics in passenger cars. Varieties and requirements for steering servo. Hydromechanical and full-hydraulic steering servo systems. Electrohydraulic steering servo systems. Programmable steering servo systems. Requirements and components of car braking systems. Circuits and hydraulic components of the braking system. Electrohydraulic braking systems ABS, ASR. Vehicle suspension components. Hydropneumatic suspension. Hydropneumatic vehicle levelling systems. Electronic vehicle stability control system ESP. Electro-hydraulic control systems in CAN-Bus system.

Prerequisites and co-requisites

Basics of general mechanics, hydraulics and electrical engineering

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
colloquium	56.0%	100.0%

Recommended reading

Basic literature	Szydelski Z.: Napęd i sterowanie w pojazdach i samojezdnych maszynach roboczych. WNT Warszawa 1980 Reński A.: Budowa samochodów. Układy hamulcowe i kierownicze oraz zawieszenia. Oficyna Wydawnicza Politechniki Warszawskiej. Warszawa 2004
Supplementary literature	Leiter R.: Hamulce samochodów osobowych i motocykli. Wydawnictwa Komunikacji i Łączności. Watrszawa 198 Katalogi firm: Danfoss, Bosch-Rexroth
eResources addresses	Adresy na platformie eNauczanie: Hydrotronika samochodowa, W, M, sem.06, letni 22/23 - Moodle ID: 28673 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28673

Example issues/ example questions/ tasks being completed	Full Hydraulic Steering Servomechnique Project Principle of operation of ABS, ESP Operation and use of retarder
Work placement	Not applicable