GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Vehicle design, PG_00057400		
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	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Zakład Pojazdów Mechanicznych i Techniki Militarnej -> Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Ryszard Woźniak	
	Teachers	dr inż. Wojciech Owczarzak dr inż. Ryszard Woźniak	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	15.0	0.0	60

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	60	8.0	32.0	100

Subject objectives

To acquaint students with selected methods of designing basic car assemblies.

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	The student describes the structure of steering systems. Presents braking systems. Describes the structure and kinematics of suspensions.	[SW3] Assessment of knowledge contained in written work and projects
[K7_U07] is able to perform a preliminary economic analysis of the undertaken engineering actions within the range of design, production and operation of machines and technical devices	The student is able to draw up the traction characteristics of a motor vehicle with a designed gearbox.	[SU1] Assessment of task fulfilment
[K7_W10] possesses knowledge on the methods of technical and economic analysis of industrial systems and optimization of manufacturing systems; is familiar with the general principles of initiating and developing forms of individual entrepreneurship, particularly for innovative projects using the knowledge	The student is able to design the differential gear, the system for disengaging the friction clutch and select the hydrokinetic clutch for the combustion engine by the chosen method.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents	LECTURE The general structure of a car. Characteristics of the engine and the necessary drive mechanisms. Drive mechanisms systems. Selection of gear ratios of the drive system. Clutches - types used. Construction, operation and calculation of friction clutches. Designing the clutch disengagement mechanism. Automatic control systems. Fluid clutches. Selection of clutch and torque converter for the engine. Stepped gearboxes. Synchronizers and gear shifting mechanisms. Design of gearboxes. Planetary gears. Automation of gear shifting. Drive shafts and joints. Drive shaft systems. Critical shaft speed. The theory of joints and design solutions. Driving bridges: types, construction and calculation. Differentials, driveshafts and wheel bearings. Design of the driveshaft. Designing a steering trapezoid. Characteristics of the steering system. Principles of designing a vehicle suspension. Calculation of the braking system. Więcej o tekście źródłowym
Prerequisites and co-requisites	Knowledge of the basics of machine construction and construction recording.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Tests during the semester	60.0%	50.0%
Practical exercises	100.0%	50.0%

Recommended reading

Basic literature	1. Studziński K.: Samochód teoria, konstrukcja i obliczanie. Wyd. Naukowo-Techniczne, Warszawa, 1980. 2. Reimpel J.: Budowa samochodów Podstawy Konstrukcji, WKŁ, warszawa, 1997. 3. Zając M.: Układy przeniesienia napędu samochodów ciężarowych i autobusów. WKŁ, Warszawa, 2003. 4. Dębicki M.: Teoria samochodu, teoria napędu. WKŁ. Warszawa. 1975. 5. Prochowski L.: Pojazdy samochodowe, mechanika ruchu. WKŁ. Warszawa. 2005. 6. Jaśkiewicz Z.: Projektowanie układów napędowych pojazdów samochodowych. WKŁ, Warszawa, 1982.
Supplementary literature	There are no requirements.
eResources addresses	Adresy na platformie eNauczanie: Projektowanie pojazdów samochodowych W-15, Ć-15, L-0, P-15, (PG_00057400), WIMiO, MiBM, MwBMiP, sem. 02, zimowy, 2024/2025, II stopnia, stacjonarne - Moodle ID: 39004 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=39004

Example issues/ example questions/ tasks being completed	Design of the differential and driveshaft of the driving axle of the vehicle.Selection of constant velocity and non-homokinetic joints for the driving axle of the vehicle.
Work placement	Not applicable

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