GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Vehicle design, PG_00064834		
Field of study	Mechanical Engineering		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
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	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Mechanical Vehicles and Military Technology -> Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Wojciech Owczarzak	
	Teachers		

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	7.0	33.0	100

Subject objectives

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

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W13] explains the main principles of individual and teamwork organization, including various forms of entrepreneurship utilizing knowledge from the field of engineering and technical sciences and disciplines relevant to the course of study	The student is able to design a differential mechanism, a friction clutch cut-off system and select a hydrokinetic clutch for an internal combustion engine using a selected method.	[SW1] Assessment of factual knowledge
[K7_W03] demonstrates a well-structured and theoretically grounded knowledge of the key issues in Mechanical Engineering to enable the design and diagnosis of mechanical systems, processes and devices	The student is able to prepare the traction characteristics of a motor vehicle with a designed gearbox.	[SW1] Assessment of factual knowledge
[K7_U04] creatively designs or modifies devices, processes or systems specific to Mechanics and Mechanical Engineering, using computer-aided design systems in the form of technical documentation, taking into account aspects of economic analysis, using appropriate tools and techniques	The student describes the structure of steering systems. Presents braking systems. Describes the structure and kinematics of suspensions.	[SU2] Assessment of ability to analyse information
[K7_K12] is ready for fullfiling social commitement and initation of actions for public interest including entrepreneurial thinking and acting	The student describes the structure of steering systems. Presents braking systems. Describes the structure and kinematics of suspensions.	[SK3] Assessment of ability to organize work

<table>
<tr><td>Subject contents</td><td>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</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of the basics of machine construction and construction recording.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Tests during the semester</td><td>60.0%</td><td>50.0%</td></tr><tr><td>Practical exercises</td><td>100.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>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.</td></tr><tr><td>Supplementary literature</td><td>There are no requirements.</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>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.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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