GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Vehicle design, PG_00064929		
Field of study	Mechanical Engineering		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2027/2028
Education level	second-cycle studies	Subject group	Specialty 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	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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Wojciech Owczarzak	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	18.0	9.0	0.0	9.0	0.0	36

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	36	7.0	57.0	100

Subject objectives

To familiarize students with selected methods of designing basic components of automotive vehicles.

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 prepare the traction characteristics of a motor vehicle with a designed drive axle.	[SW3] Assessment of knowledge contained in written work and projects [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 describes the structure of steering systems. Presents braking systems.	[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 is able to design a differential mechanism, a friction clutch disengagement system, and select a hydrokinetic clutch for an internal combustion engine using a selected method.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools
[K7_K12] is ready for fullfiling social commitement and initation of actions for public interest including entrepreneurial thinking and acting	The student is able to design a selected drivetrain element with particular emphasis on ecological aspects and vehicle performance.	[SK5] Assessment of ability to solve problems that arise in practice

<table>
<tr><td>Subject contents</td><td>Course content – lecture

LECTURE General construction of a car. Characteristics of the engine and necessary drive mechanisms. Drive mechanism systems. Selection of drive system ratios. Clutches - types used. Construction, operation and calculation of friction clutches. Design of the clutch release mechanism. Automatic control systems. Hydrokinetic clutches. Selection of a clutch and hydrokinetic transmission for the engine. Stepped gearboxes. Synchronizers and gear change mechanisms. Planetary gears. Drive shafts and joints. Drive shaft systems. Critical shaft rotation speed. Theory of joints and design solutions. Drive axles: types, construction and calculation. Differential mechanisms, axle shafts and wheel bearings. Design of axle shafts. Design of the steering trapezoid. Characteristics of the steering system. Calculation of the brake system.PROJECT Design a differential mechanism and axle shafts of the drive axle together with technical documentation.EXERCISES Computational tasks relating to the mechanics of vehicle drive, braking and steering.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of the basics of machine design and technical drawing.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
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<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Preparation of project - project</td><td>100.0%</td><td>33.0%</td></tr>
<tr><td>Colloquium exercise</td><td>60.0%</td><td>33.0%</td></tr>
<tr><td>Colloquium lecture</td><td>60.0%</td><td>34.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Jaśkiewicz Z.: Poradnik Inżyniera Samochodowego Elementy i materiały WKŁ, Warszawa, 1990.

2. Jaśkiewicz Z., Projektowanie układów napędowych pojazdów samochodowych, WKŁ, Warszawa,1982

3. Strudziński K, Samochód. Teoria, konstrukcja i obliczenia, WKŁ, Warszawa, 1980</td></tr>
<tr><td>Supplementary literature</td><td>1. Hebda M., Niziński S., Pelc H.: Podstawy diagnostyki pojazdów mechanicznych. WKŁ. Warszawa. 1980.

2. Kurmaz L.W. Projektowanie węzłów i części maszyn, WPŚ, Kielce , 2006</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Design of the vehicle's differential mechanism and drive shafts. Calculations for the friction clutch. Carrying out a traction analysis of a passenger car.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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