



Subject card

Subject name and code	Vehicle design, PG_00064929						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2025		Academic year of realisation of subject		2025/2026		
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	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. Wojciech Owczarzak				
	Teachers						
Lesson types and methods of instruction	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 fulfilling social commitment and initiation 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		

Subject contents	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.		
Prerequisites and co-requisites	Knowledge of the basics of machine design and technical drawing.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Preparation of project - project	100.0%	33.0%
	Colloquium exercise	60.0%	33.0%
	Colloquium lecture	60.0%	34.0%
Recommended reading	Basic literature	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	
	Supplementary literature	1. Hebda M., Niziński S., Pelc H.: Podstawy diagnostyki pojazdów mechanicznych. WKŁ. Warszawa. 1980. 2. Kurmaz L.W. Projektowanie węzłów i części maszyn, WPS, Kielce , 2006	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Design of the vehicle's differential mechanism and drive shafts. Calculations for the friction clutch. Carrying out a traction analysis of a passenger car.		
Work placement	Not applicable		

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