



## Subject card

Subject name and code	Vehicle design, PG_00059391						
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	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						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Wojciech Owczarzak				
	Teachers		dr inż. Wojciech Owczarzak				
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		8.0		56.0	100
Subject objectives	To acquaint students with selected methods of designing basic car assemblies.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_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.		[SW1] Assessment of factual knowledge		
	[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.		[SW1] Assessment of factual knowledge		
	[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 prepare the traction characteristics of a motor vehicle with a designed drive axle.		[SU1] Assessment of task fulfilment		

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. Planetary gears. 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. Calculation of the braking system.   		
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