



## Subject card

Subject name and code	, PG_00062011						
Field of study	Mechanical and Naval Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group					
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			8.0		
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 hab. inż. Grzegorz Ronowski				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	36.0	0.0	9.0	18.0	0.0	63
	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	63		0.0		0.0	63
Subject objectives	The aim of the course is for students to acquire basic knowledge of the construction and principles of designing motor vehicle assemblies.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U03] is able to identify, formulate and develop the documentation of a simple design or technological task, including the description of the results of this task in Polish or in a foreign language and to present the results using computer software or other aiding tools	The student calculates the resistance to motion of the vehicle and prepares a traction diagram for the adopted gear ratios of the drive system. Distinguishes between types of car steering systems and determines the design parameters of the steering link trapezoid.	[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task
	[K6_W11] has knowledge of analysis, design, technology and manufacturing of selected technical systems, machinery and equipment, metrology and quality control, knows and understands methods of measurement and calculation of basic quantities describing the operation of technical systems, knows basic calculation methods used to analyse experimental results	The student calculates the resistance to motion of the vehicle and prepares a traction diagram for the adopted gear ratios of the drive system. Distinguishes between types of car steering systems and determines the design parameters of the steering link trapezoid.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_U14] is able to analyse the operation of devices and compare the construction solutions applying usage, safety, environmental, economic and legal criteria	The student recognizes the basic systems, assemblies and components of motor vehicles. It describes their structure and explains the principle of operation. Presents the principles of designing and selecting selected vehicle components. Classifies vehicles in terms of their construction and application.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K6_W08] has a knowledge of the analysis and design of selected technical systems, machines and technical equipment, selection of construction materials, manufacturing and operation, including their life cycle	The student recognizes the basic systems, assemblies and components of motor vehicles. It describes their structure and explains the principle of operation. Presents the principles of designing and selecting selected vehicle components. Classifies vehicles in terms of their construction and application.	[SW3] Assessment of knowledge contained in written work and projects	
Subject contents	<p>LECTURE The general structure of a car. Vehicle motion resistance, traction characteristics. Characteristics of the engine and the necessary drive mechanisms. Drive mechanisms systems. Clutches - types used. Elements of friction clutches. Engagement mechanisms. Automatic control systems. Fluid clutches. Selection of a torque converter for an internal combustion engine. Stepped gearboxes. Synchronizers and gear shifting mechanisms. Planetary and hydrokinetic gears. Automation of gear shifting. Additional gearboxes. Drive shafts and joints. Selection of shafts and joints for the designed drive system. Drive shaft systems. Critical shaft speed. The theory of joints and design solutions. Driving bridges: types, construction and calculation. Differentials, driveshafts, final drives and wheel bearings. Steering, braking and suspension systems of vehicles. Unconventional vehicle wheels.</p>		
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	55.0%	100.0%
Recommended reading	Basic literature	1. Studziński K.: Samochód teoria, konstrukcja i obliczanie. Wyd. Naukowo-Techniczne, Warszawa, 1980. 2. Jaśkiewicz Z.: Projektowanie układów napędowych pojazdów samochodowych. WKŁ, Warszawa, 1982. 3. Reimpel J.: Budowa samochodów Podstawy Konstrukcji, WKŁ, Warszawa, 1997. 4. Zając M.: Układy przeniesienia napędu samochodów ciężarowych i autobusów. WKŁ, Warszawa, 2003. 5. Prochowski L.: Pojazdy Samochodowe Mechanika ruchu, WKŁ, Warszawa. 2005. 6. Zieliński A.: Konstrukcja nadwozi samochodów osobowych i pochodnych, WKŁ. Warszawa. 2003.	
	Supplementary literature	eResources addresses	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	Replace friction clutch components. Selection of the dimensions of the friction lining of the clutch plate of the car. Synchronization conditions for a system of three shafts with two cardan joints.		

Work placement	Not applicable
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