



## Subject card

Subject name and code	, PG_00057927						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			2.0		
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	dr inż. Sławomir Sommer dr hab. inż. Grzegorz Ronowski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0 Address on the e-learning platform: <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22159">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22159</a>						
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	30	0.0	0.0	30		
Subject objectives	Provide students with basic knowledge in the field of construction and general principles of designing drive systems of motor vehicles and transport devices..						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U07] is able to design a typical construction of a mechanical device, component or a testing station using appropriate methods and tools, adhering to the set usage criteria	The student selects the motor for the off-road car winch.			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	[K6_W08] possesses basic knowledge including the methodology of designing machine parts, mechanical devices, selection of construction materials, manufacturing and operation, with the lifetime cycle	The student knows the functions performed by the clutch in the drive system of the vehicle. Defines the dimensions of the clutch friction lining.			[SW3] Assessment of knowledge contained in written work and projects		

Subject contents	<p>LECTURES The general structure of the car. Characteristics of the engine and the necessary drive mechanisms. Drive mechanisms systems. Clutches - types used. Construction, operation and calculation of friction clutches. Elements of friction clutches. Engagement mechanisms. Automatic control systems. Fluid clutches. Stepped gearboxes. Synchronizers and gear shifting mechanisms. Planetary gears. Automation of gear shifting. Additional gear boxes. 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. Construction and design principles of transport devices used in automotive technology, winches, lifts, etc.</p> <p>LABORATORY. General assessment of the technical condition of the vehicle. Measurement and adjustment of the wheel alignment of the main gear of the driving axle. Balancing road wheels of a car, assembly and disassembly of car tires. Measurements of external vehicle noise. Compression pressure measurement in an internal combustion engine. Checking the headlight settings in the vehicle. Determination of the car rolling resistance coefficient.</p>		
Prerequisites and co-requisites	Knowledge of the basics of machine construction, construction record.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tests during the semester	60.0%	50.0%
	Practical exercises	100.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Studziński K.: Samochód teoria, konstrukcja i obliczanie. Wyd. Naukowo-Techniczne, Warszawa, 1980.</li> <li>2. Reimpel J.: Budowa samochodów Podstawy Konstrukcji, WKŁ, Warszawa, 1997.</li> <li>3. Zając M.: Układy przeniesienia napędu samochodów ciężarowych i autobusów. WKŁ, Warszawa, 2003.</li> <li>4. Dębicki M.: Teoria samochodu, teoria napędu. WKŁ. Warszawa. 1975.</li> <li>5. Prochowski L.: Pojazdy samochodowe, mechanika ruchu. WKŁ. Warszawa. 2005.</li> <li>6. Instrukcje do ćwiczeń laboratoryjnych.</li> </ol>	
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Jaśkiewicz Z.: Projektowanie układów napędowych pojazdów samochodowych. WKŁ, Warszawa, 1982.</li> <li>2. Hebda M., Niziński S., Pelc H.: Podstawy diagnostyki pojazdów mechanicznych. WKŁ. Warszawa. 1980.</li> </ol>	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Functions performed by the vehicle's main clutch. Draw a kinematic diagram of the indicated mechanism.		
Work placement	Not applicable		