



Subject card

Subject name and code	Mechatronics and Automation in Vehicles, PG_00055517						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
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	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	15.0	0.0	15.0	0.0	0.0	30
	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	30		2.0		18.0	50
Subject objectives	The aim of the course is to introduce students to issues related to the construction and exploitation of electrical and electronic systems of modern vehicles and basic automated systems used in these vehicles.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W08] possesses knowledge including the methodology of designing machine parts, mechanical devices, selection of construction materials, manufacturing and operation, with the lifetime cycle	The student has a basic knowledge covering the principle of operation of selected electrical components of the vehicle.			[SW1] Assessment of factual knowledge		
	[K6_W06] possesses knowledge on automatics and robotics of mechanical systems	The student has a basic knowledge covering basics of electrical engineering.			[SW1] Assessment of factual knowledge		
	[K6_U05] is able to plant an experiment within the range of measuring the basic operating parameters of mechanical devices using a specialized equipment, interpret the results and reach the correct conclusions	The student has a basic knowledge of selected electrical equipment of the vehicle.			[SU3] Assessment of ability to use knowledge gained from the subject		
Subject contents	DC circuits. AC circuits. The overall concept of the electrical installation in vehicles. Wires, cables, pipe connectors, relays, meters, fuses. The balance of power for the vehicle electrical system. Battery, its design, operation, service. Starters combustion engines, their construction and diagnostics. Power supply of electricity. Dynamos and alternators. Voltage Regulators electromechanical and electronic. Diagnosis of power systems. Ignition Systems classic. Electronic ignition systems. Spark plugs. Ignition advance. Injection-ignition systems, the construction, operation and diagnostics. Exhaust emission control systems. On-board computer. Vehicle lighting. Construction spotlight. High beam, low beam, fog and searchlights. Headlights unconventional. The "smart" headlamps. Antilock brake systems - ABS. Anti-skid systems - TC. Signaling devices emergency vehicles.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Exam	56.0%			100.0%		

Recommended reading	Basic literature	Konopiński M. "Elektronika w technice motoryzacyjnej" Ocioszyński J. "Elektrotechnika i elektronika pojazdów samochodowych" Merkisz J., Mazurek S. "Pokładowe systemy diagnostyczne pojazdów samochodowych"
	Supplementary literature	Pr. zbior. "Bosch - informator motoryzacyjny" Pr. zbior. "Automotive Electric/Electronic Systems"
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>Construction of the spark plug.</p> <p>Construction of alternator.</p> <p>The principle of operation of the ignition system.</p>	
Work placement	Not applicable	