



Subject card

|   |  |   |                                |                                     |  |            |     |
|---|--|---|--------------------------------|-------------------------------------|--|------------|-----|
| Subject name and code                       | Mechatronics and Automation in Vehicles, PG_00055517   |   |                                |                                     |  |            |     |
| Field of study                              | Mechanical Engineering   |   |                                |                                     |  |            |     |
| Date of commencement of studies             | October 2024   | Academic year of realisation of subject   |                                |                                     | 2026/2027  |            |     |
| Education level                             | first-cycle studies  | Subject group   |                                |                                     | Optional subject group<br>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_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                         |            |     |
|   | [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_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  |            |     |
| 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%   |            |     |

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| 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/<br>example questions/<br>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  |   |

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