



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Handling and repair technology

### Course

Field of study

Year/Semester

Transport

3/6

Area of study (specialization)

Profile of study

general academic

Level of study

Course offered in

First-cycle studies

Polish

Form of study

Requirements

full-time

elective

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

15

0

Tutorials

Projects/seminars

15

0

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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### Prerequisites

Knowledge: The student has basic knowledge of physics and mechanics as well as the construction and operation of motor vehicles.

Skills: The student is able to integrate the obtained information, interpret it, draw conclusions, formulate and justify opinions.

Social competences: The student is aware of the importance and understands the non-technical aspects and effects of repairing motor vehicles.

### Course objective

Students learn about the issues and the overall technology of maintenance and repair of road transport



and technology with detailed maintenance and repair of the most important systems like chassis, car body and equipment for road vehicles.

### Course-related learning outcomes

#### Knowledge

1. Has ordered, theoretically founded general knowledge in the field of technology, transport systems and various means of transport.
2. Has a structured and theoretically founded general knowledge in the field of key technical issues and detailed knowledge of selected issues in this discipline of transport engineering.
3. Has a basic knowledge of the life cycle of means of transport, both hardware and software, and in particular about the key processes taking place in them.

#### Skills

1. Is able to formulate and solve tasks in the field of transport, apply appropriately selected methods, including analytical, simulation or experimental methods.
2. Can assess - at least to a basic extent - various aspects of the risk associated with a transport project.

#### Social competences

1. Is aware of the social role of a technical university graduate, in particular understands the need to formulate and convey to the society, in an appropriate form, information and opinions on engineering activities, technological achievements, as well as the achievements and traditions of the profession of transport engineer.
2. Correctly identifies and resolves dilemmas related to the profession of transport engineer.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

- Examination of the laboratory classes, confirming the theoretical knowledge with practical skills application of the principles of service technology and repair to the selected nodes of road transport in the framework of a given type of repair with emphasis on the ability to identify the nature and scope of the repair service and the proper verification of car parts.
- Written exam on all repair issues of motor vehicles. Exam checking the basic knowledge related to the repair of means of transport and the technology of its implementation, including parts verification and quality control of repair as well as knowledge of European directives and national regulations as well as modern organizational forms of repairs in relation to individual and collective means of transport

### Programme content

1. Introduction and organization of the subject - getting acquainted with the most important definitions related to the maintenance and repair of motor vehicles; clarification of the need to service vehicles in working order and repair of unfit vehicles, resulting from damage, wear of their parts and degradation



of materials as well as ensuring the maintenance of the car fleet of vehicles in proper technical readiness to perform transport tasks.

2. The genesis, systems and principles of vehicle maintenance and repair of car - explanation the influence of factors related to the use of a motor vehicle on the wear of parts and loss of possibility to use the vehicles; types of maintenance and repairs, methods of their organization against the background of the national maintenance and repair system and the existing technical support for road transport.
3. Outsourcing of fleet vehicles repair - modern methods of organizing the maintenance and repair of car fleets, which can be selected by the owner or lessee of the fleet in the form of contracts and service packages; commissioning maintenance and repairs under the outsourcing policy to authorized services, independent or other workshops; the consequences of the GVO directive of the European Union in the scope of the so-called service and repair clauses, insurance and repair of motor damage.
4. The operational structure of the repair process - students are acquainted with the technological process of the main car repair and its most important operations; main repair operational and treatment structure; clarification of the role of disassembly and assembly operations in repair processes; discussion of the operations of washing assemblies and cleaning parts in the repair process; characterization of washers, their types and indication of their purpose; after service repair.
5. Verification of parts - stages and methods of verification; parts qualification criteria during verification; sensory verification with examples; measuring instruments and dedicated verification devices; application of defectoscopic methods for the verification of parts; detailed discussion of the verification of selected parts of the motor vehicle.
6. Quality of vehicle maintenance and repair - destructive processes and the quality of vehicles; vehicle maintenance and repair models; analysis of factors determining the quality and efficiency of service and repairs; maintenance and repair quality assessment systems; the possibility of methods of technical control of the quality of maintenance and repairs; case study, the influence of factors on quality.
7. Technological processes of vehicle maintenance and repair - general diagrams; process documentation: technical, operational and repair documentation for motor vehicles; the role of diagnostics in maintenance and repair as well as control in repair processes.
8. Technology of maintenance and repair of systems and mechanisms of passenger vehicles and trucks - examples of maintenance and repair of selected systems or accessories of motor vehicles with the type of service and scope of repair, the so-called team room; engine maintenance and repair; service and repair of the brake system; repair of turbochargers; maintenance and repair of the drive mechanism and the differential of a motor vehicle; maintenance and repair of steering system and vehicle suspension.
9. After accident repair of vehicle bodies - goals and tasks of the repair; technologies used in body repair; a tinsmith and paint shop and its equipment; body sheet repair technology; renovation painting technologies; restoration materials.



## Teaching methods

1. Lecture with multimedia presentation.
2. Table exercises - calculations necessary in the technology of road vehicle repair and regeneration of their parts.
2. Laboratory exercises - performing the tasks given by the teacher - practical exercises

## Bibliography

### Basic

1. Kozłowski M. (red.): Budowa i eksploatacja pojazdów, t. II Obsługa, diagnostyka i naprawa zespołów i podzespołów. Wyd. Vogel Business Media, Wrocław, 2008 i późniejsze wydania.
2. Uzdowski M., Abramek K., Garczyński K.: Pojazdy samochodowe. Eksploatacja techniczna i naprawa. WKiŁ, Warszawa, 2008 i późniejsze wydania.
3. Wróblewski P.: Naprawa podzespołów i zespołów pojazdów samochodowych. WKiŁ, Warszawa, 2016.
4. Wróblewski P., Kupiec J.: Diagnostowanie podzespołów i zespołów pojazdów samochodowych. WKiŁ, Warszawa, 2015.
5. Trzeciak K.: Wyposażenie warsztatów samochodowych. Wyd. Auto, Warszawa, 2005.
6. Jóska M., Ulbrich D., Kowalczyk J., Mańczak R., Nosal S.; Inżynieria odnowy pojazdów samochodowych, tom 1, Inżynieria obsługi; Wydawnictwo Politechniki Poznańskiej, Poznań, 2019.
7. Jóska M., Ulbrich D., Kowalczyk J., Mańczak R., Nosal S.; Inżynieria odnowy pojazdów samochodowych, tom 2, Inżynieria naprawy; Wydawnictwo Politechniki Poznańskiej, Poznań, 2019.

### Additional

1. Rzeźnik C., Durczak K., Rybacki P.: Serwis techniczny maszyn. Wyd. Uniwersytetu Przyrodniczego w Poznaniu, Poznań, 2015.
2. Nosal S.: Inżynieria odnowy maszyn. Wybrane zagadnienia. Wyd. Politechniki Poznańskiej, Poznań, 2017.
3. Orzełowski S.: Naprawa i obsługa pojazdów samochodowych. WSzIP, Warszawa, 2008 i późniejsze wydania.
4. Livesey W.A., Robinson A.: The repair of vehicle bodies. Elsevier, London, New York, Tokyo, 2005.



### Breakdown of average student's workload

	Hours	ECTS
Total workload	70	2,0
Classes requiring direct contact with the teacher	60	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	10	0,5

<sup>1</sup> delete or add other activities as appropriate