



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Handling and repair technology [S1Trans1>TOiN]

Course

Field of study

Transport

Year/Semester

3/6

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

15

Other

0

Tutorials

15

Projects/seminars

0

Number of credit points

3,00

Coordinators

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Lecturers

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 handling and repair of road transport means and with detailed technology of handling and repair of the most important systems like chassis, car body and equipment for road motor 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:

Learning outcomes presented above are verified as follows:

- Assessment and credit 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.
- Assessment and credit for the auditorium exercises obtained on the basis of grades from tests and auditorium activity .
- Written exam on all repair issues of motor vehicles. Exam checking the basic knowledge related to the handling and repair of transport means 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 handling and repairs in relation to individual and collective means of transport.
- The threshold for passing the knowledge of the subject is 50% of the points obtained from the written exam, covering all the issues specified in the course programme.

Programme content

The module programme covers the following topics:

1. Introduction and organization of the subject
2. The genesis, systems and principles of vehicle handling and repair of vehicles
3. Modern methods of handling and repair of motor vehicles
4. The operational structure of the repair process
5. Verification of parts
6. Quality of vehicle handling and repair
7. Technological processes of vehicle handling and repair
8. Technology of handling and repair of systems and mechanisms of vehicles
9. After accident repair of vehicle bodies

Course topics

The lecture programme covers the following topics:

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. Modern methods of handling and repair of motor vehicles. Types of handling and repair. Outsourcing of handling and repair of fleet vehicles. Methods of organizing the handling 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 of handling 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 traffic damages.

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 handling 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; as well as the influence of factors on quality (case study).
7. Technological processes of vehicle handling 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 handling 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.

The laboratory programme covers the following topics:

1. Repair technology and handling of the running system.
2. Repair technology and handling of the suspension system.
3. Steering system handling and repair.
4. Handling of the air conditioning system in the vehicle.
5. Handling and repair of clutches and dual-mass wheels.
6. Handling and repair of gearboxes and final drives.
7. Handling and repair of brake systems.

The programme of auditorium exercises covers the following topics:

1. Methodology for testing the braking and suspension system.
2. Assessment of the correctness of the repair of the braking system. Data acquisition and evaluation criteria. Identification of the research object, theoretical basis for obtaining data from measurements, sources of evaluation criteria.
3. Algorithms for calculating the operating parameters of the braking and suspension systems. Braking efficiency index, braking uniformity, rolling resistance, ovality, distribution of braking forces between axles.
4. Dimensional tolerance of parts used during vehicle handling and repairs.
5. Fits of parts used during vehicle maintenance and repairs.
6. Documentation used in the process of repairing parts and components: repair card, technology card, instruction card.
7. Machining to repair dimensions of parts used in motor vehicle repairs.

Teaching methods

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

Bibliography

Basic:

1. Jósko M., Ulbrich D., Kowalczyk J., Mańczak R., Nosal S.: Inżynieria odnowy pojazdów samochodowych, tom 1, Inżynieria obsługiwaniania; Wydawnictwo Politechniki Poznańskiej, Poznań, 2019.
2. Jósko M., Ulbrich D., Kowalczyk J., Mańczak R., Nosal S.: Inżynieria odnowy pojazdów samochodowych, tom 2, Inżynieria naprawy; Wydawnictwo Politechniki Poznańskiej, Poznań, 2019.
3. Wróblewski P.: Naprawa podzespołów i zespołów pojazdów samochodowych. WKiŁ, Warszawa, 2016.
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5. Kozłowski M. (red.): Budowa i eksploatacja pojazdów, t. II - Obsługa, diagnostyka i naprawa zespołów i podzespołów. Wyd. Vogel Business Media, Wrocław, 2008 and subsequent editions.
6. Uzdowski M., Abramek K., Garczyński K.: Pojazdy samochodowe. Eksploatacja techniczna i naprawa. WKiŁ, Warszawa, 2008 and subsequent editions.
7. Trzeciak K.: Wyposażenie warsztatów samochodowych. Wyd. Auto, Warszawa, 2005.
8. Niziński S.: Diagnostyka samochodów osobowych i ciężarowych. Dom wydawniczy Bellona, Warszawa, 1999.

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 and subsequent editions.
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	85	3,00
Classes requiring direct contact with the teacher	60	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00