COURSE DESCRIPTION CARD - SYLLABUS

Course name
Exploitation of materials in road transport [S1MiTPM1>EMwTD]

Course

Field of study
Materials and technologies for automotive industry

Year/Semester
4/7

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
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Knowledge: basics of chemistry, physics and science of materials. Skills: the ability to think logically, use of information obtained from libraries and the Internet. Social competencies: understanding the need to learn and acquire new knowledge.

Course objective

Getting to know the operational requirements used in the automotive industry. Understanding the phenomenon of friction and types of wear. Familiarization with the types of lubricants used in the automotive industry.

Course-related learning outcomes

Knowledge:
1. Student should characterize the operational requirements for vehicles.
2. Student should have general knowledge of the wear process and its types, as well as the types of lubricants used on parts in the automotive industry.

Skills:

1. Student is able to determine what dominant tribological wear occurs in machine parts.
2. Based on visual assessment, the student is able to indicate changes caused by the operation of cooperating machine parts.

Social competences:
1. Student is willing to work in a group to solve operational problems encountered in the automotive industry.
2. Student is aware of the role of friction, which affects the properties of materials and the operation of machine parts.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

End-of-semester grade:
a) in the scope of laboratory classes, based on oral or written answers to each exercise, and a report on its progress according to the instructor's instructions. The final grade is obtained based on the average of all positive grades from the answers and reports.
b) in terms of lectures based on a written assessment conducted during the last classes.
Final grade criteria:
<90–100> 5.0 (A); <80–90) 4.5 (B); <70–80) 4.0 (C); <60–70) 3.5 (D); <50–60) 3.0 (E); <0–50) 2.0 (F)

Programme content

Road infrastructure versus road transport. Exploitation of engineering materials used in road vehicles. Types of friction and lubrication of supporting parts in the automotive industry.

Course topics

Lecture:
1. Road infrastructure and operational requirements for vehicles.
2. Top layer and selected methods of shaping the top layer.
3. Vehicle wear process and its progress.
4. Types of wear occurring in vehicles.
5. Oils and greases used in machine and vehicle parts.
6. Methods of verification and regeneration of parts intended for the automotive industry.
7. Factors affecting the technical condition and operation of the vehicle.
Laboratory:
1. Macroscopic analysis of selected parts of a motor vehicle system.
2. Analysis of the microstructure of surface layers after the operation of car parts.
3. Analysis of the microstructure of selected car parts after the regeneration process.
4. Comparative analysis of the structure and properties of car parts before and after operation.
5. Part verification - stages of car part assessment.

Teaching methods

Lecture: multimedia presentation, examples, discussion.
Laboratory: practical exercises, discussion.

Bibliography

Basic:
1. Gabryelewicz M.: Podwozia i nadwozia pojazdów samochodowych. Budowa, obsługa, diagnostyka i naprawa. Wydawnictwa Komunikacji i Łączności. Warszawa 2018
2. Nosal S.: Tribologia. Wprowadzenie do zagadnień tarcia, zużywania i smarowania. Wydawnictwo Politechniki Poznańskiej. Poznań 2012
3. Podniało A.: Oleje i smary w technice smarowania maszyn i pojazdów samochodowych. Wydawnictwo RB. Opole 2012

Additional:
1. Jósko M., Kowalczyk J., Mańczak R., Nosal S., Ulrich K.: Inżynieria odnowy pojazdów samochodowych. Tom 2 inżynieria naprawy. Wydawnictwo Politechniki Poznańskiej. Poznań 2019

2. Jósko M., Kowalczyk J., Mańczak R., Nosal S., Ulrich K.: Inżynieria odnowy pojazdów samochodowych. Tom 1 inżynieria obsługiwania. Wydawnictwo Politechniki Poznańskiej. Poznań 2019
3. Paczulski M.: Technologia produktów naftowych. Oficyna Wydawnicza Politechniki Warszawskiej. Warszawa 2024

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00