COURSE DESCRIPTION CARD - SYLLABUS

Course name

Exploitation and consumables

Course

Field of study

Mechanical and Automotive Engineering

Year/Semester

3/6

Area of study (specialization)

Motor Vehicles

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Michał Libera

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tel. +4861 665-2223

Wydział Inżynierii Lądowej i Transportu

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

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Wydział Inżynierii Lądowej i Transportu

ul. Piotrowo 3, 60-965 Poznań

Prerequisites

KNOWLEDGE: The student has a basic knowledge of the construction of motor vehicles and the principles of operation of their components.

SKILLS: The student is able to analyze and synthesize information, draw conclusions, formulate and justify opinions

SOCIAL COMPETENCES: The student is aware of the importance of rational use of motor vehicles in the technical, economic and ecological aspect.

Course objective

The aim of the course is to acquire basic skills of formulating and solving problems of car operation.

Course-related learning outcomes

Knowledge

M1_W17 Has basic knowledge of tribological processes occurring in machines, i.e. friction, lubrication and wear.

M1_W19 Has extended basic knowledge necessary to understand specialist subjects and specialist knowledge about the construction, construction methods, manufacturing and operation of a selected group of working, transport, thermal and flow machines covered by the diploma path.

M1_W20 Has elementary knowledge of the life cycle of machinery, recycling of machine elements and construction and consumables.

Skills

M1_U2 Can search in catalogs and on manufacturers' websites ready-made machine components to be used in his own projects.

M1_U25 Can organize and substantively manage the process of designing and operating a simple machine from a group of machines from the group covered by the selected diploma path.

M1_U28 Has the ability to draw conclusions from the conducted periodic technical tests of vehicles and measurements, and on their basis, issue assessments about the technical condition of vehicles in terms of admitting vehicles to road traffic, as well as the ability to correctly fill in and keep the documentation applicable to technical tests at vehicle inspection stations, finding and read basic technical information from documents of countries other than Poland for vehicles registered for the first time abroad and from vehicle nameplates, as well as know how to use the knowledge about certified devices and measuring and control devices as well as the scope of their use and the scope of operational control.

Social competences

M1_K02 Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on its own.

M1_K04 Is ready to initiate actions for the public interest.

M1_K05 Is willing to think and act in an entrepreneurial manner.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written and oral test. Activity during classes and the implementation of a simple design task. Reports from laboratory classes.

Programme content

Introduction into operation. Operation as a phase of product existence. Quality of operation. Classification of operational processes. The terminology of the exploitation theory.

Operational requirements for means of transport.

Problem groups in the theory of exploitation of means of transport.

Operational states. Airworthiness and unfitness condition, damage. Service life until failure and between failures. Limit state, durability. State assessment criteria. Typical courses of changes in technical condition. Statistical description of changes in technical condition. Analysis of operational data about mileage to failure and between failures. Analysis of the types, causes and effects of unfitness.

Operating factors influencing the condition of the vehicle. Road conditions. Driving conditions. Transport conditions. Climatic and natural conditions. Seasonal conditions. The role of man in vehicle operation

Models of means of transport operation. Classification of models of technical objects operation processes. Praxeological model of the exploitation system (chain of use and servicing). Symbols of the operational state, operational graphs.

Technological models of the organization of the use of means of transport. Structural model of the use base. Measurements of the use process (quantitative characteristics) of means of transport.

Strategies for servicing means of transport. Classification of types of servicing of means of transport. Methods of determining the service life. Structural model of the means of transport service base. Models of service processes. Measures of the process of servicing means of transport.

Criteria for the efficiency of car operation. Determining the number of vehicles necessary to perform a specific transport work. Determining the number of vehicles to be repaired. Planning of supplying the vehicle service system with spare parts

Case study. Analysis of real transport systems. Identification of the use model and maintenance strategy. Quantitative characteristics of the operational efficiency of fleets of transport companies (based on real data from transport companies).

Vehicles for the transport of hazardous materials: basic concepts, vehicle requirements, equipment and marking, technical control, documentation.

Laboratory exercises on consumables. Shear resistance of lubricating oils - kinematic viscosity. Examination of lubricating properties of oils. Measurement of the penetration of plastic lubricants. Determination of water content and solid impurities in oils. Measurement of burning and solidification temperatures of lubricating oils. Determination of viscosity-temperature characteristics of oil with a rotational viscometer - dynamic viscosity

Teaching methods

Informative and problematic lecture with multimedia presentation and didactic discussion. Laboratory classes.

Bibliography

Basic

1. Gronowicz J.: Eksploatacja techniczna I utrzymanie samochodów. Wydawnictwo Uczelniane Politechniki Szczecińskiej, Szczecin 1997

2. Hebda M.: Eksploatacja samochodów. Wydawnictwo Instytutu Technologii Eksploatacji, Radom 2005

3. Smalko Z.: Podstawy eksploatacji technicznej pojazdów. Warszawa, Wydawnictwo Politechniki Warszawskiej, 1987

4. Orzełowski S.: Naprawa i obsługa pojazdów samochodowych. Wyd. Szkolne i Pedagogiczne, W-wa, 1998

5. Rydzykowski W., Wojewódzka-Król K.: Transport. PWN. W-wa, 2002

6. Uzdowski M., Abramek K., Garczyński K.: Pojazdy samochodowe. Eksploatacja techniczna i naprawa. WKŁ. W-wa, 2003

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9. Szczerek M., Wiśniewski M., Tribologia – Trybotechnika. 9 PTT, ITE, SiTMP, Radom 2000.

10. Zwierzycki W., Oleje i smary przemysłowe. ITE, Radom 1999.

Additional

1. Macha E.: Reliability of machines. Wydawnictwo Politechniki Opolskiej, Opole 2001

2. Oprzędkiewicz J., Stolarski B.: Komputerowe monitorowanie niezawodności samochodów. PWN, W-wa Kraków, 2000

3. Gołąbek A.: Eksploatacja i niezawodność maszyn. Wrocław, Wyd. Politechniki Wrocławskiej, 1988

4. Niziński S.: Eksploatacja obiektów technicznych. Wyd. ITeE, Radom, 2002

5. Moubray J.: Reliability centered maintenance, Industrial Press Inc, 2000

6. Kumar U.D., Crocer J.,Knezewic J.,El-Haram M.: Reliability, Maintenance and Logistic Support, Kluwert Academic Publishers, 2000

7. O'Connor P.D.T., Newton D., Bromley R.: Practical Reliabillity Engineering, Jonn Willey and Sons, LTD, 2001

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1,0

[1] delete or add other activities as appropriate