COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basics of Technical Diagnostics

Course

Field of study

Transport

Year/Semester

3/5

Area of study (specialization)

Rail transport

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

18

Laboratory classes

0

Other (e.g. online)

0

Tutorials

9

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Wydział Inżynierii Lądowej i Transportu

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Responsible for the course/lecturer:

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Prerequisites

KNOWLEDGE: Basic knowledge of the techniques of measuring mechanical quantities and modeling.

SKILLS: The student is able to solve specific problems appearing in technical systems.

SOCIAL COMPETENCES: The student is able to work in a group and define the priorities important in solving the tasks set before him.

Course objective

Getting to know the theoretical problems related to technical diagnostics of means of transport and methods and ways of solving issues of their technical condition assessment and forecasting.

Course-related learning outcomes

Knowledge

The student knows the basic techniques, methods and tools used in the process of solving tasks in the field of transport, mainly of an engineering nature.

Skills

The student is able to properly plan and perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions from them.

Social competences

The student is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning transport systems that have led to serious financial and social losses or to serious loss of health and even life.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written tests, written exam.

Programme content

The concept of diagnostics, diagnostics as a measurement method, conditions for diagnosing technical objects. The essence of technical diagnostics, tasks and goals of technical diagnostics. The concept of entropy in diagnostics, properties of entropy, relative entropy. Object existence phases, diagnostics in particular phases of object existence. Diagnostics in the vehicle operation system, diagnostics in the use and maintenance subsystem. Diagnostic system. Analysis of the diagnosis object, diagnostic models (determined and undetermined), a set of object state features, a set of output parameters (working and accompanying). Object structure and diagnostic signal, the concept of structure, structure parameters describing the state of the object. Conditions to be met by the output parameter to be considered a diagnostic parameter. Diagnostic parameters and their division. Technical symptoms. The concept of the limit value and the permissible symptoms, methods of estimating limit values. Classification of technical conditions of an object, two, three and four-state classification. Classification of diagnostic state parameters, general and detailed parameters. Diagnostic methods, information synthesis method, information analysis method. Vehicle diagnosis methods, instrumental and non-instrumental methods. The scope of technical diagnostics activities, diagnosing the current state, supervising the state of the object, generating existing (past) states, forecasting future states. Diagnostic experiments, passive experiment, active experiment, active-passive experiment, passive-reliability experiment. Vehicle diagnostic susceptibility. Effectiveness of using diagnostics in vehicle operation. Methodology of diagnostic tests.

Teaching methods

Lecture with multimedia presentation.

Bibliography

Basic

1. Cempel C., Tomaszewski F., Diagnostyka Maszyn. Zasady ogólne, przykłady zastosowań. Instytut Technologii Eksploatacji, Radom 1992.

2. Marciniak J., Diagnostyka techniczna kolejowych pojazdów szynowych. WKiŁ, Warszawa 1982.

3. Żółtowski B., Podstawy diagnostyki maszyn. Wydawnictwo Uczelniane Akademii Techniczno-Rolniczej, Bydgoszcz 1996.

Additional

1. Niziński S., Elementy diagnostyki obiektów technicznych. Wydawnictwo Uniwersytetu Warmińsko-Mazurskiego, Olsztyn 2001.

2. Niziński S., Diagnostyka samochodów osobowych i ciężarowych. Dom Wydawniczy Bellona, Warszawa 1999.

3. Żółtowski B., Cempel C., Inżynieria diagnostyki maszyn. Instytut Technologii Eksploatacji, Radom 2004.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	3,0
Classes requiring direct contact with the teacher	27	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	23	1,0

[1] delete or add other activities as appropriate