POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Basics of Technical Diagnostics [S1Trans1>PDT]

Course

Field of study
Transport

Year/Semester
3/5

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

3,00

Coordinators	Lecturers
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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:

Learning outcomes presented above are verified as follows:
Written tests, written exam.

Programme content
The module program covers the following topics:
1. Introduction to the essence and philosophy of diagnosis and making a diagnosis.
2. Machine operation and diagnostics.
3. Object structure and object condition.
4. Output parameters (signals) and state parameters.
5. Limits and permissible values.
6. Diagnosis methods
7. Forecasting in diagnostics.
8. Diagnostic experiments.

Course topics
The lecture program covers the following topics:
1. The concept of the term diagnostics, diagnostics as a measurement method, conditions for diagnosing technical objects. The essence of technical diagnostics, tasks and goals of technical diagnostics.
2. The concept of entropy in diagnostics, entropy properties, relative entropy. Phases of an object's existence, diagnostics in individual phases of an object's existence.
3. Diagnostics in the vehicle operation system, diagnostics in the operation and maintenance subsystem. Diagnostic system and relationships in the system.
4. Analysis of the diagnosis object, diagnostic models (determined and undetermined), set of features of the object state, set of parameters
output (working and accompanying).
5. The structure of an object and the diagnostic signal, the concept of structure, structure parameters describing the state of an object. Conditions that an output parameter must meet to be considered a diagnostic parameter.
6. Diagnostic parameters and their division. Symptoms of technical condition.
7. The concept of the limit and permissible value of symptoms, methods of estimating limit values. Classification of technical conditions of the facility, two-, three- and four-state classification.
8. Classification of diagnostic condition parameters, general and specific parameters.
9. Diagnosis methods, information synthesis method, information analysis method. Vehicle diagnosis methods, instrumental and non-instrumental methods.
10. Scope of technical diagnostics activities, diagnosing the current state, supervising the condition of the facility, generating existing states
(past), forecasting future states.
11. Diagnostic experiments, passive experiment, active experiment, active-passive experiment, passive-reliability experiment.
12. Diagnostic susceptibility of vehicles. Effectiveness of using diagnostics in vehicle operation.
13. Methodology of diagnostic tests, diagnostic algorithms, basic diagnostic procedures.

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	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00