STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Basics of Technical Diagnostics**		Code **1010624251010600221**
Field of study **Transport**	Profile of study (general academic, practical) **(brak)**	Year /Semester **3 / 5**
Elective path/specialty **Railway Transport**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **part-time**	
No. of hours Lecture: **14** Classes: **6** Laboratory: **-** Project/seminars: **-**		No. of credits **3**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**	
Education areas and fields of science and art **technical sciences**		ECTS distribution (number and %) **100 3%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Students have elementary knowledge about measurement techniques and modeling.
2	**Skills**	Student can solve particular problems occurring in technical systems.
3	**Social competencies**	Student can cooperate in a group and define priorities important for solving appointed problems.

Assumptions and objectives of the course:

The aim of the subject is to get students acquainted with theoretical problems connected with technical diagnostics of means of transport and methods and modes of solving problems connected with assessment of their technical condition.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Students have elementary knowledge about technical diagnostics of means of transport and methods and modes of solving problems connected with assessment of their technical condition and prognosticating. - [K1A_W25]

2. Students have elementary knowledge about conditions of diagnosing technical objects, the essence of technical diagnostics applied in means of transport, tasks and aims of technical diagnostics. - [K1A_W25]

Skills:

1. Students can find information in literature, in the internet, data bases and other sources. - [K1A _U01]

2. Students can self-educate using modern didactic tools. - [K1A _U06]

Social competencies:

1. Students are aware of necessity and know ways of continuous training, are aware of necessity to gain new knowledge for professional development. - [K1A _K01]

2. Students can define tasks and priorities of their realization for themselves and a team. - [K1A _K05]

3. 3. Students can identify and solve problems connected with practiced profession, among others, problems connected with technology and environment. - [K1A _K06]

Assessment methods of study outcomes

Written exam, pass-fail test

Course description

Term diagnostics, diagnostics as measurement method, conditions of diagnosing technical objects. The essence of technical diagnostics, tasks and aims of technical diagnostics.

Term entropy in diagnostics, characteristics of entropy, relevant entropy. Phases of object existence, diagnostics in particular phases of object existence. Diagnostics in the system of operational use of vehicles, diagnostics in usage and service subsystem. Diagnostic system. The analysis of diagnosed object, diagnostic objects (determined and non-determined), set of characteristics of object condition, set of preliminary parameters (operational and accompanying).

Object structure versus diagnostic signal, term structure, structure parameters describing object condition. Requirements of preliminary parameters to be defined as diagnostic parameter. Diagnostic parameters and and their classification. Symptoms of technical condition. Terms critical value and acceptable value of symptoms, methods of assessing critical values. Classification of technical conditions of objects, two-, three- and four-state classification.

Classification of condition diagnostic parameters, general and specific parameters. Diagnosing methods, method of information synthesis, method of information analysis. Methods of diagnosing vehicles, methods with and without instruments. Operation scope of technical diagnostics, diagnosing current condition, monitoring object condition, finding origin of existing (past) conditions, prognosticating future conditions. Diagnostic experiments, passive experiment, active experiment, active-passive experiment, passive-reliability experiment. Diagnostic susceptibility of vehicles. Effectiveness of using diagnostics in operational use of vehicles. Methodology of diagnostic tests.

Basic bibliography:

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 bibliography:

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.

Result of average student's workload

Activity	Time (working hours)
1. Preparation to the lecture	1
2. Participation in the lecture	30
3. Consolidation of the lecture content	4
4. Consultation about lecture	1
5. Preparation to the exam	5
6. Participation in the exam	1
7. Preparation to the classes	4
8. Participation in the classes	15
9. Consolidation of the classes content	4
10. Consultation about the classes	1
11. Preparation to pass-fail test	5
12. Participation in pass-fail test	1

Student's workload

Source of workload	hours	ECTS
Total workload	82	3
Contact hours	49	2
Practical activities	0	0