STUDY MODULE DESCRIPTION FORM

Name of the module/subject **The Methods of Diagnostic of Rail-Vehicles**		Code **1010624261010620551**
Field of study **Transport**	Profile of study (general academic, practical) **(brak)**	Year /Semester **3 / 6**
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: **20** Classes: **-** Laboratory: **16** Project/seminars: **-**		No. of credits **4**
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 4%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The main knowlage of the construction and operation of railway transport, as well as the physics of the phenomena occurring in the mechanical objects. The main message of Metrology and the measuring range of mechanical values Basic information from the field of linear algebra and statistics.
2	**Skills**	Can get access to information from the literature, the Internet, databases, and other sources, can be integrated to interpret the information received and to make conclusions from them, and create and justify reviews.
3	**Social competencies**	has the awareness and understands pozatechniczne aspects and consequences activities engineer of transport and its impact on the environment and responsibility for the decisions, the consequences of their actions in respect of short and long-term.

Assumptions and objectives of the course:

Knowledge of the theoretical and practical problems associated with the diagnosis of rail transport means and methods of diagnostics of rail transport. The creation of a system of diagnosis and the ability to use diagnostics in the system of management of rail transport.

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

Knowledge:

1. Understands the need for continuous training in. - [K1A_K01]
2. Has basic knowledge in the field of Metrology and measurement of mechanical values. - [K1A _K16]
3. Has basic knowledge in the field of technical diagnostics of vehicles. - [K1A _K25]

Skills:

1. Can get access to information from the literature, the Internet, databases, and other sources. - [K1A_U01]
2. Know how to plan and carry out experiments. - [K1A_U07]
3. Can analyze technical objects from the point of view of their diagnostic. - [K1A_U10]

Social competencies:

1. Has the awareness and understands another aspects and consequences. - [K1A_K02]
2. Knows how to think and work entrepreneur, make decisions. - [K1A _K07]

Assessment methods of study outcomes

A written exam and an exam on the basis of a written test and evaluation order of lessons and exercises.

Course description

The system antropotechnic the operator of the system action. Possibilities and methods of diagnostics of the operator.

The introduction of technical diagnostics of rail transport. Processes and signals diagnostics, as a source of information about the technical condition of the vehicle railway transport. A method of constructing the diagnosic system. from assumptions functional after measurement data management and reasoning. Search and Troubleshooting rail vehicles, based workflows and certificates, flaw detector. System diagnostics for cross-country skiing, internal combustion engine, electrical machinery and auxiliary equipment. Diagnostics of cars. The conditions of the technical-organizational applications diagnostics in the system of operation of rail vehicles.

A method of constructing the base system diagnostics in the LabView environment. Multisymptomowość damage and ways of integrating measuring systems for monitoring of technical condition of separate systems and units of vehicles.

Basic bibliography:

1. Marciniak: Diagnostyka techniczna kolejowych pojazdów szynowych. WKiŁ, Warszawa 1982.
2. M. Hebda, S. Niziński, H. Pelc: Podstawy diagnostyki pojazdów mechanicznych. WKiŁ, Warszawa 1980.
3. C. Cempel, F. Tomaszewski: Diagnostyka Maszyn. Zasady ogólne, przykłady zastosowań. M.C.N.E.M.T, Radom 1992.
4. B. Żółtowski: Podstawy diagnostyki maszyn. Wydawnictwo. Uczelniane Akademii Techniczno-Rolniczej w Bydgoszczy, Bydgoszcz 1996.
5. R. A. Collacot: Mechanical Fault Diagnosis and Condition Monitoring. Chapman and Hall, London 1977.

Additional bibliography:

1. W Tłaczała: Środowisko LabVIEWTM w eksperymencie wspomaganym komputerowo, WNT 2002.
2. www.ni.com.
3. www.wobit.com.pl.
4. www.kistler.com.
5. www.bksv.com.
6. www.endevco.com.

Result of average student's workload

Activity	Time (working hours)
1. Preparation for the performance	2
2. Participation in lectures	30
3. Consultations	1
4. Preparation for the exam/ credit	4
5. The participation in the examination	1
6. Part in the exercises	30
7. Fixing the contents of the report exercises	8
8. Consultations	8
9. Preparation for the exam	5
10. Participation in success	1

Student's workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	71	3
Practical activities	62	2