Poznan University of Technology
Faculty of Transport Engineering

European **C**redit **T**ransfer **S**ystem

STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
The Methods of Diagnostic of Rail-Vehicles	**1010621361010620551**

Field of study	Profile of study (general academic, practical)	Year /Semester
Transport	**general academic**	**3 / 6**

Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Railway Transport	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours				No. of credits
Lecture: **2** Classes: **-** Laboratory: **2** Project/seminars: **-**				**2**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
major	**from field**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**2 100%**
Technical sciences	**2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge from the construction and operation of railway vehicles and physics of phenomena occurring in mechanical objects.
		Basic knowledge of metrology and the range of mechanical measurements.
		Basic information on linear algebra and statistics.
2	**Skills**	is able to obtain information from literature, the Internet, databases and other sources, in Polish, is able to integrate the information obtained, interpret and draw conclusions from them, and to create and justify opinions.
3	**Social competencies**	ma świadomość ważności i rozumie pozatechniczne aspekty i skutki
		działalności inżyniera transportu i jej wpływ na środowisko oraz
		odpowiedzialność za podejmowane decyzje, konsekwencji własnych działań w aspekcie krótko i długoterminowym

Assumptions and objectives of the course:

Knowledge of theoretical and practical problems related to rail vehicle diagnostics and methods of rail vehicle diagnostics. Building a diagnostic system and the ability to apply diagnostics in rail vehicle service systems.

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

Knowledge:

1. has extensive and in-depth knowledge of physics useful for formulating and solving selected technical tasks, in particular for correct modelling of real problems   - [T1A_W02]

2. has basic knowledge of the life cycle of means of transport, both hardware and software, and in particular of the key processes taking place in them   - [T1A_W06]

Skills:

1. is able to obtain information from various sources, including literature and databases, both in Polish and English, integrate it properly, interpret and critically evaluate it, draw conclusions, and fully justify opinions formulated by him/her   - [T1A_U01]

2. is able to plan and perform experiments, including measurements and computer simulations, to interpret the results obtained, and to draw correct conclusions from them   - [T1A_U03]

Social competencies:

1. Understands that in technology knowledge and skills become obsolete very quickly - [T1A_K01]

2. Is aware of the importance of knowledge in solving engineering problems and knows examples and understands the causes of faulty transport systems, which have led to serious financial, social or even life or serious loss of health or even life - [T1A_K02]

Assessment methods of study outcomes
Written examination and credit on the basis of written test and partial marks from laboratory classes.

Course description
Anthropotechnical system - operator in an operating system. Possibilities and methods of diagnosing the operator.
Introduction to the issues of technical diagnostics of rail vehicles. Diagnostic processes and signals as a source of information about the technical condition of rail vehicles. Methodology of building a diagnostic system. From functional assumptions to management of measurement data and inference. Diagnosis of railway vehicles on the basis of working and accompanying processes, defectoscopy. Diagnostics of the gear system, combustion engine, electric machines and auxiliary equipment. Diagnostics of wagons. Technical and organizational conditions for the application of diagnostics in the system of rail vehicles exploitation.
Methodology of building a basic diagnostic system in the LabView environment? Multisymptomicity of failures and ways of integrating measurement systems for monitoring the technical condition of selected systems and assemblies of railway vehicles.

Basic bibliography:

1. R.B. Randall: Vibration based condition monitoring, Wiley, 2011.

2. Niziński S. Michalski R.: Diagnostyka obiektów technicznych. Monograficzna seria wydawnicza Biblioteka Problemów Eksploatacji, Warszawa - Sulejówek - Olsztyn - Radom, 2002

3. C. Cempel, F. Tomaszewski: Diagnostyka Maszyn. Zasady ogólne, przykłady zastosowań. M.C.N.E.M.T, Radom 1992.

Additional bibliography:

Result of average student's workload	
Activity	**Time (working hours)**
1. Preparation to the lecture	1
2. Participation in the lecture	30
3. Consultations for lectures	1
4. Preparation for the examination	1
5. Participation in the exam	1
6. Participation in laboratory classes	30
7. Strengthening the content of laboratory classes	1
8. Consultation to the laboratory	1

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	73	2
Contact hours	64	2
Practical activities	35	1