



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Techniques of vehicles diagnosis

### Course

Field of study

Mechanical and Automotive Engineering

Area of study (specialization)

Mass transport vehicles

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

polish

Requirements

elective

### Number of hours

Lecture

9

Laboratory classes

18

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr hab inż. Grzegorz Szymański

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Responsible for the course/lecturer:

### Prerequisites

Basic knowledge of mechanics, metrology, strength of materials and machine construction. Can use the scientific method in problem solving, experimentation and inference. He knows the limitations of his own knowledge and skills; is able to precisely formulate questions, understands the need for further education

### Course objective

Learning methods and acquiring practical skills in solving tasks in the field of vehicle diagnostics.

### Course-related learning outcomes

Knowledge

Has basic knowledge of the basics of machine design and the theory of machines and mechanisms, including mechanical vibrations.



Has basic knowledge of the strength of materials, including the basics of the theory of elasticity and plasticity, stress hypotheses, calculation methods for beams, membranes, shafts, joints and other simple structural elements, as well as methods of testing the strength of materials and the state of deformation and stress in mechanical structures.

Has extended basic knowledge necessary to understand specialist subjects and specialist knowledge about the construction, construction methods, manufacturing and operation of a selected group of working, transport, thermal and flow machines covered by the diploma path.

#### Skills

Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.

Can properly use modern equipment for measuring major physical quantities, used in machine research and production control.

Can use learned mathematical theories to create and analyze simple mathematical models of machines and their elements, and simple technical systems.

#### Social competences

Is ready to critically assess his knowledge and received content

Is ready to fulfill social obligations and co-organize activities for the benefit of the social environment.

Is willing to think and act in an entrepreneurial manner.

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified by a 45-minute test carried out during the 15th lecture. Kolokwim consists of questions (test and open), with different scores. Passing threshold: 50% of points.

#### Programme content

Introduction to technical diagnostics. Functional and technical diagnostics. Physico-chemical processes as a carrier of information about the condition of vehicles. Vehicle condition assessment, assessment criteria. Research and measurement techniques used in vehicle diagnostics. Modeling in diagnostic tests. Diagnostics of basic machine elements (shafts, bearings), gear transmissions, rotating machines, piston machines.

#### Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given on the board.
2. Laboratory exercises: a multimedia presentation, a presentation illustrated with examples given on the blackboard and the implementation of tasks given by the teacher - practical exercises.



## Bibliography

### Basic

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

### Additional

1. W Tłaczała: Środowisko LabVIEWTM w eksperymencie wspomaganym komputerowo, WNT 2002
2. [www.ni.com](http://www.ni.com)
3. [www.wobit.com.pl](http://www.wobit.com.pl)
4. [www.kistler.com](http://www.kistler.com)
5. [www.bksv.com](http://www.bksv.com)
6. [www.endevco.com](http://www.endevco.com)
7. [www.skf.com](http://www.skf.com)

## Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	27	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	48	2,0

<sup>1</sup> delete or add other activities as appropriate