



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Vehicle diagnostics

### Course

Field of study

Year/Semester

Transport

4/7

Area of study (specialization)

Profile of study

Road transport

general academic

Level of study

Course offered in

First-cycle studies

Polish

Form of study

Requirements

full-time

elective

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

15

30

0

Tutorials

Projects/seminars

0

0

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

PhD (Eng) Jerzy Kupiec

Piotrowo Street, 3

60 – 965 Poznan, Poland

Ph: + 48 61 665 2709

E-mail: [jerzy.kupiec@put.poznan.pl](mailto:jerzy.kupiec@put.poznan.pl)

### Prerequisites

The student has basic knowledge of the construction, operation and operation of motor vehicles and their assemblies, has basic knowledge in the field of automotive electronics

The student is able to integrate the obtained information, interpret it, draw conclusions, formulate and justify opinions, has the ability to perceive, associate and interpret phenomena occurring during the work of individual systems.

The student is aware of the importance of the technical efficiency of the vehicle and understands the technical aspects and consequences of the failure for road safety



### Course objective

Provide students with knowledge on the possibility of diagnosing motor vehicles with instrumental and non-instrumented methods, evaluation criteria, diagnostic algorithms and modern diagnostic equipment.

### Course-related learning outcomes

#### Knowledge

1. 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
2. The student has a basic knowledge of the life cycle of means of transport, both hardware and software, and in particular about the key processes taking place in them

#### Skills

1. The student is able to make a critical analysis of the functioning of transport systems and other technical solutions and assess these solutions, including: can effectively participate in technical inspection and assess the transport task from the point of view of non-functional requirements, has the ability to systematically conduct functional tests
2. The student has the ability to formulate tasks in the field of transport engineering and their implementation using at least one of the popular tools

#### Social competences

1. The student understands that in technology knowledge and skills very quickly become obsolete
2. 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:

Assessment on the basis of a written exam during the examination session and completed laboratory classes (reports + tests).

### Programme content

The scope and methods of diagnosing the working space, timing system, cooling system and the lubrication system of internal combustion engines. Basics of using vibroacoustics to diagnose an internal combustion engine.

Test methods for the toxicity of exhaust gases and the degree of their opacity as well as testing the noise generated by vehicles.

Diagnostics of the driving system and suspension of motor vehicles: indication of possible sources of deterioration of the technical condition of these systems, scope and methods of diagnosing the



suspension system, visual inspection, instrument methods, diagnosis of leading elements and their connections, methods of verification of shock absorbers, elastic elements.

Steering system diagnostics: conditions to be met by an efficient steering system, possible sources of deterioration of the technical condition, diagnostic parameters, diagnostic methods, universal mechanical-optical and optical diagnostic instruments, system geometry, diagnosis of power steering systems.

Diagnostics of hydraulic and pneumatic braking systems: possible sources of deterioration of the technical condition or failure of this system, diagnostics of actuating, supporting and executive mechanisms, assessment of the effectiveness of the braking system using instrument methods, roller devices, decelerators, overrun plates.

Drive system diagnostics: possible sources of deterioration of its technical condition, presentation of general diagnostic parameters (power on wheels, coasting path, fuel consumption), diagnostics of clutch, gearbox, drive shaft and drive axle, diagnostic instruments, inertial and load chassis dynamometers.

OBD on-board diagnostics: definition of basic terms, general principles of OBD systems operation, characteristics of diagnostic information in OBD systems, on-board diagnostics system monitors, Diagnostic information and communication in the on-board diagnostics system, directions of development of motor vehicles, on-board diagnostics of other vehicle components.

Diagnostics of lighting systems and systems of passive, active and comfort safety (air conditioning).

Vehicle inspection stations, basics of operation, equipment and documentation used during technical tests.

### Teaching methods

1. Lecture with a multimedia presentation - a combination of an information and problem lecture;
2. Laboratory - building systems and testing their operation - experimental method.

### Bibliography

Basic

1. Kupiec J., Wróblewski P.: Diagnostowanie podzespołów i zespołów pojazdów samochodowych, WKiŁ, Warszawa 2015r.
2. Niziński S.: DIAGNOSTYKA SAMOCHODÓW OSOBOWYCH I CIĘŻAROWYCH, Dom wydawniczy Bellona, Warszawa 1999r.
3. Trzeciak K.: Diagnostyka samochodów osobowych, WKiŁ, Warszawa 2005r.
4. Bocheński C.: Badania kontrolne samochodów, WKiŁ, Warszawa 2000r.



Additional

1. Serwis motoryzacyjny; miesięcznik dla naprawiających i badających pojazdy, PISKP, Warszawa 2012r.

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	90	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	45	2,0

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