COURSE DESCRIPTION CARD - SYLLABUS

Course name
On-board diagnostic systems

Course

Field of study
Construction and Exploitation of Means of Transport
Year/Semester
2/3
Area of study (specialization)
Internal Combustion Engines
Profile of study
general academic
Level of study
Second-cycle studies
Course offered in
Polish
Form of study
full-time
Requirements
compulsory

Number of hours

Lecture
30
Laboratory classes
0
Other (e.g. online)
0
Tutorials
0
Projects/seminars
0

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

Knowledge: Has knowledge of: the process of diagnosing motor vehicles in terms of diagnostics of technical processes and objects, types of diagnostics and methods of diagnostic analysis, interdependencies occurring during the diagnosis of systems and physical quantities and tools included in the research process. Has knowledge of the analysis of signals obtained from various sources of processes located in the vehicle. The student knows the possibilities of analyzing measurement signals depending on the field of research assessment adopted.

Course objective

Detailed knowledge and analysis of problems related to on-board diagnostic systems used in motor vehicles, taking into account the problems of using various sources of vehicle propulsion and strategies for controlling their operation. Thus, the objectives of this subject include not only the analysis of on-board diagnostic systems used in classic combustion engines, but also the implementation of OBD systems for alternative drives. skills in the field of diagnostics of technical processes and objects. Can

build a simple vehicle diagnosis system based on the knowledge acquired within the subject in the field of construction, operating principles of systems and procedures for diagnosis and control. Can use the knowledge obtained in the analysis of a specific case of diagnosing a vehicle component under the OBD diagnostic procedure. group, assuming different roles in it. The student is able to define priorities important in solving the tasks set before him. The student demonstrates independence in solving problems, acquiring and improving the acquired knowledge and skills.

Course-related learning outcomes

Knowledge

1.has an ordered, theoretically founded knowledge of means of transport, general characteristics and classification of means of transport, their functional properties and basic technical and operational parameters, basic nodes, mechanisms and assemblies, drive sources, drive transmission systems, types, structure and operation of means internal transport

2.has basic knowledge of ICT systems, types of information systems and their description, amount of information, data encoding and compression, information networks, information resources distribution and their flow, means and standards of information transfer, the scope of information technology applications in transport, selected systems information

3. has detailed knowledge in the field of technical operation, system reliability and safety knows: praxeological, technical and economic aspects of transport equipment operation, mathematical foundations of reliability theory, reliability models of technical systems, physical and statistical interpretation of reliability indicators, reliability structures

4. has basic knowledge in the field of metrology, knows: measurement methods, characteristics of measuring instruments and their classification according to their intended use, principles of operation and metrological features, workshop metrology, sensors and measuring transducers, recording results, measuring systems, measurement errors, influence of external factors statistical analysis of measurement results

Skills

1. can obtain information from literature, the Internet, databases and other sources, in Polish and foreign languages, can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions

2. can communicate with the use of various techniques in the professional environment and other environments, using the formal notation of construction, technical drawing, concepts and definitions from the field of study

3. is able to freely use the native and international (English) language to the extent enabling the understanding of technical texts and writing descriptions of technical objects in their technical field using dictionaries (knowledge of technical terminology)

4. can use one additional foreign language in verbal communication, can describe in this language issues related to the field of study studied, can prepare technical descriptive and drawing documentation of an engineering, transport and / or logistics task

5. has the ability to self-educate and is able to define the directions of further learning with the use of modern didactic tools, such as remote lectures, internet websites and databases, didactic programs, books and electronic journals

6. can develop a manual for operating and repairing machines from the group of devices and means of transport, covered by a selected specialty

Social competences

1. knows the need and knows the possibilities of continuous training, knows the need to acquire new knowledge for professional development, is able to organize the process of teaching other people

2. can think and act in an entrepreneurial way, make decisions, act for the development of the employer and society

3. is aware of transferring the acquired knowledge to the public, makes efforts to make this information understandable, presents various solutions and points of view

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The learning outcomes presented above are verified as follows: Final test

Programme content

Introduction to diagnostics of technical processes and objects. Division of diagnostics from the point of view of the life phases of a technical object and the purposes of its application. Analysis of interdependencies in the diagnosis process, evaluation of the sources and value of diagnostic information and diagnostic parameters, the genesis of the choice of the method of diagnosis and the location of measurement of the quantity carrying information about the process and technical condition of the object, diagnostic signals and symptoms (biomechanical approach), cause and effect relations between the condition of the object and the signal , diagnostic algorithms and process generation models, techniques for analyzing diagnostic signals. An introduction to on-board diagnostics of vehicles, including the purposes of its application, legal and technical requirements, design features and areas of application of on-board vehicle diagnostics. Legal regulations, technical standards and emissions of harmful components, and OBD on-board diagnostics. Division of vehicle diagnostic systems. Construction of OBD systems with regard to their next generations. Operation of the on-board diagnostic system (OBD), taking into account the classification of emission elements, diagnostic tests and their types. Rules for placing emission elements and decision strategies. Characteristics of OBD system diagnostic tests, diagnostic information and communication. Properties of diagnostic information readers in OBD II / EOBD systems. Components of OBD systems and their characteristics. The types of ICT systems used in various OBD systems from the point of view of the communication strategy in the system and the processing of diagnostic data and the possibility of their development in

future vehicle information network communication architectures. Analysis of diagnostic data obtained from the OBD system and decision-making procedures. Maintenance and repair of vehicles equipped with OBD systems

Teaching methods

1. Lecture with multimedia presentation
2. Problem solving with the participation of students (problem, case and simulation method)
3. Elements of discussions and practice-practical methods

Bibliography

Basic

1. Ecological problems of internal combustion engines. Vol. 1 i 2 / Jerzy Merkisz; Poznan University of Technology. Publish. PP, 1999.

2. On-board diagnostic systems of motor vehicles / Jerzy Merkisz, Stanisław Mazurek> WKiŁ 2002.

3. Thermal state of the internal combustion engine and the emission of harmful compounds / Piotr Bielaczyc, JerzyMerkisz, Jacek Pielecha. Publish. Poznań University of Technology, 2001.

4. On-board diagnostic systems of motor vehicles / Jerzy Merkisz, Stanisław Mazurek. Communication and Communications Publishing House, 2004

5. Alternative vehicle drives / Jerzy Merkisz, Ireneusz Pielecha. Publishing House of the Poznań University of Technology, 2006.

6. On-board diagnostic systems of motor vehicles / Jerzy Merkisz, Stanisław Mazurek. Communication and Communications Publishing House, 2007.

7. Pragmatic basics of atmospheric air protection in road transport / Jerzy Merkisz, Jacek Pielecha, Stanisław Radzimirski. Publishing House of the Poznań University of Technology, 2009.

8. Automotive emissions in the light of new EU regulations / Jerzy Merkisz, Jacek Pielecha, Stanisław Radzimirski. Communication and Communications Publishing House, 2012.

9. On-board recording devices in cars / Jerzy Merkisz, Stanisław Mazurek, Jacek Pielecha. Publishing House of the Poznań University of Technology, 2007.

10. Exhaust gas treatment systems and OBD vehicle diagnostic systems. Uwe Rokosch, WKiŁ 2007.

Additional

1. Bench tests and diagnostics. Kazimierz Sitek, Stanisław Syta, WKiŁ 2011.

2. Diagnostics of passenger cars. Krzysztof Trzeciak, WKiŁ 2010.

3. On-board diagnostics. OBD II / EOBD standard - service manual. Stefan Myszkowski.

4. Data exchange buses in vehicles. Protocols and standards. W. Zimmermann, R. Schmidgall. WKiŁ.

5. Vehicle data buses. Martin Frei. WKiŁ.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1,0

[1] delete or add other activities as appropriate