

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject On-Board Diagnostic Systems		Code 1010625231010620540
Field of study Mechanical Engineering	Profile of study (general academic, practical) general academic	Year /Semester 2 / 3
Elective path/specialty Combustion Engines	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 18 Classes: - Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 2 100%
Responsible for subject / lecturer: D.Sc., Ph.D., Mech. Eng. Marek Waligórski email: marek.waligorski@put.poznan.pl tel. 61 647 59 95 Transport Engineering Piotrowo 3 Str., 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Has knowledge about: the process of diagnosing motor vehicles in terms of diagnostics of processes and technical 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 in the field of signal analysis obtained from various sources of processes placed in the vehicle. The student knows the possibilities of analysis of measurement signals depending on the adopted field of research assessment. The student knows: what is the on-board diagnostic system, what are the reasons for its use,
2	Skills	One can analyze various types of on-board vehicle diagnostic systems in accordance with the adopted criteria and in accordance with knowledge and skills in the diagnosis of processes and technical facilities. One can build a simple vehicle diagnosis system based on knowledge acquired within the framework of the subject, the principles of operation of systems and procedures for diagnosis and control. Knows how to use the acquired knowledge in the analysis of a specific case of diagnosing a vehicle component as part of the OBD diagnostic procedure.
3	Social competencies	The student is able to cooperate in a group, taking various roles in it. The student can determine the priorities important in solving the tasks set before him. Student demonstrates independence in solving problems, acquiring and improving acquired knowledge and skills.
Assumptions and objectives of the course: Detailed knowledge and analysis of problems related to on-board diagnostic systems used in automotive vehicles, including the problems of using various sources of vehicle propulsion and strategies for controlling their work. Thus, among the goals of this subject is not only the analysis of on-board diagnostic systems used in classical internal combustion engines, but also the consideration of the implementation of OBD systems for alternative drives.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		

<p>1. has ordered, theoretically founded knowledge in the field of transport, general characteristics and classification of transport means, their functional properties and basic technical and operational parameters, basic nodes, mechanisms and assemblies, sources of propulsion, transmission systems, types, construction and operation of internal means of transport. - [K2A_W14]</p> <p>2. has basic knowledge in the field of ICT systems, types of information systems and their description, the amount of information, data coding and compression, information networks, information resources and their flow, means and standards of information transfer, the scope of information technology applications in transport, selected information systems. - [K2A_W15]</p> <p>3. has a detailed knowledge of technical operation, reliability and security of systems knows: praxeological, technical and economical aspects of transport equipment operation, mathematical foundations of reliability theory, reliability models of technical systems, physical and statistical interpretation of reliability indicators, reliability structures, - [K2A_W16]</p> <p>4. has basic knowledge in metrology field, knows: measurement methods, characteristics of instruments and classification according to purpose, principles of operation and metrological features, workshop metrology, sensors and transducers, results registration, measurement systems, errors - external factors influence, statistical analysis measurement results - [K2A_W17]</p>
<p>Skills:</p> <p>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, and create and justify opinions - [K2A_U01]</p> <p>2. is able to communicate using various techniques in a professional environment and other environments using a formal record of construction, technical drawing, concepts and definitions in the field of the studied field of study - [K2A_U02]</p> <p>3. knows how to use native and international language (English) freely to the extent that it is possible to understand technical texts and to write descriptions of technical objects in dictionaries using technical dictionaries (knowledge of technical terminology) - [K2A_U03]</p> <p>4. knows how to use verbal communication in one additional foreign language, can describe issues in the field of the studied field of study in this language, can prepare technical documentation descriptively - drawing engineering, transport and / or logistic tasks - [K2A_U04]</p> <p>5. has the ability to self-education and can determine the directions of further learning using modern teaching tools, such as remote lectures, websites and databases, didactic programs, e-books and magazines - [K2A_U06]</p> <p>6. can develop a manual for servicing and repairing machines from the group of devices and means of transport covered by the selected specialty - [K2A_U15]</p>
<p>Social competencies:</p> <p>1. understands the need and knows the possibilities of continuous training, knows the need to acquire new knowledge for professional development, can organize the process of teaching other people - [K2A_K01]</p> <p>2. can think and act in an entrepreneurial way, make decisions, act for the development of the employer and society - [K2A_K07]</p> <p>3. is aware of the transfer of knowledge to the public, makes efforts to understand this information, presents different solutions and points of view - [K2A_K08]</p>

Assessment methods of study outcomes
Final test
Course description
<p>Introduction to diagnostics of processes and technical objects. Division of diagnostics from the phase perspective the life of the technical object and the purposes of its use. Analysis of interdependence in the diagnosis process, assessment of the sources and values ??of diagnostic information and diagnostic parameters, the genesis of the choice of method</p> <p>diagnose and location of measurement of the size of information about the process and technical condition of the object, signals and diagnostic symptoms (biomechanical approach), causal relationship between the state of the object and signal, diagnostic algorithms and models of process generation, diagnostic signal analysis techniques.</p> <p>Introduction to on-board vehicle diagnostics, including its application, legal and technical requirements, design features and areas of on-board vehicle diagnostics. Legal regulations, technical standards and emission of harmful components and OBD on-board diagnostics. Division of vehicle diagnostics systems. Building OBD systems including their subsequent generations. OBD on-board diagnostic system operation taking into account the classification of emission elements, diagnostic tests and their types. Placement rules emission elements and decision strategies. Characteristics of diagnostic tests of OBD systems, information diagnostic and communication. Properties of diagnostic information readers in OBD II / EOBD systems. components components of OBD systems and their characteristics. Types of teleinformation systems used in various systems OBD from the point of view of communication strategy in the system and processing of diagnostic data and their capabilities development in future IT communication architectures of the vehicle. Analysis of diagnostic data obtained from the OBD system and decision-making procedures. Service and repair of vehicles equipped with OBD systems.</p>

Basic bibliography:		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparation for the lecture	4	
2. Participation in the lecture	28	
3. Fixing the content of the lecture	8	
4. Consultations	4	
5. Preparation for passing	4	
6. Participation in the test	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	50	2
Contact hours	30	1
Practical activities	0	0