STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Car diagnostics		**1010611361010618485**

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)
Road 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: **1**	Project/seminars: **-**		**2**

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

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**	The student has a basic knowledge of the construction, operation and maintenance of motor vehicles and their components have a basic knowledge of automotive electronics.
2	**Skills**	The student is able to integrate the obtained information, make their interpretation, draw conclusions, formulate and justify opinions, has the ability to see, associate and interpret phenomena occurring during the work of individual systems.
3	**Social competencies**	The student is aware of the importance of the technical efficiency of the vehicle and understands the technical aspects and effects of the failure for road safety.

Assumptions and objectives of the course:

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

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

Knowledge:

1. Has an extended basic knowledge necessary for understanding specialist subjects and specialist knowledge on the diagnosis of mechanical objects covered by the specialization profile of BTI, in particular: 1. Motor vehicles 2. Mechatronic systems 3. Internal combustion engines. - [M1_W19]

Skills:

1. Can acquire information from literature, the internet, databases and other sources. Can integrate the information obtained and interpret conclusions and create and justify opinions - [M1_U01]

2. Is able to properly use modern equipment to measure the main physical quantities used in machine testing and production control. - [M1_U04]

Social competencies:

1. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem - [M1_K02]

Assessment methods of study outcomes

Assessment based on a written test carried out during the exam session and completed laboratory classes (reports + tests).

Course description

Scope and methods of diagnosing work space, timing system, cooling system and lubrication system of internal combustion engines. Basics of using vibroacoustics to diagnose an internal combustion engine.

Diagnosis of ignition systems and electrical equipment: classical and fully electronic ignition systems. Possibilities of diagnosing modern ignition systems, including coils, spark plugs. Oscilloscope diagnostic methods. Diagnosing the power supply system with electric energy and the starting circuit. Vehicle lighting diagnosis methods.

Diagnostics of power systems for spark-ignition and self-ignition engines: injection of fuel and air supply systems

Methods for testing the toxicity of exhaust gases and their degree of smoke as well as testing the noise generated by vehicles.

Diagnostics of the chassis 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, instrumental methods, diagnosing of conducting elements and their connections, methods of verification of shock absorbers, elastic elements.

Diagnostics of the steering system: conditions that should 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 technical condition or disability of this system, diagnostics of actuating, supporting and implementing mechanisms, evaluation of braking system's effectiveness with instrumental methods, roller devices, delay gauges, overrun plates.

Diagnostics of the drive system: possible sources of deterioration of its technical condition, presentation of general diagnostic parameters (power on wheels, coastage, fuel consumption), diagnostics of the clutch, gearbox, drive shaft and drive axle, diagnostic instruments, inertia and load chassis dynamos.

OBD on-board diagnostics: defining basic definitions, general principles of OBD systems operation, characteristics of diagnostic information in OBD systems, on-board diagnostic system monitors, diagnostic information and communication in the on-board diagnostic system, directions of car vehicle development, on-board diagnostics of other vehicle units.

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

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

Basic bibliography:

1. Kupiec J., Wróblewski P.: Diagnozowanie 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 bibliography:

1. Serwis motoryzacyjny ? miesięcznik dla naprawiających i badających pojazdy, PISKP, Warszawa 2018r.

Result of average student's workload

Activity	Time (working hours)
1. Participation in the lecture	30
2. Participation in laboratory exercises	15
3. Preparation of the report	3
4. Preparation for the exam	2
5. Participation in the exam	3

Student’s workload

Source of workload	hours	ECTS
Total workload	74	2
Contact hours	42	1
Practical activities	46	2