

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Powertrain Diagnostics</b>		Code <b>1010621271010622438</b>
Field of study <b>Transport</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>4 / 7</b>
Elective path/specialty <b>Ecology of Transport</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>1</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>1</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b>		ECTS distribution (number and %) <b>1 100%</b>
<b>Responsible for subject / lecturer:</b>  Jarosław Kałużny, dr inż. email: jaroslaw.kaluzny@put.poznan.pl tel. 61 6652355 Faculty of Machines and Transport 3 Piotrowo street, 60-965 Poznan, Poland		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	The student has academic level knowledge in area of vehicle structure and subsystem design and functioning The student has basic knowledge in mathematics The students has basic knowledge in combustion engines design and functioning
2	<b>Skills</b>	The student is able to do analyses, synthesize informations, draw conclusions, make and reason the remarks
3	<b>Social competencies</b>	Understands the need and knows the possibilities of lifelong learning. Is aware of and understands the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment and responsibility for own decisions.
<b>Assumptions and objectives of the course:</b> To make students familiar with knowledge allowing testing and measuring vehicle systems, with regard to ecological aspects of combustion engines exploitation		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. The student has knowledge of the role of combustion engines in transport, knows the advantages and disadvantages of combustion engines and alternative powertrain - [K1A_W14] 2. The student has knowledge of combustion engines design, as well as design of combustion engines systems and subsystems - [K1A-W21] 3. The student understands the ecological aspects of combustion engines exploitation - [K1A_W24] 4. The student understands the functioning and restrictions of on-board diagnostics systems - [K1A_W25]		
<b>Skills:</b> 1. The student is able to estimate the effects of defined powertrain malfunctions in vehicles - [K1A_U07] 2. The student knows the methods of powertrain diagnostics - [K1A_U03] 3. The student understands the main principles of diagnostics process and is able to follow the development of vehicles design and design of diagnostics systems - [K1A_U01]		
<b>Social competencies:</b>		

1. The student understands the meaning of development and strives the improvement of their own social competences - [K1A\_K02]
2. The student understands the meaning of engineers knowledge and work for the peoples society, he estimates the social aspects of engineers activity - [K1A-K07]
3. The student knows, that the social necessity is the reason for engineers work - [K1A\_K08]

### Assessment methods of study outcomes

Written test, which is based on answers related to the selection of given answers and open questions. Credits will be given after achieving at least 50% of points. Answers are scores from 0 to 1 point

### Course description

Repetition and systemizing of knowledge in area of combustion engines design and function with special regard to design and functioning of engine control- and fuel supply systems.

Principles of powertrain management, algorithms and functional relations.

Diagnostic problems connected to the fuel supply systems in SI Engines.

Diagnostic problems connected to the fuel supply systems in SI Engines.

The methods of powertrain diagnostic, diagnostic tools and procedures.

Diagnostics of the direct injection, turbocharged SI engine.

Diagnostics of the direct injection, turbocharged CI engine.

The future development paths in engines with special regard to development of diagnostic methods and tools.

Self-study methods.

#### Basic bibliography:

1. Wajand J Tłokowe silniki spalinowe średnio- i szybkoobrotowe WNT, Warszawa 2005
2. Merksiz J., Mazurek S. Pokładowe systemy diagnostyczne pojazdów samochodowych, WKŁ, 2002
3. Rokosch U. Układy oczyszczania spalin i pokładowe systemy diagnostyczne samochodów, WKŁ, 2007

#### Additional bibliography:

1. Silniki Spalinowe kwartalnik
2. Volkswagen AG, Wolfsburg Selbststudienprogramm; wersja polska: Zeszyty samodzielnego kształcenia, wersja angielska Self Study Program
3. Zimbardo P, Psychology and Life, 13th Edition, Allyn and Bacon, Boston, Massachusetts, USA, 1992, tłumaczenie polskie PWN

### Result of average student's workload

Activity	Time (working hours)	
1. Participation in lectures	15	
2. Consultation	2	
3. Preparation for written credits (based on lectures).	5	
Student's workload		
Source of workload	hours	ECTS
Total workload	22	1
Contact hours	17	1
Practical activities	5	0