STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Environment and Ecology**			Code **1010621271010623054**
Field of study **Mechanical Engineering**	Profile of study (general academic, practical) **(brak)**		Year /Semester **4 / 7**
Elective path/specialty **Internal Combustion Engines**	Subject offered in: **Polish**		Course (compulsory, elective) **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **full-time**		
No. of hours Lecture: **1** Classes: **1** Laboratory: **1** Project/seminars: **-**			No. of credits **4**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**		
Education areas and fields of science and art **technical sciences**			ECTS distribution (number and %) **4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	student learns the classification of harmful compounds to human health and to their characteristics, the student acquires general knowledge of environmental factors causing danger to the environment, to know how to prevent the entry of harmful substances into the atmosphere, acquire general knowledge in the construction and operation of the mitigation into the atmosphere, take in practice the methodology of measuring emissions from internal combustion engines, can handle the latest equipment for testing in real conditions and engine test bench can count emissions according to EU standards
2	**Skills**	student is able to integrate obtained information, to make their interpretation, draw conclusions, formulate and justify opinions, have a general knowledge of health and safety
3	**Social competencies**	student is aware of the risks associated with the emission of harmful substances into the atmosphere and has a negative environmental awareness social behavior on health and human security in transport and industry

Assumptions and objectives of the course:

-Introduction to the theme of ecology in the industry and the automotive industry, general knowledge of the risks associated with human activities now and the possible consequences in the future.

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

Knowledge:

1. He knows the classification of harmful and toxic compounds. - [K1A_W03]
2. He knows the rules associated with emissions of harmful exhaust gases. - [K2A_W21]
3. He knows the methods to prevent the emission of harmful substances into the atmosphere. - [K2A_W20]
4. He knows the general outline of environmental determinants of transport. - [K2A_W20]
5. He knows the quality of road transport conditions. - [K2A_W20]

Skills:

1. 1. He can a classified categories of vehicles. - [K2A_U02]
2. 2. He can analyze the major factors shaping the environmental performance of the transport. - [K2A_U09]
3. 3. Know how to interpret the provisions of toxic gases - [K2A_U16]
4. 4. He can make a preliminary assessment of the environmental performance of vehicle. - [K2A_U16]

Social competencies:

1. 1. Recognizes the importance of protecting the environment. - [K2A_K01]
2. 2. He can point to important social factors affecting environmental awareness. - [K2A_K02]

Assessment methods of study outcomes
-Test of knowledge of the toxicity of exhaust gas regulations, standards, and general environmental awareness in transport. Two tests during the semester.
Course description
-Lecture ? environmental conditions for transport, natural resources, social and economic factors, classification of vehicles, standards toxic gases.

Basic bibliography:

1. 1. Stanisław Wiąckowski, Toksykologia środowiska człowieka. Wydawnictwo: Branta, 2010 ISBN: 978-83-616-6806-0.

2. 2. Merkisz Jerzy, Mazurek Stanisław, Pokładowe Systemy Diagnostyczne Pojazdów Samochodowych. Wydawnictwa Komunikacji i Łączności WKŁ, 2006-01-01.

3. 3. Jerzy Merkisz, Ekologiczne problemy silników spalinowych, Wyd. Politechniki Poznańskiej, Poznań 1998.

4. 4. Merkisz J., Pielecha I., Alternatywne napędy pojazdów. Wydawnictwo Politechniki Poznańskiej, Poznań 2006.

5. 5. Nagórski Z., Teodorczyk A., Bernhard M., Regeneracja samochodowych filtrów cząstek stałych ? tendencje rozwojowe, modelowanie i badania symulacyjne. Politechnika Warszawska, Instytut Pojazdów, Instytut Techniki cielnej. Wydawnictwo WsiMR PW, Warszawa 2003.

6. Kruczyński S.W., Trójfunkcyjne reaktory katalityczne. Politechnika Warszawska, Warszawa ? Radom 2004

Additional bibliography:

1. 1. Wojciech Serdecki, Badania silników spalinowych. Wyd. Politechniki Poznańskiej, Poznań 2012.

2. 2. Witold M. Lewandowski, Proekologiczne źródła energii odnawialnej. WNT, Warszawa 2002.

3. 3. Zdzisław Chłopek, Ochrona środowiska naturalnego. Pojazdy samochodowe. WKŁ, Warszawa 2003.

Result of average student's workload

Activity	**Time (working hours)**
1. Prepare to the class	5
2. Activity	15
3. Knowledge	10
4. Excersices	15
5. Labour	15
6. Prepare to the test	15
7. Test activity	2

Student's workload

Source of workload	**hours**	**ECTS**
Total workload	77	4
Contact hours	62	3
Practical activities	15	1