

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Ecological Aspects of Internal Combustion Engines		Code 1010622221010620478
Field of study Mechanical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 2
Elective path/specialty Internal Combustion Engines	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: - Project/seminars: -		No. of credits 2
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 %) 2 100%
Responsible for subject / lecturer: DEng. Andrzej Ziolkowski email: andrzej.ziolkowski@put.poznan.pl tel. 61 665 2045 Faculty of Machines and Transport 3 Piotrowo street, 60-965 Poznan, Poland		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	student has a basic understanding of the impact of the use of vehicles on the environment, exhaust emissions regulations and methods of reducing the negative impact of transport on the environment
2	Skills	student is able to integrate the information, make their interpretation, draw conclusions, formulate and justify opinions
3	Social competencies	student is aware of and understands the importance and impact of the technical aspects of vehicle operation
Assumptions and objectives of the course: refer to environmental issues in transport, general knowledge of the methods of measuring emissions from vehicles of different categories, general knowledge of alternative sources of powertrains		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. He knows the terminology in the English language associated with the toxicity of exhaust gases. - [-] 2. Familiar with the basic standards in the field of toxic exhaust gases. - [-] 3. He knows the basics of field methods for measuring exhaust gas emissions. - [-] 4. He knows the basics associated with factors affecting the environmental performance of vehicles. - [-] 5. He knows the quality of road transport conditions. - [-] 6. He has a general knowledge of the development trend of the means of transport. - [-]		
Skills:		
1. He can a classified categories of vehicles. - [-] 2. He can analyze the major factors shaping the environmental performance of the transport. - [-] 3. Know how to interpret the provisions of toxic gases. - [-] 4. He can make a preliminary assessment of the environmental performance of vehicle. - [-]		
Social competencies:		
1. Recognizes the importance of protecting the environment. - [-] 2. He can point to important social factors affecting environmental awareness. - [-] 3. Able to analyze qualitatively the negative impact of human behavior on the environment in transport. - [-] 4. Able to independently develop their knowledge of the toxicity of exhaust gas regulations. - [-]		

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.		
Exercise ? calculation of fuel consumption, emissions during stationary cycles and specific emissions.		
Basic bibliography:		
1. Jerzy Merkisz, Mazurek Stanisław, Pokładowe Systemy Diagnostyczne Pojazdów Samochodowych. Wydawnictwa Komunikacji i Łączności WKŁ, 2006-01-01.		
2. Jerzy Merkisz, Ekologiczne problemy silników spalinowych, Wyd. Politechniki Poznańskiej, Poznań 1998.		
Additional bibliography:		
1. Jan Gronowicz, Ochrona środowiska w transporcie lądowym. Wyd. ITE, Poznań ? Radom 2003.		
2. Wojciech Serdecki, Badania silników spalinowych. Wyd. Politechniki Poznańskiej, Poznań 2012		
Result of average student's workload		
Activity	Time (working hours)	
1. Total workload	65	
2. Contact hours	32	
3. Practical activities	1	
Student's workload		
Source of workload	hours	ECTS
Total workload	30	1
Contact hours	17	1
Practical activities	0	0