

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Ecological Aspects of CPowertrains Application		Code 1010624371010620377
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 4 / 7
Elective path/specialty Ecology of Transport	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 9 Classes: 9 Laboratory: - Project/seminars: 9		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 Technical sciences		ECTS distribution (number and %) 4 100% 4 100%
Responsible for subject / lecturer: dr hab. inż. Paweł Fuć, prof. nadzw. email: pawel.fuc@put.poznan.pl tel. 61 665-2045 Faculty of Transport Engineering ul. Piotrowo 3 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	student has a basic knowledge of the environmental factors causing danger to the environment, meets the mechanisms of toxic compounds in transport and industry, know how to prevent the entry of harmful substances into the atmosphere, meets the classification of harmful compounds to human health and the safety data sheets
2	Skills	student is able to integrate the information, make their interpretation, draw conclusions, formulate and justify opinions, have general knowledge of safety and environmental protection in the workplace
3	Social competencies	student is aware of the risks associated with the issue of harmful substances into the atmosphere and is aware of the negative environmental social behavior on health and human security in transport and industry
Assumptions and objectives of the course: refer to environmental issues in industry, general knowledge of the risks associated with human activities now and the possible effects on future hazard classification and their determination		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. He knows the causes of harmful and toxic compounds - [-] 2. Familiar with the basic structure of the standard toxicity of exhaust gases and gases - [-] 3. He knows the methods of prevention of harmful emissions into the atmosphere - [-] 4. He knows the general outline of environmental determinants of mass transit - [-] 5. He has a general knowledge of the risks of industrial development on the environment - [-] 6. Has basic knowledge in the field of safety in terms of contact with toxic substances - [-]		
Skills:		
1. He has skills of classified categories of vehicles - [-] 2. He can analyze the factors shaping environmental performance of transport - [-] 3. He can analyze the provisions of the toxicity of exhaust gases and gases based on the literature - [-] 4. He can make a preliminary assessment of environmental risks in transport and industry - [-]		
Social competencies:		
1. The possibility of formation of environmental awareness in the social environment - [-] 2. Awareness of social risks in terms of environmental protection - [-]		

Assessment methods of study outcomes		
Test of knowledge of the formation of harmful compounds, structures standards toxicity of exhaust gases. One test during the semester		
Course description		
Lecture ? classification of propulsion systems, basic information of ecological transport, basic knowledge of exhaust gas cleaning systems, eco-friendly technologies in transport, the impact of macroeconomic factors on the implementation of environmentally friendly technologies in transport		
Basic bibliography:		
1. Stanisław Wiąckowski, Toksykologia środowiska człowieka. Wydawnictwo: Branta, 2010 ISBN: 978-83-616-6806-0		
2. Merkiż Jerzy, Mazurek Stanisław, Pokładowe Systemy Diagnostyczne Pojazdów Samochodowych. Wydawnictwa Komunikacji i Łączności WKŁ, 2006		
3. Jerzy Merkiż, Ekologiczne problemy silników spalinowych, Wyd. Politechniki Poznańskiej, Poznań 1998		
4. Merkiż J., Pielecha I., Alternatywne napędy pojazdów. Wydawnictwo Politechniki Poznańskiej, Poznań 2006.		
Additional bibliography:		
1. Wojciech Serdecki, Badania silników spalinowych. Wyd. Politechniki Poznańskiej, Poznań 2012		
2. Witold M. Lewandowski, Proekologiczne źródła energii odnawialnej. WNT, Warszawa 2002		
3. Zdzisław Chłopek, Ochrona środowiska naturalnego. Pojazdy samochodowe. WKŁ, Warszawa 2003		
4. Jan Gronowicz, Ochrona środowiska w transporcie lądowym. Wyd. ITE, Poznań ? Radom 2003		
Result of average student's workload		
Activity		Time (working hours)
Student's workload		
Source of workload	hours	ECTS
Total workload	62	4
Contact hours	32	2
Practical activities	30	2