

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Energy Management in Transportation		Code 1010612321010600385
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 2
Elective path/specialty Railway Transport	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: 1 Classes: 1 Laboratory: - Project/seminars: -		No. of credits 3
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 %) 3 100% 3 100%
Responsible for subject / lecturer: dr hab. inż. Jarosław Bartoszewicz, prof. nadzw. email: jaroslaw.bartoszewicz@put.poznan.pl tel. +48616652215 Faculty of Transport Engineering ul. Piotrowo 3 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The knowledge gained during the study subjects: Physics, chemistry, thermodynamics, mechanics, economics has an ordered, knowledge of the means of transport, their functional properties and basic parameters operational and technical
2	Skills	It can retrieve information from the literature, the Internet, databases, and other sources, in the language of Polish and foreign, can integrate the information to interpret and draw conclusions from them, and create and justify reviews
3	Social competencies	Understand the validity of and understand non-technical aspects and effects of transport engineering activities and its impact on the environment and the responsibility for the decisions taken, the consequences of their own actions in terms of short and long term
Assumptions and objectives of the course: Skill of making a correct analysis and evaluation of energy processes with a focus on the field of transport.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. has advanced and in-depth knowledge in the field of transport engineering, theoretical foundations, tools and means used to solve simple engineering problems - [T2A_W01] 2. has knowledge about development trends and the most important new achievements of transport means and other, selected, related scientific disciplines - [T2A_W04]		
Skills: 1. can - when formulating and solving engineering tasks - integrate knowledge from various transport areas (and if necessary also knowledge from other scientific disciplines) and apply a systemic approach, also taking into account non-technical aspects - [T2A_U05] 2. can assess the usefulness and the possibility of using new achievements (methods and tools) and new products of transport technology - [T2A_U06]		
Social competencies: 1. understands the importance of popularizing activities regarding the latest achievements in the field of transport engineering - [T2A_K03]		
Assessment methods of study outcomes		

Classification on the basis of a written test and evaluations of classroom practice.		
Course description		
Energy consumption in the life cycle of a transport system with a focus on vehicles. Basic problems. Indicators of the unit energy consumption and egzergy, the cumulative energy consumption and egzergy. Issues of technical and economical optimisation of energy processes and systems used for transport. Energy technologies environmental man. Renewable fuels and renewable not-their use in rail transport.		
Basic bibliography:		
1. Bałandynowicz H.W. i inni: Energochłonność skumulowana, Polska Akademia Nauk. Instytut Podstawowych Problemów Techniki, Warszawa : Państwowe Wydawnictwo Naukowe, 1983.		
2. Gronowicz J.: Energochłonność transportu kolejowego. Trakcja spalinowa, Warszawa, Wydawnictwo Komunikacji i Łączności, 1990.		
3. Gronowicz J.: Gospodarka energetyczna w transporcie lądowym, Wydawnictwo Politechniki Poznańskiej, Poznań 2006.		
Additional bibliography:		
1. J. Szargut, A. Ziębik - Podstawy energetyki cieplnej, PWN, Warszawa 1998.		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparing for lectures	5	
2. Participation in lectures	45	
3. Fixation of the lecture content	8	
4. Consultation	12	
5. Exam preparation	15	
6. Exam	5	
Student's workload		
Source of workload	hours	ECTS
Total workload	80	3
Contact hours	40	2
Practical activities	0	0