

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Energy Management in Transportation</b>		Code <b>1010621351010600385</b>
Field of study <b>Transport</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>3 / 5</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>1</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>2</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> <b>Technical sciences</b>		ECTS distribution (number and %) <b>1 100%</b> <b>1 100%</b>
<b>Responsible for subject / lecturer:</b>  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		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	The knowledge gained during the study subjects: Physics, chemistry, thermodynamics, mechanics, economics; is an ordered, with theoretical principles, knowledge of the means of transport, their functional properties and basic operational and technical parameters.
2	<b>Skills</b>	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	<b>Social competencies</b>	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.
<b>Assumptions and objectives of the course:</b> Skill of making a correct analysis and evaluation of energy processes with a focus on the field of transport.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Has a structured and theoretically founded general knowledge in the field of key issues of technology and detailed knowledge in the field of selected issues of this discipline in transport engineering - [T1A_W04]		
2. He knows the basic concepts in the field of economics, referring in particular to transport investments - [T1A_W09]		
<b>Skills:</b>		
1. He can make a critical analysis of the functioning of transport systems and other technical solutions and evaluate these solutions, including: can effectively participate in the technical inspection and to assess the transport task from the point of view of non-functional requirements, it has the ability to systematically carry out functional tests - [T1A_U09]		
2. Can design elements of transport using environmental data - [T1A_U12]		
<b>Social competencies:</b>		
1. He understands that in technology, knowledge and skills quickly become obsolete - [T1A_K01]		
<b>Assessment methods of study outcomes</b>		
Classification on the basis of a written test and evaluations of classroom practice.		
<b>Course description</b>		

Energy consumption in the life cycle of a transport system with a focus on vehicles. Basic problems. Indicators of the unit energy consumption and energy, the cumulative energy consumption and energy. 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. Baładynowicz 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
4. Baładynowicz H.W. i inni: Energochłonność skumulowana, Polska Akademia Nauk. Instytut Podstawowych Problemów Techniki, Warszawa : Państwowe Wydawnictwo Naukowe, 1983
5. Gronowicz J.: Energochłonność transportu kolejowego. Trakcja spalinowa, Warszawa, Wydawnictwo Komunikacji i Łączności, 1990
6. 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
2. J. Szargut, A. Ziębik - Podstawy energetyki cieplnej, PWN, Warszawa 1998

**Result of average student's workload**

Activity	Time (working hours)
1. Participation in the lecture	30
2. Consultation	5
3. Preparation for exam with lecture and accounting exercise	15
4. Participation with exam lecture and accounting exercise	2

**Student's workload**

Source of workload	hours	ECTS
Total workload	52	2
Contact hours	37	2
Practical activities	0	0