

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Energy Management in gas and fluid transportation		Code 1010631331010633216
Field of study Transport	Profile of study (general academic, practical) general academic	Year /Semester 2 / 3
Elective path/specialty Engineering of Pipeline 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: 2 Classes: - Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 2 100% 2 100%
Responsible for subject / lecturer: Prof. dr hab. inż. Ewa Tuliszką-Sznitko, email: ewa.tuliszka-sznitko@put.poznan.pl tel. 61 665 2111 (Faculty of Transport Engineering ul. Piotrowo 3, 60-965 Poznań)		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The student has basic knowledge of thermodynamics, fluid mechanics and economics.
2	Skills	The student knows how to carry out basic thermodynamic calculations, how to create engineering algorithms and to analyze technological schemes.
3	Social competencies	The student is able to work in a group.
Assumptions and objectives of the course: The aim of the course is to understand the principles of rational acquisition, processing, transportation, distribution and the use of energy. To gain knowledge on the balancing of energy systems, and to deepen the knowledge of the impact of technological processes on environment. To gain knowledge on the domestic gas and oil pipeline transport system.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
Skills:		
Social competencies:		
Assessment methods of study outcomes		
Written exam, tests		
Course description		
Basic problems of energy. World and national primary energy deposits. The national energy system. The domestic gas and oil pipeline transport system. Underground natural gas storages. Vapor and combined power cycles. Gas power cycles. Methods of increasing thermal cycle efficiency. Stationary gas turbine installations. Co-generation of heat and electricity. The use of renewable energy. The use of waste energy. The cost of building of power plants. Energy audit - basic definitions and rules. The benefits from energy saving.		

Basic bibliography:		
1. Górzyński J., Audyting energetyczny, Biblioteka Fundacji Poszanowania Energii, 2000		
2. Szargut J.: Termodynamika techniczna, Wyd. P. Śl. 2011		
3. Laudyn D., Pawlik M., Strzelczyk F., Elektrownie, WNT Warszawa, 2000		
4. Wiśniewski St.: Termodynamika techniczna, WNT 1995		
5. Tuliszka E. Red.: Termodynamika techniczna. Zbiór zadań, Nr 889, Wyd. P.P. 1980		
6. Tuliszka E. Red.: Termodynamika techniczna. Zbiór zadań, Nr 889, Wyd. P.P. 1980		
Additional bibliography:		
1. Szymański W., Wolańczyk F., Termodynamika powietrza wilgotnego, Oficyna Wydawnicza Politechniki Rzeszowskiej, 2008		
Result of average student's workload		
Activity	Time (working hours)	
1. Lecture	30	
2. The consolidation of the lecture	7	
3. Consultation	1	
4. Exam preparation	6	
5. Participation in the exam	1	
Student's workload		
Source of workload	hours	ECTS
Total workload	45	2
Contact hours	32	0
Practical activities	0	0